Association for Educational Communications and Technology

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About this issue...

This issue of JID features three in-depth articles that should be of considerable interest to our readers.

Cooper presents a consultation strategy to facilitate the improvement of teaching in higher education. Through the use of ethnographic observation and a collaborative relationship with instructors and students, the developer can assist faculty in identifying instructional problems, developing solutions, and testing their effectiveness.

Cytrynbaum continues the faculty development theme by applying adult development theory to help identify the personal, organizational, and policy problems five different types of faculty members are confronted with. He then suggests faculty and organizational development interventions that can help ameliorate these problems.

Riegeluth and Darwazeh explain elaboration theory, its conceptual base, the components of a lesson built according to elaboration principles, and the development procedure in designing instruction according to the conceptual organization of elaboration theory. They include a glossary of elaboration theory terms and present an example using the procedure.

In this issue you will also find JID’s regular features—book reviews and a summary of some recent ERIC reports of interest.

— K.H.S.
Getting Inside the Instructional Process
A Collaborative Diagnostic Process for Improving College Teaching

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Abstract. CAP, a Collaborative Analysis and Action Planning Process, is a consultation strategy developed to facilitate the improvement of teaching in higher education. The design is based on research from school ethnographies and instructional systems. CAP permits the complexities of the teaching process to be addressed and uses naturalistic inquiry methods in a consultation setting. Through the development of a collaborative relation with the instructor and students, their conscious and tacit knowledge can be combined with the consultant's expertise to reach accurate data-based statements about the strengths, limitations, and achievable goals of the instructional process.

Improving the quality of college instruction is a necessary but complex task. The task is difficult because the instructional process is dynamic, interactive and individualistic. Gaining access to the internal workings of the process to uncover how the parts of the system are integrated and function is a challenge. It is equally challenging for a consultant to facilitate relevant and enduring change that will improve the quality of instruction. Now there is a process which allows us to gain access to uncover and understand classroom teaching in a relatively uncomplicated way. This analysis and problem solving process relies heavily on collaboration with the instructor and students. The main purpose of this paper is to describe how the Collaborative Analysis and Action Planning Process (CAP)* works.

Overview of CAP Process

The CAP process entails nine interactive steps. Briefly, the steps are:
1. Initial Interview—collect information on the course content and structure; discuss concerns or problems.
2. Class Observation—talk with students, record class activities in behavioral terms, develop questions and hunches about the instructional process.
3. Class Questionnaire—collect information from students on what instructor does to help or hinder learning and motivation.
4. Videotape Class and recruit student volunteers to review videotape.
5. Review Videotape with instructor—ask the instructor to talk about what they do that facilitates or hinders student learning and motivation, record what is said and when (use counter on playback unit), solicit questions to ask students.
6. Review videotape with students—ask parallel questions to step 5 and record comments.
7. Action Planning—review parts of videotape that were identified by the instructor and/or students as significant, summarize student comments, discuss events, collaboratively brainstorm instructional strategies (building on the instructor's strengths when possible), ask the instructor to summarize the outcome and her action plan.
8. Follow-Up Letter—send a letter to the instructor summarizing her strengths and concerns, document with student comments, list steps in action plan.

As you can see, this diagnostic process relies on the multiple methods of gathering and cross-checking information about the instructional system. For example, when, how, and why the instructor elicits student participation can be explored through observations, a questionnaire, and the instructor's and the students' responses during the videotape review sessions. This diagnostic process is also collaborative. That is, the instructor, students, and consultant exchange information in order to better understand how the parts of the instructional system interact and function and what could be done to improve student learning.

Research Perspective

Classroom teaching is indeed complex and interactive. To get inside the instructional process, inquiry methods are needed which allow the consultant and instructor to examine parts while not losing sight of the whole; to explore the event from within while standing outside and looking in; to fix an event in time while remembering that in its context it is ongoing; to attend to various views of the same event; and to remain flexible and open to ideas. The fieldwork techniques of school ethnographies provide means to examine, analyze, and understand the interaction dynamics and the structure of classroom teaching (Wolcott, 1973; Erickson, 1976, 1977; Mehan, 1978; McDermott, Gopspinoff, and Aron, 1977; Moore, 1977; Florio, 1978; and Cooper, 1979, 1981).

Two principles of ethnographic inquiry guide the CAP process:
1. The dynamics of a complex social event can best be understood by

*CAP is a title given to this diagnostic consultation process by Dr. Deborah Orban, Asst. professor at the University of Texas. Dr. Orban further analyzed and described the CAP process for her doctoral dissertation at Michigan State University, 1981.
integrating the conscious and tacit perspectives of the participants and the consultant.

2. The use of multiple methods provides the means to gather and integrate information from the perspectives of the participants and the consultant.

Ethnographic methods also facilitate the consultation process:

1. The instructor and student interactions are recorded as they naturally evolve in the classroom. The consultant can review a videotape of a class with the instructor and students to help them reflect on what is or is not effective. This information suggests what might be done to refine the instructional process.

2. A collaborative relationship is important (Smith-Bowen, 1966; Powdermaker, 1966; Florio and Walsh, in press). A trusting collaborative relationship sets the stage for open reflection on behaviors and the development of an action plan for relevant and lasting change.

Through ethnographic studies, research methods are evolving and we are learning more and how instructional systems function both academically and socially. We are learning how the teacher and students monitor talk and actions to keep track of the academic or task information, and how they determine what is appropriate to do next. We are also learning more about how the instructor and students monitor the social information, that is, the interactive work they do to establish who they are in relationship to one another. We are finding people keep track of voice tone, inflection, and pacing, as well as gestures, body positions, location in the room and facial expressions. We are beginning to better understand how certain salient behavior patterns are produced, interpreted and responded to in situationally appropriate ways.

In fact, there are "different ways of being a teacher" (Cooper, 1981). Teachers are at times subject matter experts, facilitators of learning, models of the learning process, managers of the course and people or fellow human beings. As the task and social dimensions in the class interact and change, so do teacher roles. What, when, and how a message is conveyed proves to be very telling.

While there are some commonalities across classrooms, each classroom is unique and some patterns of behaviors come to have special meanings. By using naturalistic or descriptive methods, we are better able to locate behavioral patterns which participants respond to by their actions and/or by their comments as being functional or dysfunctional.

Collaborative Analysis and Action Planning Process

In order to further explain the steps in this diagnostic-problem solving process, a hypothetical example will be described within step two. Class Observation. Some representative examples of meaningful patterns of behavior will be examined.

1. Initial Interview

The initial interview can be initiated either by the faculty member or the consultant. Suppose in this case an instructor calls us as faculty development consultants. She is not satisfied with her classroom instruction. While she has some hunches about what she is doing that is effective or ineffective, she is not certain. During the initial phone contact we will first explain the CAP process: second, we will obtain information about the course; and third, arrange for class observation and a videotaping session.

2. Class Observations

Next, we would visit a class session in order to record the flow of instructor and student behaviors. We can also interact informally with some

"Faculty development consultants face a difficult task of gaining access to the internal dynamics of instructional systems."

When obtaining information about the content, structure, and process of the course, we will focus on what is planned, how the course actually works, and why the course was designed as it is. We want to begin to gain insights into the instructor's attitudes and beliefs about teaching, learning, teachers and students. By being sensitive to the approach the instructor takes in describing the course and the decisions that were made, we would begin to have some hunches about what she considers to be important.

For example, we could try to determine if the instructor seems to have a conceptual model which guides instructional decisions. What is it like? students. During the visit, insights would be gained, questions would be raised, and hunches would be explored. Our task is to record talk and actions as they occur. Since any behavior in the class may be significant, we would try to record as much information as possible.

It is impossible to record everything that is said or done, but it is possible to record at least the first part of sentences or phrases which indicate the structure of the lesson or when changes are taking place. An excerpt from observational notes is given as an example:

(Puts on a new transparency). This is a real sleeper... .This one will sneak up on you and get you, so
Instructor Interview Schedule
Course Design

Purpose:
Attain information on the content, structure and process of the course; define the students' and instructor's responsibilities and roles in the course.

Procedure:
(1) Attain and review available course documents (syllabus, outline, description, etc.).
(2) Use the interview schedule as a guide to determine what is planned, how the course actually works and why the course is designed as it is.
(3) Guide the interview but also follow the instructor's lead to maximize the flow of information.
(4) Use the Course Design/Summary Chart for easy reference (Figure 1A).

Steps:
1. How the course operates or is organized in general.

Opening question: To get started, why don't you give me an overview of the course and how it is organized in general.

A. Probes for "what"—What else should I know about your course to understand it? For example:
(1) What is the general purpose or goal of the course?
(2) What is the actual content?
(3) What are the methods you use to present the information to the students? (i.e., lecture, discussion, readings, lab)
(4) What materials do you use? (texts, videocassettes, handouts, lecture outlines)?
(5) What are the evaluation methods?
(6) What are your methods for giving students feedback during the course?

B. Probes for "why"—Can you expand somewhat on these ideas to help me understand how you made these decisions? For example:
(1) You stated your purpose or goals were _____________. Why did you select these as your goals? (Response may be: It's essential for the course, for the field.)
(2) Why did you decide upon this content? (Response may be: It was decided for me by the department; I know that the content is important for them in the field.)
(3) Why did you select the methods of ____________? to present the material? (Response may be: Class size, motivation, learning)
(4) Why have you selected the materials you use? (Response may be: The text I use is the best I've found because... the films I use are appropriate because...)
(5) Why did you decide to evaluate in the manner you've chosen? (Response may be: It's a large class—objective tests are the only reasonable method; I use essay because... I ask them to write papers because...)
(6) Why have you decided to use the method of feedback you use? (Response may be: I know that immediate feedback is best...)
(7) Why do you use these methods to motivate? (Response may be: I've found students to be more motivated when I relate the content to their personal lives...)

C. Probes for "how"—What do you actually do?
(1) How do you use the materials? (Response may be: In the lecture, I present... housework is used to...; papers must reflect...)
(2) How do you evaluate? (Response may be: I assign papers... I give exams after each unit... In order to determine prerequisite behaviors, I... I revise my course on the basis of...)
(3) How do you give feedback? (Response may be: After each exam, I...)
(4) How do you motivate the students? (Response may be: I relate the content to their lives by...)

D. Probes for "when?"
(1) When do you teach (fill in content).
(2) When do you use (fill in methods).
(3) When do you use (fill in materials).
(4) When do you use (fill in evaluation procedures).
(5) When do you use (feedback).
(6) When do you use (types of motivation).

II. How a specific aspect of the course operates.
Select a method of instruction (lecture, discussion, lab...) and ask:

What happens in the course of events in a typical ____________ (lecture, discussion, lab...)? What typically happens from moment to moment?

Probe for what happens, when it happens, why it was designed that way, what are the results...

III. What are the effects of the course on the students and instructor?
Probe: What are the effects, what are some examples of the effects...

Written with the assistance of: Dr. Stephen Yelon and Sandra Korsjeny, Learning and Evaluation Service, Michigan State University.

Figure 1. Instructor Interview Schedule: Course Design.

watch out for it... (Asks a question, students respond.) That's good... (Explains the concept in systems terms while standing by screen and looking around room at students.)

Some of you will get confused on this point... (Points to equation on screen) Let's think it through (Moves to pole, looks at screen and students. Seems to move logically through problem step by step. Modulates voice from soft to loud, slow to fast.)

While we would attempt to remain open to everything that is taking place, there are particular aspects of the class and patterns of behaviors which tend to provide significant information. Some patterns of behavior in college classes have been
<table>
<thead>
<tr>
<th>Probe for</th>
<th>What</th>
<th>How (actual process)</th>
<th>Why (design)</th>
<th>When</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals: (purpose)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>What are goals? i.e., when finished this process, what have students learned</td>
<td></td>
<td>Why these goals?</td>
<td></td>
</tr>
<tr>
<td>Course Content:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>What does process look like?</td>
<td></td>
<td>Why decide on these methods?</td>
<td></td>
</tr>
<tr>
<td>Instructional Methods: lecture, labs, discussion Individualized self-instruction projects, homework</td>
<td>What instructional methods are used?</td>
<td>How do it?</td>
<td>When use each method?</td>
<td></td>
</tr>
<tr>
<td>Materials: (text, videotape)</td>
<td>What materials are used?</td>
<td>How do it?</td>
<td>Why decide on these materials?</td>
<td>When use these materials?</td>
</tr>
<tr>
<td>Evaluation: (prerequisite formative summative)</td>
<td>What methods of evaluation?</td>
<td>How do it?</td>
<td>Why decide on these methods?</td>
<td>When use each?</td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>What methods of feedback?</td>
<td>How do it?</td>
<td>Why decide?</td>
<td>When use?</td>
</tr>
<tr>
<td>Motivation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>What methods?</td>
<td>How do it?</td>
<td>Why decide?</td>
<td>When use?</td>
</tr>
</tbody>
</table>

Figure 1A. Instructor Interview Schedule—Course Design Summary Chart.

found to inform participants of (a) what time it is—preclass, warm-up, instruction after class, or a transition between parts; (b) what task they are involved in—course management, instruction, elicitation of a student response, or a transition; (c) who they are in relationship to one another—the instructor-as-a-manager, expert, teacher, model, or person; and student as fullfiller of responsibilities, novices, learners, or persons. (Cooper, 1979, 1981).

Some of these parts, transitions, and behaviors which tend to be revealing will be discussed to provide a guide for analysis of observations and videotapes of the class sessions. The parts discussed are generalized examples from studies of effective instructors at Michigan State University and may or may not apply to other classrooms.

A. Patterns of behaviors which can inform participants of “what time it is”

Preclass. The time between when the students enter the room and the instructor enters the room can be viewed as “preclass”. What takes place at this time can subtly influence what takes place when the instructor enters and when instruction begins. We would observe the physical environment—chair arrangement, temperature, equipment, materials—and observe student behaviors—talk, actions, interactions, seating arrangements.

Warm-up. The time between when the instructor enters the room and instruction begins has been referred to as “warm-up” by a number of effective instructors at Michigan State. They refer to this time as having two functions: to conduct course management activities and to psychologically ready themselves and the students for the instructional process. The instructor and student interactions at this time seem to set the tone for the class session. When the instructor enters the room, we would look for any changes in the physical environment and in student and instructor behaviors. We would note what is said or done as well as how the act is performed.

Transition from “warm-up” to “instruction”. The shift from precursory management activities to instructional activities is generally marked by co-occurring talk and actions. There is often an accompanying shift in the relationships between the instructor and student. Transitions are of interest because they can be difficult to manage while orchestrating people as a unit. We would attempt to note the cues that might indicate that a transition is underway, such as change in instructor position in the room, activities, direction of gaze, semantics (ok, now, first, alright), and paralinguistics (tone, volume, projection).

Instruction. Instruction, the major part of the class session, begins with a transition from “warm-up” and ends with a transition to the end of class. While much of instruction is planned prior to class, the delivery of the information is often situationally determined as the lesson progresses and interactions take place. The content presentation and interactive relations aspects of instruction are both important for us to observe. As consultants, we would attend to many different aspects of the instructional process, since any behavior might be important.

For example, we might observe co-occurring behaviors such as: use of space (where the instructor stands); gestures (hand or arm movements); direction of gaze (what or who is looked at); voice (projection, pace, volume); instructional discourse (teachers can inform, direct, elicit, check, evaluate, provide feedback, comment, prompt, provide cues and give asides) (Sinclair and Coulthard, 1975).

End of class. The shift from instruction to the end of class is often composites of behaviors such as verbal cues (finally today, before we finish) and nonverbal cues (students packing up, instructor closing notes, turning off projector, etc.).

Prior to and following the lesson, we would engage in an informal conversation with students. The purpose of the observation would be explained, and students would be asked how things are going in the class, what is helpful, and what gets in the way of their learning. Most students are very cooperative. They provide examples and even indicate during the lesson when an example of a behavior is taking place.

B. Patterns of behavior which can inform participants of “what task they are involved in”

The instructor’s use of space and his
The students he reflected on the logic of the subject matter, provided realistic examples, asked more questions which required and allowed time for answers, used colloquial phrases, put information into perspective, and went through problem solving steps as an experienced student might. In doing so, he directly looked at students, increased the frequency and intensity of his gestures, and varied the volume and rate of speech. Students were more likely to respond to questions.

During videotape review sessions they were more likely to stop the tape and talk about what the instructor was doing.

It appeared that he was working harder to make a point or involve students in the instructional process in this position. For example:

(Moves from the screen closer to the students) OK... so we got a sine and a cosine that are offset from each other by 90°...right?... And they're of this frequency and I can add those things up and multiply them by the appropriate scalars in the front here... and (moves back to screen) boom... I get that original signal back.

The instructor commented:

I move closer to the students to increase their involvement in the lecture as well as to view the problem from their perspective... Walk through the logic step by step and to help students use their own intuitive logic... to say, "Wait a minute... what does this mean?" Often I'm preaching at them... making them think through a concept...

Students made comments such as:

There are large patterns of movement from the screen to the front of the room... at the front he's emphasizing a point... He gestures, elaborates, makes me believe this is important... "This is great... You can do this and this..." He's trying to get attention back by talking directly to the group without looking at the screen. He refers to past information... how we'll later use it... Attention is fading, he's using hands. He moves to the front when he wants our attention. He's asking questions and answering, or showing applications... When he gets a point across, there's...
always a lag. I sit back and say...what’s next. He gets our attention back right then. He might ask a few questions, then goes back to the analytical process at the screen. When he comes to the front he wants to get an important point across or he’s starting something new...a new process.

When at the chalkboard the instructor generally developed a concept step-by-step, diagrammed, illustrated, elaborated and answered students’ questions. For example:

(Moves from close to students to chalkboard.) I’ll give you an example of a signal that’s not periodic...it’s gonna stop...it’s gonna go along for a little way and then just stop...ah (writes on the board)...Ah...ah...there...Ok? There...that’s zero and zero over there...all right...and let me give you an example of another signal...continues writing) with lots of sharper corners...something like that...ok?...now I want to be able to say that this is a lower frequency signal than this kind of signal is...Ok?

The instructor commented about the use of the chalkboard:

Here I use the board...I purposely left out the answer so they’ll see the process...I build in reminders for myself on the transparency...“how?” or “why” or “I”...I use the board to develop ideas...to march through ideas...to give the steps...I walk through the logic step by step and try to help students use their own intuitive logic...to say

“Wait a minute...what does this mean?”

Students made comments such as these:

At the board he’s explaining beyond the notes when the class is confused...

When at the board he emphasizes a point...cleans up details...answers questions...

When what is on the transparency is too big of a step he breaks it down so students can understand...

The instructor’s behavioral patterns were interpreted by students as having special meaning. Salient patterns of behavior such as these can be further examined to locate those behaviors which convey relevant, consistent, and positive messages and those behaviors which convey inconsistent, confusing, or negative messages. It is the students’ and instructor’s interpretation of the behavior that counts in the final analysis. We can help them locate such patterns of behavior, provide them with this information, and together determine what to do to improve the quality of instruction.

C. Patterns of behavior which can inform participants of “who they are” in relation to one another

The instructor and students interact in different ways during lessons, and they make reference to these different kinds of social relationship during videotape review sessions. Through closer examination of what one instructor said and did, Cooper (1979, 1981) documented some variations in his use of pronouns of address. Brown (1970) talks of pronouns of address as indicators of two dimensions of social relationship: power and solidarity.

Power is a nonreciprocal relationship in which one person has some form of control over another. Solidarity is a more reciprocal and symmetrical relationship.

Four instructor “roles,” or different ways of fulfilling the responsibilities of a teacher, were located and examined by Cooper in terms of the instructor’s use of pronouns of address and accompanying behaviors. These roles were based on the teacher-student relationships which were jointly produced and which varied across different parts of the class. Ciccurel (1972) refers to this socially negotiated

Table 1. The Instructor’s “Roles”

The instructor’s “roles” varied across the different parts of a class session. His “roles” and the instructor-student relationships, as indicated by the pronouns of address, are presented.

<table>
<thead>
<tr>
<th>Role as Instructor</th>
<th>Instructor-Student Relationship as Indicated by Pronouns of Address</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager: responsible for course requirements</td>
<td>I am giving, assigning, returning something to you. I am the instructor—manager, (a position of power).</td>
<td>“I have a homework set for you.” “I’m returning a set of papers to you.” “I promised you a handout of tables you can use whenever you want.”</td>
</tr>
<tr>
<td>Person: fellow human being</td>
<td>I am doing or did something that tells you something about me as a person. I am a person—(a position of solidarity).</td>
<td>(The instructor makes an error and students laugh.) “I owe you guys one...I’ll get you next time...” (When passing out tables). “Well, I haven’t decided, should I sell’em or give’em away?”</td>
</tr>
<tr>
<td>Teacher-expert: facilitator of student learning</td>
<td>I am doing something to or for you to help you learn. I am the possessor of knowledge—(a position of power). We are doing or did something together. We are people—(a position of solidarity).</td>
<td>“I’ll show you intuitively how you get it...” “Let me ask you first...” “I’m going to lead you down the garden path and zap you...”</td>
</tr>
<tr>
<td>Experienced learner: model of the thinking process</td>
<td>I am modeling a way you could be thinking about this problem. I was at one time like you—(a position of solidarity).</td>
<td>“How can I do that?” “What can I expect?” “What do I assume?”</td>
</tr>
</tbody>
</table>
"The instructor's use of space can be a source of information that students monitor to help them determine what is taking place academically and socially."

facilitating the learning of students.

(I, implied, am forewarning you that) . . . this one will sneak up on you, so watch out for it. . . . Some of you will get confused. . . . Let's think it through. . . . .

The use of the plural "Let's" indicates a relationship of solidarity, 'let's work it through together.'

As a person, an instructor is a fellow human being, a position of solidarity. He or she comments on him- or herself rather than doing something to or for students. For example:

I'm from a small farm in Tennessee, we enjoyed farming rich soil the Mississippi brought us from Indiana and Illinois.

As an experienced learner, an instructor models the thinking process, a position of solidarity. The instructor demonstrates how to progress through the problem as if he or she was a learner. For example:

How do I do this? What can I expect? What do I assume? Let's see. . . . I can first write the sum of sines and cosines. . . .

By examining the pronouns of address and accompanying discourse, we can gain some insights into the possible social relationships in the class. The notes are further examined to explore the organization of a lesson, how transitions between different parts of the class are conducted, and to obtain a general idea of the frequency and kinds of examples, practice, instructor questions, student responses, student questions, and instructor comments. Some of this initial information would be shared with the instructor following the class or soon after. (Some instructors begin to feel anxious if the information is withheld too long. It is better to say something general, rather than nothing at all.)

3. Class Questionnaire

We might decide to administer a "officially" over.

It is easiest to recruit student volunteers to review the videotape before class. We would temporarily stop the camera, explain the purpose of the study, stress the importance of the student role, and suggest times students might review the tape. A sign-up sheet and reminder slips can be circulated during class. A phone call as a reminder is essential!

5. Review Videotape With Instructor

Videotape review sessions provide a stimulus which jogs participants' memories and allows them to reflect upon and talk about their informal, but important operating knowledge of dynamics of the instructional process. They can locate patterns of behaviors that have meaning to them. The purpose of the instructor videotape review session is to gather information and gain insights into the instructor's perspective of the instructional process. While viewing the videotape the instructor would talk about what is taking place and what she was attempting to do.

We would attempt to locate the parts of the lesson (pre-class, warm-up, the lesson, the transitions), when things are going well, and when things are not going well. We would stop the videotape and review a segment of class again if necessary. During this initial viewing session the instructor does most of the talking. As the consultants, we keep comments to the minimum. We might ask "What are you doing here?" "What are you attempting to accomplish now?" "Did something take place which caused you to act differently?" We would also examine the pre- and post-class activities, as these are part of the total instructional event.

Throughout this review process we would record what the instructor says and at what point in the lesson it is said by recording the number of the counter of the playback unit. At the conclusion of the videotaped lesson we would ask and record any questions the instructor would like asked of students who will review the videotape. It is essential to not make suggestions or note possible problems. The instructor will likely become defensive. This is a fact finding stage, not a problem definition or solution finding stage.

6. Review Videotape with Students

The purpose of the student videotape
review session is to begin to understand what is meaningful to the students in the instructional process. The volunteer students would review the videotape following the procedures used with the instructor; however, the questions would be asked from the students' perspective. In addition, the parts of the lesson the instructor talked about are brought to the students' attention through questions such as: "What do you think the instructor is doing here?" "Is it working?" "Why or why not?"

After reviewing the videotape, we would ask the student the questions the instructor posed after completing her review session. We would then probe for additional information or for clarification. Students are typically very helpful and contribute constructive ideas on how the instructor might improve the instructional process.

7. Action Planning

Specific segments of the videotape that were referred to during the review sessions are examined with the instructor in a follow-up session. We would report to the instructor the students' perspective of her behaviors by integrating information from various sources. With the behaviors identified, they can be examined and reflected upon. Our role is to facilitate this reflective process and to assist the instructor in clarifying the situation. At this stage we help the instructor define her instructional strengths and limitations. A key here is to build on strengths. What does the instructor do well that she should do more often? What does she not do so well that can be improved. This leads naturally to a reflection on instructional improvement goals.

Based on the identified goals we can begin to brainstorm possibilities of different instructional strategies and techniques. During this collaborative brainstorming session the instructor will begin to focus on some ideas that seem plausible, considering her teaching style, the course, and the students. It is critical that the ideas be "owned" by the instructor to help ensure implementation in the classroom. As the session draws to a close the instructor is asked to state what she has learned, what she feels about the process and what she plans to do with the information and ideas she has developed. An action plan is developed and will be part of the follow-up letter.

8. Follow-up Letter

A letter is sent to the instructor briefly reviewing the CAP process, summarizing her strengths and concerns (which are documented with student comments) and listing the steps in her action plan. Many faculty submit this letter to their chairpersons for their personnel files.

9. Follow-up Contacts

In the final step we would arrange follow-up contacts to help initiate and implement the instructor's action plan. After changes are in progress, information may be gathered to determine if the outcomes are positive and to help determine what to do next.

Results of The CAP Process

Twenty-six faculty members of Michigan State have participated in the CAP process. They represent different disciplines, degrees of teaching experience, course levels, and class size. They all responded to an open-ended questionnaire and follow-up phone interview about the CAP process. As a group they concurred that the CAP process had a significant impact on their teaching and interactions with students. Analysis of the comments revealed significant changes in their attitudes about themselves as teachers and their students. They also spoke of the specific strategies they had developed to improve their teaching practices and relationships with students. A measure of the instructors' satisfaction with the experience is their continual recommendation of the CAP process to other faculty members.

Summary

Faculty development consultants face a difficult task of gaining access to the internal dynamics of instructional systems. A collaborative diagnostic process has been discussed which allows us to gain insights into how a system is structured and how it functions. This
analysis process focuses on patterns of behaviors that are produced, interpreted, and responded to by participants during a lesson. Because the instructor and students jointly produce the instructional lesson, both perspectives are needed to understand the lesson.

While participants continuously make interpretations and respond in situationally appropriate ways during a lesson, much of their commonsense logic is not at their level of conscious awareness. The use of multiple corroborative methods provide means of bringing the logic of the moment to the forefront of their minds so behaviors can be reflected upon. Once patterns of behaviors are identified, they can be examined. The strengths and limitations of the system can be appropriately dealt with by the instructor, students, and consultant.

By using a collaborative, systematic and multimehtod consultation process such as CAP, consultants are in the position:
1. to study the dynamics of an instructional process as they naturally occur and to avoid constructing or reconstructing events as they think they occur;
2. to see the system as a whole and to avoid isolating parts;
3. to examine events as the joint responsibility of the instructor and students and to avoid placing the sole responsibility on either;
4. to analyze what is working or not working based on how participants interpret and produce behaviors and to avoid prematurely defining problems based on superficial information or on information primarily from the outsider's perspective;
5. to learn from the instructor and the students and to gain new ideas of what instructional methods work, what doesn't work and why, and to avoid believing the flow of constructive information is one way—from the consultant to client.
6. to use information gathered on instructional methods with other clients;
7. to develop training programs using excerpts of videotapes and the accompanying instructor and student comments as examples of instruction.

A special thanks to my colleagues at Michigan State who worked with me in developing the CAP process: Deborah Orban, Jan Townsend, Rebecca Henry, Stephen Yelon, and Sandra Kozmeny.

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Faculty Development Through The Life Course

Application of Recent Adult Development Theory and Research

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Abstract. Recent work in adult development serves as a conceptual base for examining personal and professional developmental potentials, tasks, and conflicts for five faculty groups. The five groups are Age 50 Transition faculty, Dual Career Couple faculty, Midlife faculty, Late Entry faculty, and Senior Retiring faculty. These groups were selected because they represent different intersection points of chronological and occupational age and because they illustrate increasingly difficult personal and organizational dilemmas facing faculty and administrators. For each faculty group these dilemmas will be identified and appropriate personal, organizational or policy interventions proposed.

Introduction

This paper uses current adult development/social systems theory and research as a basis for conceptualizing and examining personal and professional developmental issues for five selected faculty groups. The five groups are designated Age Thirty Transition faculty, Dual Career Couple faculty, Midlife faculty, Late Entry faculty, and Senior Retiring faculty. Issues related to personal and professional developmental potentials, tasks, and conflicts are explored for each group. These are related to the organizational structure and dynamics of academia as they impinge on the functioning of individual faculty. For each group, various developmental tasks, potentialities, and processes or critical transitional periods along the life course are presented and discussed in terms of their impact on faculty growth, commitment, productivity, morale, and compatibility with the expectations of the university setting and their respective professional roles. Implications for personal as well as organizational support networks and change paradigms are presented and discussed where appropriate to these life phase developmental tasks.

Our conceptualization of faculty development builds upon a psychological and systems viewpoint presented elsewhere (Cytrynbaum et al., 1980). Major developmental tasks, potentialities, and difficulties emerge at different points along the life course, according to gender. Because these involve different precipitators and developmental tasks, faculty groups have been identified according to gender and general age criteria. Recent theory and research findings will be used as a way of examining commonalities and differences within the five faculty groups. This knowledge base will be supplemented by the results of indepth formal and informal interviews as well as clinical work with faculty at various points in the life course.

The first part of this paper briefly conceptualizes gender related personality and interpersonal changes that occur during major life course transition periods. Although these changes manifest many idiosyncratic differences, commonalities among the faculty groups can be identified.

The contribution of selected social systems and organizational parameters to the experience of life course transitions offers a unique perspective on life-span theory. This developmental-social systems point of view will set the stage for the second part of the paper. Here we will consider individual and organizational examples and explore their potential to enhance or disrupt the quality of university life. Finally, we will explore selected intervention strategies which can be adapted by both individuals and the organization, resulting in a more adaptive response to developmental transitions.

A Personality and Social Systems Perspective on Life Course Development

Let us begin by clarifying the use of certain terms. The life course has been described in terms of several important and inevitable phases and transitional periods, or epochs (Gould, 1981; Levinson et al., 1978; Litz, 1975; Lowenthal, Thurnheer, & Chiriboga, 1975; Pollock, 1981; Rapaport & Rapaport, 1980; Vaillant, 1977). The term "transition" implies a process of change moving an individual from one relatively stable stage or period of personality development to another. Although transitions often tend to be experienced as stressful, disruptive, or psychologically painful, they offer opportunity for growth and development. Adults who manage these transitions well are thus prepared for later life tasks. Those who do not may be vulnerable to distress and despair in old age.

Chart I summarizes the views of several recent life-span theorists on the timing of major life transitions. Although there is some disagreement on the exact chronological age for various transitions, most believe that they are...
Chart 1

Age-Specific Stages of Adult Development

<table>
<thead>
<tr>
<th>Ages</th>
<th>Adolescence</th>
<th>Young Adulthood</th>
<th>Middle Age</th>
<th>Late Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-18</td>
<td>Leaving one's parent's world</td>
<td>Becoming nobody's baby now</td>
<td>Opening up what's inside</td>
<td>Midlife Regain</td>
</tr>
<tr>
<td>19-24</td>
<td>Early Adult Transition</td>
<td>Entering the adult world</td>
<td>Age 30 Transition</td>
<td>Midlife Transition</td>
</tr>
<tr>
<td>25-34</td>
<td>Young Adulthood</td>
<td>Middle Years</td>
<td>Midlife Crisis</td>
<td>Late Adulthood</td>
</tr>
<tr>
<td>35-44</td>
<td>Patriarchy</td>
<td>Confonnation</td>
<td>Individuation (second half of life)</td>
<td></td>
</tr>
<tr>
<td>45-54</td>
<td>Neumann &amp; Neuman</td>
<td>Early Adulthood</td>
<td>Middle Adulthood</td>
<td>Late Adulthood</td>
</tr>
<tr>
<td>55-64</td>
<td>Rapoport &amp; Rapoport</td>
<td>Early Adulthood</td>
<td>Middle Adulthood</td>
<td>Late Adulthood</td>
</tr>
<tr>
<td>65-74</td>
<td>Shenk</td>
<td>Early Adulthood</td>
<td>Middle Adulthood</td>
<td>Late Adulthood</td>
</tr>
<tr>
<td>75-84</td>
<td>Vaillant</td>
<td>Early Adulthood</td>
<td>Middle Adulthood</td>
<td>Late Adulthood</td>
</tr>
<tr>
<td>85-94</td>
<td>Gordon</td>
<td>Early Adulthood</td>
<td>Middle Adulthood</td>
<td>Late Adulthood</td>
</tr>
<tr>
<td>95-104</td>
<td>Early Maturity</td>
<td>Full Maturity</td>
<td>Retirement at age of onset of severe illness</td>
<td></td>
</tr>
</tbody>
</table>

"normal" in the sense that they occur inevitably over the course of the life due to the effect of "normally occurring individual and systems precipitators." Most theorists recognize that these normal transitions may result in developmental crises if there are insufficient adaptive resources. A developmental crisis is defined here as a perceived state of physical and psychological distress caused when internal resources and external social support systems are overwhelmed by the demands of developmental tasks.

The precipitators of developmental transitions and transitional crises are multiple and complex, composed of internal individual changes (i.e., biological, emotional, and psychological) as well as external systems changes that impinge on the individual (i.e., occupational setting, family, community, sentient groups).

The need to jointly consider personality and social systems parameters serves to organize much of this presentation. Chart II below illustrates the application of this viewpoint to a previous analysis of midlife development. We suggest that similar analyses of the major transitions incorporate the following components: 1) precipitators or triggers; 2) tasks in each stage; 3) changes in personality; 4) phases of development; and 5) outcomes.

Certain system properties are particularly relevant to the analysis of major life transitions. Thus we assume that any major change in one member of a system has dramatic implications for the couple, family, organizational, or work system in which that individual is embedded. Thus, in addition to understanding the individual's experience of major life transitions, our analysis focuses on relations to partners or spouses, to children, and to job or organizational settings. Relevant systems can exacerbate individual stress, chaos, and conflict, or serve as important support structures. We further assume that because most systems attempt to maintain some form of dynamic stability or equilibrium, major changes, either intrapsychic or behavioral, on the part of individuals will often meet with resistance. Predictable and anticipated developmental transitions, as well as transitional crises, have specific implications and potentially disruptive reverberations for the academic community—repercussions which cannot be ignored. Using this perspective we will now explore each of the five faculty groups, placing special emphasis on the disruptive potential of their unique developmental transitions and struggles. We also suggest organizational interventions which may enhance individual and university adaptation.

Faculty Development From a Life Course Perspective

Few research efforts employ a life span viewpoint in understanding faculty development. There are many studies of career mobility, career development, and career patterns, usually from a predominantly sociological perspective, but these often lack integration of other facets of the individual's development (e.g., Kanter, 1977; Kanter & Stein, 1979; Hall, 1976; Smelser & Erikson, 1980). Some studies have attempted to examine career development within the context of a more general life-span perspective, but these often ignore internal psychological dynamics which may crucially affect the career development (Ashley & Ashley, 1973; Ashby, 1972; Cain, 1974; Clausen, 1979; Faulkner, 1974; Hall, 1976; Jelinek, 1979; Neugarten & Dotan, 1973; Neugarten & Moore, 1968; Riley, Johnson, & Foner, 1972; Sarason, 1977). The following discussion strives to integrate research on life-span psychology with observations about faculty career development in specific stages.

The Age 30 Transition and Female Faculty Development

The Age 30 Transition is a particu-
CHART II
A SCHEMATIC OVERVIEW OF MIDLIFE OUTCOME
Outcome potential is seen as a complex and multi-determined process composed of the following interrelated factors.

PRECEPITATORS
These include both usual and unusual events that arise from internal and external sources. Events are categorized according to the area of origin and impact, i.e., biological, psychological, interpersonal and sociological or groups. Events include individual changes, physical, affective, or family losses and declination or social context changes (changes in rules at home, change in environment, change in neighborhood or economy).

MEDILIFE DEVELOPMENTAL TASKS
Personalization of death and acceptance of mortality.
Acceptance of biological limitation, decreasing strength and stamina, and increased health risks.
Integration of emergent components of personality, reassessment and restructuring of identity, cognitive and sexual identity.
Reorientation to work and career, creativities and leisure activities. Reassessment of need for power and achievement.
Reassessment of primary relationships, including spouse, parents, children, friends, lovers, and other special individuals.

INDIVIDUAL PREDISPOSITION
This includes personality characteristics (i.e., ego strength, coping mechanisms, level of narcissism, reality testing, ability to tolerate ambivalence, defenses) which predispose individuals to respond differently to precipitators. Individual defenses can serve an exclusive protective function for some and effectively block or deny affect related to precipitators.

SOCIAL SYSTEMS PREDISPOSITION
This includes the extent to which primary groups and systems (i.e., family, couples, clubs, work and career groups, school, social, political and religious) can adapt and support individual member's engagement with precipitous tasks as assessed by the system's flexibility communication, boundary management, leadership, role differentiation, culture and myths. Group response will occur as individual member's attitudes and/or behavior changes.

INTERACT WITH EACH OTHER AND GIVE RISE TO
DYNAMIC DEVELOPMENTAL PROCESS OF CHANGE AND GROWTH
Engagement in developmental change process requires specific abilities (i.e., ability to reality test, tolerate ambivalence, explore new options and components of self, and introspective behavior).

DEVELOPMENTAL CHARGE PROCESS RESULTS IN DIFFERENT LEVELS OF GROWTH, ADAPTATION AND INTERNAL AND EXTERNAL BEHAVIORAL CHANGE. FOUR OUTCOMES HAVE BEEN IDENTIFIED.

1) DEPRESSION: Casualties of one's own developmental potential expressed in psycho-pathological symptom formation (depression, anxiety, eating and sleeping disorders, alcoholism, psychosomatic disorders, psychos and others).
2) ARREST: Developmental outcome expressed predominantly by depression, boredom, apathy, withdrawal and a severely narrow life style.
3) MISHAP: Characteristic involves distortion and sublimation of previously c Kathartic objects and relates primarily toDHs. Individual prematurely shifts investment to new life structure with only partial mourning and integration of losses.
4) NORMAL: Normal developmental outcome at midlife; results in acceptance of loss and ambivalent feelings, integration of newly emerged personality components, adequate mourning for losses and reinvestment of narcissism in self and other objects and relationships. Well prepared to deal with developmental tasks of the second half of life.

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larly interesting period of adult development which presents female faculty with unique dilemmas. It is the blend of developmental tasks with organizational dynamics that often leaves many women confused and frustrated during this time. Our psychological view of professional women considers their struggles and conflicts in the context of those factors contributed by the institutional setting.

Much has also been written concerning the normal psychological development of the young adult woman’s sense of self, personal and sexual identity, and its relationship to childbearing and work (Bardwick, 1970; Chodorow, 1978; Erikson, 1968; Mead, 1949; Stewart, 1977). Bardwick (1971) suggests that the twenties are a time when women achieve a “feminine identity” through their major commitment to marriage and childbearing, while the achievement of a more individualistic sense of identity may wait until the thirties or beyond. Stewart (1977), expanding on Levinson’s (1978) idea of “The Dream” in the lives of men, proposed that there were two distinct Dreams for women, a “relational” Dream, which is primarily formed and acted out via intimate interpersonal relationships, usually with husbands and children, and the “individualistic” Dream, usually formed around a career and acted out within a traditionally male context (i.e., the corporation, business, academia, etc.). Many women have reported a struggle between these two types of developmental life patterns which may reach crisis proportion at around age 30 (Hennig & Jardim, 1976; Stewart, 1977; Wilk, 1979). It is at this time in their lives that they engage in serious introspection, self-scrutiny, and attempt to resolve questions concerning the place in their lives of the relational and individualistic components of their Dreams.

Emerging from “putting down roots” in the twenties, these new professionals enter the academic rank of junior faculty. Surviving initiation rituals and the “high” of having accomplished a major career goal, the desire to see the Dream in all of its glory becomes concrete and intensifies significantly. That desire is a powerful precipitator for a major life appraisal. For married women or those in an intimate relationship, there is what ostensibly appears as a withdrawal of energy from the relationship while attempting to survey the fruits of young adulthood during the twenties. The self-preoccupation and introspection is often mistaken for withdrawal of feeling.

This shift in investment sets the stage for the growing tension between the occupational dream and the relational dream. It is in some cases played out through a series of complex decisions involving career, lifestyle, relation to family of origin, husband, and children. The choices are tied to the reappraisal and critical review of one’s life direction which is also an hallmark of this transitional period for women. Career and relationships alike are scrutinized, pulling into focus the difficulties at home as well as on the job. For contemporary women there is a form of dual socialization that presents a new model for emulsion, pointedly represented by the attache case with Better Homes and Gardens inside.

The prospects for successfully integrating both aspects in a single identity at times seems dismal. The result can be a sense of disillusionment and loss. One woman aptly described it as “I never knew it would be like this.” The expectation of having-it-all can lead to pain-
ful disappointments. Another set of themes that emerge at this time also contribute to further dissonance between what was accepted as one's life course with what glimmers in the distance. At around age 30, women begin in earnest the task of psychological separation from their family of origin. Even in cases where women had been married for several years, they had often simply transferred dependency from parents to spouse. If the relationship to the spouse is characterized as very close or fused, attempts to individuate or become one's own person can seriously shake the foundation of the relationship. Differentiating oneself from the fused “us” to an autonomous “me” is often experienced as a very disruptive shift. While on one hand examining the nature of the relationship is a step in the new life course path, the transition can be further complicated by the pressure of a seductive spokesperson with a hidden agenda for having members join her camp. The power of these external and internal socializing “voices” is enhanced by the hypersensitivity of the Age 30 Transition issues.

These developmental tasks and the contribution of organizational dynamics add further to the distress of this particular life passage for women. As junior faculty they are subjected to the myths and fantasies that often surround competent and ambitious women in the workplace. Many become preoccupied with how they are perceived by colleagues. The following are examples of experiences reported in interviews:

- Women are seen as uni-dimensional—either fragile and vulnerable or cold and bitchy; sexualized or neuter.
- Women are virtually invisible within the institution. They report a lack of deference to their position or title, exclusion from important decision-making processes, and lack of recognition for professional accomplishments.

Conflict may result when such women enter a competitive, aggressive work environment, seeking growth and fulfillment, but must deal with dependent character traits developed in childhood and reinforced by cultural stereotypes of femininity.”

2. Lack of role models within the organization.
3. Few sanctions to develop a support network within the organization.
4. Limited opportunities for advancement.
5. Personalization of interaction not usually characteristic of male-to-male interaction.
6. Personal collusion with the superwoman myth in response to effort to be viewed as such by other professional women and students.
7. Institutional rewards based on the male model.
8. Impact of quota systems in hiring practices.
9. Role performance inhibited by lack of resource power in the institution.
10. Regular encounters with stereotypical perceptions of women.

The university can demonstrate its cognizance of this developmental struggle and its commitment to assist in a number of ways. Factors 2, 3, 5, 6, and 10 above seem appropriate for faculty development interventions, while the others call for larger scale organizational change efforts.

To assist in resolving these problems, a faculty development program could assist women in:

- finding successful role models within the institution;
- developing a support network within the organization;
- adding the “characteristic male-to-male” interaction patterns to their existing repertoires;
- recognizing and avoiding the “superwoman” myth;
- developing appropriate responses to encounters with the stereotypic responses of women, and assist men in overcoming these stereotypic responses.

Perhaps the most significant organizational intervention that could be made would be a re-evaluation of its overt and covert policies concerning favoritism and nepotism. Changes in longstanding policies concerning the rules of promotion, tenure, and the distribution of lesser organizational rewards are not achieved easily, especially when they are designed to benefit the more powerful male majority, the same majority that usually controls their distribution. This is a necessary step if the university is serious about retaining and utilizing these and other capable junior faculty. The current state of higher education demands that academic administrators be responsive and
meritocratically fair in their dealings with all faculty. The disproportionate representation of female faculty, of all ages, reflects that this has not been the case in the past.

Dual Career Couple Faculty Development

Within the last decade much has been written about the dual career couple and the dual career family. Recent analyses have taken a psychological approach in examining the dual career family as a deviant form of development, and the unique problems, dilemmas, and stress these places on individuals and the family as a whole (Bailyn, 1973, 1978; Babington, 1973; Burke & Weir, 1976; Holmstrom, 1972; Huser & Grant, 1978; Johnson & Johnson, 1977; Papanek, 1975; Rapaport & Rapaport, 1971, 1976; Rice, 1979; Roland & Harris, 1979; Wilk, 1979). Organizational studies (Hall & Hall, 1979; Holmstrom, 1972) have analyzed the dilemmas these couples face trying to match their individual career needs and obligations to their needs as a coupling unit. As with the Age-30 transitional faculty, many of the psychological studies on dual career individuals have focused on the specific problems encountered by women concerning their sense of self-identity and sexual identity. A major threat to identity comes from a perceived fear of having to choose between childbearing and career, thereby leaving a major part of their personality unfulfilled (Bardwick, 1971; Barnett & Baruch, 1976; Hensig & Jardim, 1976; Karpe, 1978).

While this may represent the most salient issue for the young dual career women where children are absent from the relationship, a slightly different set of problems exist for the couple when children are present. Here again the female partner appears to be the more affected of the two when she is faced with role conflict and role ambiguity. Recent studies suggest that for dual career marriages with children, there is an unequal division of child-rearing tasks and, where conflicts with children exist, it is usually the woman’s career which suffers the most. The day-to-day management of the dual career family system falls heavily on the woman’s shoulders, a situation which can and does cause difficulties within the work setting, as well as being a potential source of conflict between the couple.

Faculty/Organizational Development Implications

Organizational acknowledgement of the dilemmas and issues encountered by the dual career couple can provide important psychological support. Liberal sabbatical policies or the option to split a single position, especially when accompanied by counseling from individuals in positions of authority within the university, can help make conflict management easier. Although we acknowledge the difficult fiscal situation many universities currently face, it would also be appropriate to explore the possibility of university-sponsored day-care facilities, or perhaps shared financial support for day-care services through affiliated agencies.

University-run or sponsored day-care facilities represent one of the best support functions the university can invest in to assist both members of the dual-career family in actively pursuing their individual career goals as well as those of the university itself. Continuation of liberal and flexible “hours” will also be facilitative to this couple when children reach school age. Decisions to have a family have both positive and negative implications for couples’ career development. These normally occurring dilemmas are real for dual career couples, and universities are in a position to be facilitative and supportive.

Overt support can be given through sabbaticals, flexible teaching schedules, day-care arrangements, counseling, and the possibility of the husband and wife splitting the same position. Likewise the university must be prepared to deal openly and honestly with other unique problems a couple may face throughout the life course. This includes situations when one member of the couple is more valued by the university than the other, or if the productivity and promotion occur at unequal rates, or if one individual receives an offer for transfer. These are some of the real and difficult problems that can arise when dual career couples are at the same university. Academic settings could meet these contingencies more fairly and honestly and should re-evaluate overt and covert policies concerning nepotism, if they wish to retain a dual career couple as productive members of the faculty.

Midlife Faculty Development

Midlife is seen as one of several important and inevitable transitions during the life course. Adults who manage the midlife transition well are thus prepared for later life tasks. Those who do not may be vulnerable to distress and despair in old age (Atchley, 1972; Cynembaum et al., 1980; Gute, 1979; Mayer, 1978; Pollock, 1981; Riehl, 1975).

For the purpose of this paper, the midlife faculty groups consist of men and women in their late 30's to mid or late 50's who are consciously or unconsciously confronting midlife tasks. These are individuals who have usually spent their entire working careers in academic settings. Midlife often coincides with the organizational age of associate and full professor. Due to the occurrence of many anticipated and unanticipated precipitators at this time, these individuals may now be in the process of consciously reassessing selected components of their entire personal and professional lives—past, present, and future. Part of this struggle may include conscious deliberation about a minor or dramatic career shift, whether to a new profession entirely or more focused pursuits within a similar academic unit.

Overt manifestations of this struggle may be present in the form of personal symptomatology and professional malaise. Personally, these individuals may be experiencing generalized depression, loss of motivation and enthusiasm, sadness at the loss of personal and career dream goals (Levinson et al., 1978; Vaillant, 1977), and anxiety over awareness of decreasing time left to live and the professional time left to accomplish all of which they had hoped. Some suffer quietly, others enter states of temporary developmental crises, as in-
ternal adaptive resources and external support systems are overwhelmed, while still others manifest this pain via alcoholism, psychosomatic illness, and clinical manifestations of depression (Cytynbaum et al., 1980; Guinnan, 1979b).

Midlife can characteristically be a time of review and disruption in one's personal, family, and work systems triggered by several manifest changes, events or precipitators in the personal, familial, biological, and occupational spheres. Typical internal and external precipitators are: parents become old and die; children leave the nest; friends become ill, die, or move; family and career objectives are accomplished; and opportunities for job advancement become more limited along with physical stamina and vitality (Cytynbaum et al., 1980). Central to this process is the core psychological task of consciously confronting and acknowledging one's own mortality, giving up one's sense of personal invulnerability, and dealing with "time left to live."

Other midlife tasks are intimately related to the core struggle with death anxiety. Simultaneously one must deal with the emergence of unconscious anxieties and feelings of depression around loss of objects such as one's children, aging parents, and one's youth. One also becomes engaged in the struggle to integrate conflicting forces in the self (e.g., one's creative or loving and destructive or aggressive impulses as well as one's male and female components). In addition, one encounters the recognition that long held hopes, ambitions, and components of the "Dream" must be given up, in the context of the experience of declining health, strength, appearance, and opportunities (Cytynbaum et al., 1980; Jaques, 1965; Levinson et al., 1978). Chart III, below, contains a convenient summary of the intrapsychic and social systems precipitators and developmental tasks of midlife.

The work of midlife—mournvng various losses, confronting one's personal vulnerability and mortality, reassessing the past, and rehearsing in fantasy and action possibilities for the future—is consuming in energy, emotion, and time, for the midlife as well as for members of his/her immediate family, work, and support systems. Professionally, midlife faculty may demonstrate an "intellectually fallow" period or even professional or personal withdrawal. Their writing and research may stop, their teaching may be characterized by a lack of enthusiasm or infusion of new ideas, their administrative, counseling, and mentoring functions may be left incomplete or inadequately done. All in all, this can be an extremely stressful period in their lives, in which energy is low and used almost exclusively for defensive, ego review, or introspective work. They may manifest little excitement for the quality academic scholarly work of past periods of their lives.

Faculty/Organizational Development Implications

As with the other faculty groups, the major responsibility to resolve and adapt to these developmental challenges rests with the individual. However, since successful resolution and adaptation has such significant and widespread ramifications for the university edge. Previous studies have identified the serious disruptive potential of the midlife experience for certain individuals; therefore formal counseling may represent an appropriate intervention for individuals seriously affected by midlife issues or in crisis.

2. The availability of flexible sabbatical leaves is another important option that can prove invaluable to the midlife faculty at this time. Such leaves will enable him or her to temporarily "step away" from the university setting during crises or periods of stressful transitions and reassessment, without fearing loss of the security they have worked so long to achieve. The threat to the "financial security" of the university is often used as the major rationale for resisting this option. Since the leave might not be used for academic work or a major project that will directly and immediately benefit the university,

"All in all, this can be an extremely stressful period in their lives, in which energy is low and used almost exclusively for defensive, ego review, or introspective work."
1. Task: Acceptance of one’s own mortality, vulnerability, and the shortening of time left to live.
Precipitators: Potential threats of death to self or immediate family member or close personal friend; serious illness to self or immediate family member or close personal friend; death of a more distant family member of friend; death of individuals associated with belonging to one’s same age cohort. Unusual precipitator would be the death of an immediate family member or close friend.
Themes: Death becomes personalized in terms of death anxiety as parents and friends become seriously ill or die. The focus changes from time since birth to “time left to live.”
Dilemmas for men and women are themes of struggle with the meaning of death, mortality, and life. This sets the stage for a major reassessment of self, life structure, primary relationships, etc., in the present, and gives vision and hope for the second half of life.

2. Task: Acceptance of biological limitations and increased health risk, both physical and psychological.
Precipitators: Decreased physical strength, stamina, and recovery rate from physical exertion; decreased potential for childbearing; physical signs of aging (i.e., weight gain, wrinkles, graying hair, etc.); decreased sexual vitality; increased vulnerability to stress and physical illness. Unusual precipitator would include a major illness such as heart attack, cancer, and stroke, or a severe physical handicap.
Themes: The major struggle is to: (a) recognize bodily changes, decrease physical abilities, decreased sexual vitality, and greater vulnerability to stress and physical illness. The meaning of these changes must be translated to everyday living.

Dilemmas for men include accepting physical change in the form of femininity, fatigue, decreased physical strength, and sexual fluctuations in sexual drive. Particular attention is paid to physical illnesses such as heart disease, stroke, and hypertension.
Dilemmas for women include acknowledgment of changes in physical attractiveness, acceptance of pre-menopausal and climacteric imbalances and changeable sexual interest and fantasies at a time when spouse’s interest is fluctuating. Women also deal with sexual fantasies outside of the primary relationship.

Dilemmas for women include recognizing, experiencing, and integrating emergent components of the personality that include the more independent, aggressive, and competitive characteristics. They must reassess current housewife, work/career goals in light of empty-nesting and cope with increasing independence and autonomy. They must explore and deal with anxiety, guilt, and fear aroused by the more aggressive, ego-centric, and autonomous wishes and motives, particularly in relation to home, work, career, and primary relationships. They must also deal with the experience of threat to the spouse caused by increased need for intimacy and nurturance. This may be particularly strong in dual career families.

Precipitators: Awareness of previously repressed components of the personality. For men this includes the desire to be more sensitive, nurturant, artistic, passive, and active on parts of their personality that traditionally thought to be “feminine.” For women the struggle between family or career reaches its peak at around 30, perhaps again in the 40s. Traditional “male” characteristics are awakened, i.e., competence, aggressiveness, competition, independence, etc.
Themes: The major themes of this task are the integration of contra-sexual opposite components of the personality, the re-emergence of struggle for individuality from early parental and current relationships and systems, and a reassessment of the “fit” between current and projected needs for the second half of life. This may lead to a change in role and the personal identity.
Dilemmas for men include recognizing, experiencing, and integrating emergent components of the personality that include the more passive, dependent, sensitive, and intimacy-oriented characteristics. They must also deal with the residual mother-son ties and related fantasies and/or acting out in relation to older maternal and/or younger seductive women as a threat of an integrative struggle. They must cope with their spouse’s moves toward greater personal and career autonomy and individuation. They must re-evaluate work/career components of the Dream, including personal achievement, striving and projection and the recognition of what will be achieved and the context of possible “ladder climb.” And, finally, they must explore alternative types of work and/or career possibilities, particularly if current options are limited.
Dilemmas for women include recognizing, experiencing, and integrating emergent components of the personality that include the more independent, aggressive, and competitive characteristics. They must reassess current housewife, work/career goals in light of empty-nesting and cope with increasing independence and autonomy. They must explore and deal with anxiety, guilt, and fear aroused by the more aggressive, ego-centric, and autonomous wishes and motives, particularly in relation to home, work, career, and primary relationships. They must also deal with the experience of threat to the spouse caused by increased need for intimacy and nurturance. This may be particularly strong in dual career families.

4. Task: Reassessment and restructuring of primary relationships.
Precipitators: Aging and ill parents, the reality of their roles and the personal identity.
Themes: The major struggle is to: (a) recognize bodily changes, decrease physical abilities, decreased sexual vitality, and greater vulnerability to stress and physical illness. The meaning of these changes must be translated to everyday living.

Dilemmas for men include recognizing, experiencing, and integrating emergent components of the personality that include the more passive, dependent, sensitive, and intimacy-oriented characteristics. They must also deal with the residual mother-son ties and related fantasies and/or acting out in relation to older maternal and/or younger seductive women as a threat of an integrative struggle. They must cope with their spouse’s moves toward greater personal and career autonomy and individuation. They must re-evaluate work/career components of the Dream, including personal achievement, striving and projection and the recognition of what will be achieved and the context of possible “ladder climb.” And, finally, they must explore alternative types of work and/or career possibilities, particularly if current options are limited.

Dilemmas for women include recognizing, experiencing, and integrating emergent components of the personality that include the more independent, aggressive, and competitive characteristics. They must reassess current housewife, work/career goals in light of empty-nesting and cope with increasing independence and autonomy. They must explore and deal with anxiety, guilt, and fear aroused by the more aggressive, ego-centric, and autonomous wishes and motives, particularly in relation to home, work, career, and primary relationships. They must also deal with the experience of threat to the spouse caused by increased need for intimacy and nurturance. This may be particularly strong in dual career families.

Late Entry Faculty Development

Over the last decade the phenomenon of older women returning to the labor force after empty nest has been repeatedly described (Neugarten & Brown-Ruzanka, 1978; Sheppard, 1976). However, little has been written about the specific problems women face upon late entry to academia, especially in light of the development tasks they encounter. For our purposes, this late entry faculty group is composed predominantly of middle aged women (40 years and older) who have recently
to the university.

3. Midlife faculty who are exploring a career shift or a retouching of talents and energies will also benefit greatly from a leave of absence, or reduction of responsibilities for a period of time. This will allow them the opportunity to explore new possibilities and to obtain the training and education they need if they decide to make a shift within their own field or into new areas and/or new fields. The university need not lose these senior individuals because they have made major career shifts. By supporting such efforts, the university could gain a faculty member who has greatly broadened his/her knowledge and area of expertise. Such faculty may be appropriate for assignment to another department, they could serve as interdisciplinary bridging persons, or the university can capitalize on their new talents and renewed energy by creating a new position which will allow them the latitude to engage in new areas of research and teaching. This kind of lateral move will also free up the former position, allowing the university to hire new and energetic staff to carry on in the vacant position.

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received a PhD and entered the university community as a junior faculty. While such women currently make up only a small percentage of the total faculty, educational and societal trends suggest a significant increase in this group in the future. The intersection of chronological age with organizational or professional age present this faculty group with unique developmental problems.

Late entry faculty tend to be highly motivated and serious about an academic career. Despite their late start, although they are usually chronologically middle-aged or older, they view themselves less as “forty and on the way down” like many of the midlifers, but rather more like “forty and on the way up.” In this sense they resemble the Age 50 transitional faculty. Many have worked extremely hard, competently, and productively, not only to earn a PhD but to successfully compete for a position in the academic community. Regardless of their level of achievement, the discrepancy between chronological age and professional or organizational age can present entry faculty with unique transitional challenges, stress, and anxiety. Despite the fact that late entry faculty may be very bright, highly motivated, and committed to their new careers, the sense of being “off-time” and “out of phase” with their colleagues can be responsible for feeling isolated, unsure of how to behave, and open to feelings of self-doubt about their ability to compete successfully.

The experience of being socially “off-time” within a variety of occupations and careers, as well as in regards to predictable developmental milestones along the life course (i.e., marriage, childbirth, retirement, etc.); has been repeatedly documented (e.g., Bardwick, 1979; Butler, 1969; Cain, 1974; Livson, 1978; Maas & Kypers, 1974; Neugarten et al., 1966; Neugarten & Moore, 1968; Osheroff, 1980; Riley, 1978; Sarason, 1977; Troll, 1975). These findings bear directly on the experience of the older woman entering academia 10 to 20 years off expected social time.

In terms of expected “social time” of academia, a forty year old faculty member should be closer to being a full tenured professor (or is at least viewed as a senior faculty member) rather than as a novitiate. Thus, other members of the academic community (students, staff, faculty, and administration) may relate to her as if she were senior faculty with expectations of advice, mentoring, or assistance equivalent to that level of functioning. Such role stereotyping can cause conflict for the late entry individual who realistically sees herself as relatively inexperienced and “young” professionally. Being young professionally, late entry faculty need the freedom to make the same mistakes, fail prey to the same poor judgments, and have to “learn it the hard way” like other junior faculty much younger in age. Because they are in fact older and more experienced, late entry faculty may not feel the same freedom or experience the same “grace period” to learn the organizational ropes usually permitted junior faculty. Similarly, other colleagues may expect more from them faster than from other junior faculty. Under these social system pressures, some late entry faculty could experience performance stress and risk a premature “burnout” and a sense of futility earlier in their careers.

Late entry faculty may not feel the same freedom or experience the same ‘grace period’ to learn the organizational ropes usually permitted junior faculty.”

Late entry female faculty, particularly those who are middle aged with children leaving or already left, may encounter unexpected conflicts and stress having to do with competitive and aggressive impulses and themes emerging in themselves and inherent in the academic social structure and culture. One potential source of internal conflict arises from personality changes and emergent possibilities which occur during the post-parental years, which have recently been described by Gutmann and associates (Gutmann, 1975, 1976, 1979; 1980; also see Neugarten & Gutmann, 1968). The accumulated research outlines a theoretical framework for understanding the post-parental midlife experience and potential conflicts, stress, and psychopathology in middle and later adulthood.

Gutmann’s view arises from the following assumptions:

1. New potentials for growth and disruption continue to emerge across the life span and especially during midlife.
2. Midlife changes appear to be developmental in nature and occur in predictable sequences across widely disparate cultures.
3. The post-parental period of life marks the point at which three relational modes—communalistic in men, aggressive in women, and narcissistic in both men and women—once blunted and suppressed in the service of production and parenthood—become available to the post-parental midlife adult and can become the pivot of renewed growth or of vulnerability and psychopathology.
4. Cultural factors play an important role in mediating the outcomes of these transformations (i.e., a culture that provides proper collective representations at the proper time provides the psychological objects that allow for transformations and self-transcendence in later life).

According to Gutmann et al., both sexes reveal, in later life, the potentials that were blunted in the service of production, procreation, and parenthood. Thus, in their earlier years as young husbands and parents, men suppress those potentials within themselves—toward presenting sentiment, dependency, sensuality, aestheticism, and intimacy—that could interfere with their role as the productive or instrumental parent, the manager of the boundary to the external world, and the provider of physical security. The female partner de-emphasizes her potential for competitiveness, independence, assertiveness, and aggression, which could interfere with her primary parental child care task—the provision of emotional security and nurturance. Thus, “during the active and critical period of young parenthood, each sex conceives the other to the other that aspect of their sexual bimodality that could interfere with their special responsibility in parenting.”
Gutman et al.’s viewpoint suggests several disruptive implications for late entry faculty and for academia. For example, late entry postparenatal female faculty who have been less than successful in integrating or who are conflicted about their emergent aggressive, assertive, and competitive impulses will encounter much difficulty as they are required to compete actively with other younger faculty at the same organizational level for promotion and other rewards, benefits, and resources.

Symonds (1976) has identified another set of risks for late entry female faculty which arises from the conflict between their own persistent dependency needs and the demands of newly available positions and roles in competitive work environments.

Symonds in part attributes these conflicts to new possibilities generated by the feminist movement. Women who now hold positions in traditionally male-dominated professions such as law and engineering, may find themselves “required to make a characterological change from a predominantly compliant, dependent personality to a more expansive one. This causes profound turmoil.” Conflict may result when such women enter a competitive, agressive work environment, seeking growth and fulfillment, but must deal with dependent character traits developed in childhood and reinforced by cultural stereotypes of femininity.

This conflict can result in neurotic dependency manifested by anxiety, turmoil, confusion, withdrawal, and marital difficulties as well as physical symptoms such as insomnia, and heart palpitations. Symonds states:

[Women] are entering these new experiences with psychological patterns which were developed for a totally different emotional climate. They are poorly prepared for the competitive demands of our culture and experience severe anxiety when faced with it. After a lifetime of functioning in a self-effacing dependent manner, it is not surprising (p. 98).

For these personal and related organizational reasons, some late entry faculty may find it difficult to find mentors—an accomplishment crucial to survival and promotion in academia. This is particularly so if the available “pool” of senior faculty is limited, or younger than themselves. In other cases because of their own conflicts they may feel inappropriate approaching a senior faculty member and especially a male for this kind of relationship. Since competent mentoring may be essential to the promotion and tenure process, late entry faculty who are unable to establish such a relationship may be at a distinct disadvantage. (The functions, dynamics, and complexities of the mentoring relationship are beyond the scope of this paper; the interested reader is referred to Lee, Gilbert, & Cytrynbaum, 1981, for an examination of the significance of this relationship for young professional women in academia.)

Faculty/Organizational Development Implications

Late entry faculty members do in fact represent a valuable resource for the university that should be supported and cultivated. They bring with them a rich and unique set of talents and experiences as well as wisdom and maturity gained over a life time of work elsewhere. In many cases these individuals are “post midlife crisis” or have used their graduate training and entry into academia as a means of making the transition into later adulthood. This unique group of junior faculty may present themselves as a confident, stable, and goal directed group.

However, it is important that colleagues and administrators be sensitive to and recognize that the transition to academia for late entry faculty may initially be quite stressful because they are “off-time” or because of their need to further integrate internal changes or adapt to the challenges of the academic culture. The university must guard against stereotypically viewing them as less serious or only pursuing the academic career as an “afterthought.” Like any group of junior faculty, they can, with competent mentoring and support, blossom into stable, energetic, versatile, and productive members of the university community for many years to come. Specifically, a faculty development program might:

- Reinforce the motivation and seriousness of the late entry faculty members;
- Reduce expectations and allow for initial learning and mistakes, during a grace period;
- Provide non-threatening experiences during which late entry faculty can gain their initial learning and make mistakes;
- Provide opportunities for late entry faculty to recognize and deal with the internal conflicts they experience;
- Provide opportunities for females to learn the “competitive and aggressive” characteristics required for survival in the organization;
- Assist late entry faculty in finding mentors.

Senior Retiring Faculty

Recent developmental and policy research on aging and the elderly has raised serious questions about the organizational policy of age-based forced retirement (Baltes & Schaie, 1974; Binstock & Shanahan, 1976; Lauffer & Fowler, 1971; McFarland, 1978; Neugarten, 1970; Riley, Foner, Moore, Hess, & Roth, 1968; Shanahan, 1972; Sheppard, 1972; Sheppard, 1976). These studies demonstrate clearly that many older individuals have both the motivation and ability to continue productive teaching, research, writing, administration, and a variety of other necessary tasks within the university for several years beyond the age of retirement. Perhaps a distinction between psychologically "younger" and "older" retirement aged faculty would be useful. It is somewhat paradoxical that the university should force retirement or impose special post-retirement emeritus positions (often token), when they still have so much to offer the university. Premature retirement can be seen as arising
from a policy of institutionally-based age segregation. Policies promoting realistic age-desegregation based on competency factors and desire to continue would certainly benefit the university and involved individuals.

Mandatory retirement results in the university losing many of their most experienced, seasoned, productive, and adaptive faculty. Many older adult faculty have either maintained their productivity over the years, have done some of their best work during this period, have even launched new careers, and clearly plan to continue to be productive and involved in their profession. Many are very desirous of maintaining their established role within the academic community and of contributing to the university in a "real and meaningful" rather than token way. The collective experience and wisdom of this group can represent a stabilizing force and a mentoring influence for the more junior faculty and/or administrators.

This view of aging faculty also assumes that not all retirement-aged individuals fit the above description. In agreement with others (e.g., Cath, 1965; Gutmann, 1975, 1976, 1979, 1980; Gutmann et al., 1979; Stein et al., 1978; Vaillant, 1977) it should be acknowledged that the ability of older faculty to maintain their personal and organizational productivity will be influenced by their developmental progress during the second half of life. The image of the "wise and loving" white haired grandfather figure within the academic community is sometimes more myth than real. The above and related studies demonstrate that the ability and willingness of an older adult to remain productive is contingent upon a variety of developmental progressions and adaptations. The degree to which some older adults are able to reconcile and reassess their personal and professional lives, especially during the midlife period, will impact on the quality of their lives during the latter half of life.

Adaptation to the developmental tasks discussed earlier may be crucial to a secure sense of personal and professional identity during the second half of life. For many men and women, the midlife transition and concomitant stress can be met with mastery, adaptive resolution, and expansion of life's potentials and goals. For others, such adaptation is not so easily achieved. As was indicated earlier, the transition to older adulthood may be laden with debilitating anxiety and an increased sense of vulnerability that may ultimately set the stage for later low level or acute psychological and emotional distress. Psychopathology may occur for the first time in some members of the faculty, on policy and advisory boards, as consultants and mentors to other less senior faculty and administrators, as leaders for special ad hoc committees and as chairpersons for specific projects or politically sensitive inter-departmental or intra-departmental committees.

Summary and Conclusions

Recent adult development theory and research served as a basis for conceptualizing specific personal and professional issues related to five university faculty groups. For each grouping, various developmental tasks and processes derived from work on critical transitional periods along the life course were presented and discussed in terms of their impact on faculty growth, commitment, productivity, morale, and compatibility with the university setting and their respective professional roles. Implications for personal as well as organizational support networks, policy reassessment, and change paradigms were presented and discussed in light of these specific, life-stage developmental tasks.

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The Elaboration Theory’s Procedure For Designing Instruction
A Conceptual Approach

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Abstract. This paper describes the use of elaboration theory in selecting, sequencing, synthesizing, and summarizing instructional content that is predominantly conceptual in nature. A brief summary of the elaboration theory is provided, as well as a description of the major works that the elaboration theory has incorporated or built upon. A nine-step procedure is presented which can be used by designers and teachers working together as a team. The procedure involves (1) deciding when to use a conceptual approach, (2) selecting the concepts to be taught and organizing them into knowledge structures, (3) deciding what is the most inclusive of those knowledge structures, (4) arranging that knowledge structure’s concepts in a general-to-detailed sequence that will provide the “skeleton” or basic structure of the course, (5) identifying other ideas and facts that should also be taught (including learning prerequisites) and adding “flesh” to the skeleton of the course by allocating each such idea and fact to its most highly related “skeletal” concept, (6) allocating all content to lessons, (7) sequencing the content within each lesson, (8) designing the test items and instruction on each individual piece of content (i.e., on each concept, principle, procedure, and fact), and (9) creating synthesis test items and instructional components. Prescriptions for developing instruction on a single piece of content (step 8 above) are based on Merrill’s component display theory.

Instructional design and development are much like architecture and construction, respectively. Like a building, instruction should be planned and then created. To the extent that the plan is based on ideas of proven utility, it is likely that an effective product will be produced. The result of instructional design is a “blueprint” of the instruction that is about to be created. An architect might have a standard blueprint for a hospital, another for an elementary school, another for a three-bedroom house, and so on. In a similar way, an instructional designer can benefit from having a set of models of instruction, each of which would be used as a “standard blueprint” for meeting a different kind of content, or different kind of learner. Such a set of models of instruction, together with the bases for prescribing when to use each, comprise a prescriptive theory of instruction, such as the elaboration theory. Of course, one must not forget that, like an architect, an instructional designer almost always modifies the “standard blueprint” in certain ways to accommodate the specific needs of the project at hand.

Once an architect has created the specific blueprint for a project, a constructor works to create the building under the watchful eye of the architect. In a similar way, subject matter experts and experienced teachers develop the instruction under the supervision of the designer. Both the designer and the developers follow certain steps in order to perform their duties.

The purpose of this paper is to describe a set of steps that both designers and developers might follow in order to effectively utilize the “standard blueprints” represented by the elaboration theory. However, it is beyond the scope of this short paper to describe such a set of steps for all three of the “standard blueprints” of the elaboration theory. Hence, this paper will deal with only one of those standard blueprints: that which is referred to as the conceptual organization. Before we start our description of the steps for
designing and developing instruction, it may be useful to many readers to have a brief background about the elaboration theory. All elaboration theory technical terms used below are defined in the glossary in Table 1.

What Is the Elaboration Theory?

As was mentioned above, the elaboration theory is a set of “standard blueprints” as to what instruction should be like in order to meet different needs. At its present stage of development, it is intended exclusively for the cognitive domain (Bloom, 1956) and we believe that it is particularly inappropriate for the affective domain. Within the cognitive domain, the intention is to make it fully applicable for all kinds of goals, content, learners, and situations. For example, it can presently prescribe models for teaching such “generic” cognitive strategies as discovery skills and thinking skills, models for teaching pure memorization level objectives, and models for virtually every kind of cognitive objective in between. Hence, it covers all of the levels of Bloom’s taxonomy, plus an additional level which is often referred to as “meta-cognition.”

As a set of prescriptive models of instruction, the elaboration theory has attempted to integrate all of the useful current knowledge about learning and instruction, regardless of the “theoretical perspective” out of which it was developed (e.g., behavioristic, cognitive, humanistic). In many cases, the major differences between these different perspectives are the goals that their instructional methods are intended to achieve: behavioristic being content-specific skills, cognitive being generic skills such as discovery, and humanistic being self-actualization. When those differences are discounted, the methods espoused by the different theoretical perspectives are remarkably similar (see, e.g., Reigeluth, in press).

When one identifies that the content of cognitive instruction is comprised of facts, concepts, principles, and procedures, it becomes convenient to think of two major classes of methods of instruction: (1) those which apply to teaching a single idea (i.e., a single fact, concept, etc.) which we have referred to as micro strategies, and (2) those which apply to a whole set of related ideas, which we have referred to as macro strategies. Micro strategies include such things as the use of examples, practice, feedback, and diagrams, because they all help a student to learn a single idea. Macro strategies include such things as the selection of ideas which will be most instrumental in achieving the goals of the course, the sequencing of those ideas so as to maximize the case, speed, and permanence of the learning, the synthesis of (or the showing of relationships among) related ideas, and the systematic summarizing (preview and review) of the ideas that have been taught.

Initially, the elaboration theory was restricted to the macro level, but it has since subsumed a similarly eclectic instructional theory on the micro level: Merrill’s component display theory (Merrill, in press; Merrill, Reigeluth, & Faust, 1979; Merrill, Richards, Schmidt, & Wood, 1977; Merrill & Wood, 1975).

In addition, Keller’s strategies for the motivational design of instruction (Keller, 1979; in press) are currently being integrated into the elaboration theory.

With respect to macro strategies, the elaboration theory incorporates aspects of the work of Ausubel (1968), Bruner (1960, 1966), Gagne (1968, 1977), Norman (1973), P. Merrill (1978, 1980), Resnick (1973), Scarduna (1978, in press), and others. It draws on Ausubel’s specification for the use of general-to-detailed (or, more precisely, subsumptive or assimilative) sequencing as a primary organizational strategy, and the use of periodic “integrative reconciliation” of content within the learner’s cognitive structure. It draws on Bruner’s notion of a “spiral curriculum,” which is an approach to sequencing instruction that entails teaching ideas initially in a general, simplified, yet “intellectually honest” form, and periodically cycling back to teach those same ideas in progressively more complete and complex form. It draws on Gagne’s notion of learning hierarchies, or learning prerequisites, which involves the fact that some knowledge must be acquired before other knowledge can be acquired. The elaboration theory also draws on Norman’s notion of “web learning,” which entails the use of an initial, broad, conceptual outline or schema of to-be-acquired content, followed by progressively more detailed and specific information. And it draws on work that P. Merrill, Resnick, Scarduna, and others have done on an information-processing approach to task analysis and on the use of “path analysis” (P. Merrill, 1978) as a method for sequencing instruction.

As is indicated by the above, the purpose of elaboration theory is to create a comprehensive set of models that integrate most of our existing knowledge about instruction in a way that will greatly improve our ability to design good instruction. Although much useful knowledge remains to be integrated into it and much validation (and possible revision) is needed, the elaboration theory is presently capable of providing considerable guidance in the creation of instructional “blueprints.”

At its present stage of development, the elaboration theory of instruction prescribes that the instruction follow a special kind of general-to-detailed sequence that is intended to build stable cognitive structures and to always provide a meaningful context for any given piece of the instructional content. This general-to-detailed sequence starts by presenting a special kind of overview lesson that epitomizes a single type of content (called the “organizing content”) and includes whatever of the other types of content are highly relevant. (Epitomizing differs from summarizing in that it presents but a few ideas at the application level rather than many ideas at the memorization level.) The remainder of the lessons present progressively more detailed organizing-content ideas which elaborate on earlier ones. Naturally, whatever of the other types of content are highly relevant are also included in each lesson along with the organizing-content ideas. The lessons are organized into layers of detail or complexity, with
about three to ten lessons elaborating directly on any single lesson. The degree of learner control over selection and sequencing is not dictated by the theory; but our own preferences are generally for as much learner control as possible.

The organizing content may be concepts, principles, or procedures; and it is selected on the basis of the overall goals of the course (or curriculum). A concept is a set of objects, events, or ideas that share certain characteristics (e.g., "fish" is a concept). A principle (or proposition or hypothesis) is a change relationship, usually a cause-and-effect relationship (e.g., the relationship between cold-blooded animals' body temperature and the external temperature is a principle). And a procedure (or technique, method, or skill) is an ordered set of actions for achieving a predetermined goal (e.g., the steps that somebody follows to design instruction is a procedure). Depending on whether the goals of the course emphasize learning "what," "why," or "how to," the elaboration theory prescribes a conceptual, theoretical, or procedural organization. But such a selection only provides the basis for planning the elaborative sequence; it does not preclude the other types of content from being included in all lessons.

In addition to structuring lessons in an elaborative sequence of organizing content, the elaboration theory also prescribes an internal structure for each lesson. Each lesson should start with a motivational strategy component, such as the satisfaction of an incongruity (see Keller, in press); but such strategy components have not yet been adequately integrated into, and specified by, the elaboration theory. Then the lesson presents an analogy if a good one can be found and is believed to be necessary and useful. Next, it presents the organizing content ideas in a "most fundamental, most representative, most general, and/or most simple first" sequence. However, each of these ideas is directly preceded by all of its learning prerequisites that have not yet been mastered by all of the target learner population. Each of the organizing content ideas may also be directly followed by any supporting content ideas (those kinds of ideas that are not the organizing content) that have been selected as highly relevant to it. Alternatively, it may be best to group all of those supporting ideas for presentation after all of the organizing content ideas have been presented, especially if those supporting ideas are highly interrelated.

All of the ideas in the lesson are presented according to component display theory specifications (Merrill, in press; Merrill, Reigeluth & Faust, 1979; Merrill, Richards, Schmidt, & Wood, 1977). Finally, a summarizer and a synthesizer are presented. The summarizer is a specific kind of summary which provides a concise generality, a reference example, and a "self-test" practice items for each idea that was taught in the lesson. The synthesizer teaches interrelationships among the ideas that were just taught by presenting a subject-matter structure (Reigeluth, Merrill, & Bunderson, 1978). Integrated examples, and integrated practice items. Also, cognitive strategy activation (Rigney, 1978) are included wherever they are needed and appropriate, as are additional motivational strategy components.

An instructional designer can benefit from having a set of models of instruction, each of which would be used as a "standard blueprint" for meeting a different need.

The above description is a brief summary of the elaboration theory in its current stage of development. For a more detailed description, see Reigeluth and Stein (in press). The remainder of this article describes the procedure for designing and developing instruction according to the elaboration theory. However, as was mentioned above, due to space limitations we will only present the procedure for conceptual organizations. The procedure for procedural and organizational organizations is described in Reigeluth and Rodgers (1980). The procedure for theoretical organizations remains to be published. Finally, for a specific application of the procedure to textbook development and evaluation, see Reigeluth & Sari (1980) and Sari & Reigeluth (in press.)

The Design-development Procedure for a Conceptual Organization

The following procedure is based on standard instructional development procedures, such as the IDI (Instructional Development Institute) procedure (Twelker, Urbach, & Buck, 1972). It requires (1) an instructional designer (the "architect") who is experienced in the use of the elaboration theory and (2) several teachers (the "builders") who are experienced in teaching the content of interest to the student population of interest. The differentiation of roles in this "team approach" is crucial to the success of the development effort.

This procedure for designing and developing instruction according to the conceptual organization of the elaboration theory has nine major steps:

Step 1. Decide to use a conceptual organization.

Step 2. Select all the concepts to be taught and arrange them into kinds and parts conceptual structures.

Step 3. Decide which of the conceptual structures should be used as the organizing structure for the course.

Step 4. Allocate all concepts in the organizing structure to the levels of detail.

Step 5. Identify the supporting content for each organizing content idea.

Step 6. Allocate all content within each level to lessons and sequence them.

Step 7. Sequence all content within each lesson.

Step 8. Design the test items and instruction on each individual concept, principle, procedure, and fact within each lesson.

Step 9. Create the synthesis test items and the remaining components of the instruction for each lesson. Each of these nine steps is described in some detail below.

Step 1: Decide on a Conceptual Organization

The instructional designer and experienced teachers help the client to decide, on the basis of the goals of the course, whether or not concepts represent the most important kind of content.
to be learned in this course. Concepts are usually the most important kind of content if the course is primarily concerned with "what," whereas principles and procedures are usually the most important if the course is primarily concerned with "why" or "how," respectively. Usually, a "general education" course will emphasize concepts as the most important kind of content. But remember that whichever one is selected as the organizing content, the other two types of content are not omitted—they are included whenever and wherever appropriate (see Step 5 below).

We will use a biology course on animals to illustrate the design procedure. In this case, the teachers have indicated that they feel that the most important thing for the students to learn is what the most important kinds of animals are and what characteristics each has. Hence, the client has agreed on a conceptual organization.

**Step 2: Select all Concepts to Be Taught**

Step 2 entails selecting all the concepts that are to be taught and arranging them into kinds and parts conceptual structures. To do this, you should follow these substeps:

2.1 Make sure the experienced teachers understand the notions of superordinate, coordinate, and subordinate relations among concepts and the notion of parts-ordinate and kinds-ordinate varieties of those relations. Detailed descriptions of those kinds of relations can be found in Reigeluth, Merrill, and Bunderson (1978) and Reigeluth and Stein (in press).

2.2 Have the teachers identify the most general and inclusive concepts in the subject-matter area to be taught.

2.3 For each of the concepts, have the teachers start to derive both a parts conceptual structure and at least one kinds conceptual structure. This is done by dividing each concept into its most general parts on one piece of paper and into its most general kinds on another. (Note: you may find that there is more than one dimension—or way—in which a concept can be divided into kinds. For example, fish could be divided into tropical fish, etc., or into fresh water fish, etc., or ... Encourage the teachers to look for all important dimensions.)

2.4 Continue to derive a parts conceptual structure and at least one kinds conceptual structure by successively dividing each part and each kind into its most general parts and kinds, respectively.

2.5 Have the teachers check to make sure that all concepts are appropriate to teach in this course and that no important concepts for the course have been omitted.

Returning to our biology example, Figures 1 and 2 illustrate the nature of the results of this step. In Figure 1, animals were broken down into kinds: cold-blooded animals and warm-blooded animals. Cold-blooded animals were further broken down into reptiles, fish, etc.; reptiles were further broken down into turtles, snakes, etc.; and so on. In Figure 2, the human body was broken down into parts: circulatory system, digestive system, etc.; circulatory system was further broken down into heart, arteries, etc.; and so on. Due to space limitations, we have included only a sample of kinds and parts in those figures, and those two figures represent only a small sample of all the kinds and parts conceptual structures that would be developed during this step. Although biology is especially easy to analyze for conceptual structures, our experience has not yet revealed any subject-matter areas in which sufficiently inclusive and extensive conceptual structures cannot be built.

**Step 3: Select the Organizing Structure.**

The following substeps can be used to decide which of all the conceptual structures from Step 2 should be used as the organizing structure—the structure that determines the general-to-detailed sequence for the course.

3.1 The designer helps the teachers to decide which conceptual structure contains the most inclusive and important of all the concepts that were selected in Step 2 (i.e., which conceptual structure subsumes the greatest number of all the concepts for the course, and includes the most important concepts in relation to the goals of the course). For example, the kinds conceptual structure shown in Figure 1 would probably be selected as the most inclusive and important one—that is, practically all of the other concepts that are to be taught provide more knowledge about these concepts, and these concepts are among the most important in the whole course.

3.2 The designer helps the teachers to identify any other conceptual structure

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**Figure 1. A portion of a kinds conceptual structure.**
which could be usefully combined with the first to form a matrix. The matrix is a structure which has kinds on one dimension and either kinds or parts on the other. The intersection of the two dimensions identifies a third set of concepts (see Figure 5). In addition, each dimension is part of a conceptual structure (either kinds or parts), and the next level down on each of those two structures can also be combined into a matrix structure, which identifies a more detailed version of the "third set of concepts" mentioned above. (See Reigeluth, Merrill, & Bunderson, 1978, and Reigeluth et al., 1980, for more about matrix structures). If a good matrix structure is found, then it (complete with its different levels) serves as the organizing structure. Otherwise, the conceptual structure identified in 3.1 serves as the basis for organizing the elaborative (general-to-detailed) sequence for the course.

Step 4. Allocate Concepts in the Organizing Structure to Levels of Detail
This step entails allocating all concepts in the organizing structure to different levels of detail (including the epiphenome and all levels of elaboration). The following are the substeps for doing this:

4.1 To decide which concepts to teach in the epiphenome, prune the conceptual organizing structure from the bottom up until you reach a small enough number of concepts for the student to be able to learn and synthesize in one lesson (about one hour). In the case of a matrix structure, both dimensions would have their conceptual structures pruned in a similar manner, and the remaining concepts would be combined into the epiphenome version of the matrix.

4.2 The concepts for the first level of elaboration are the ones comprising the highest level of the organizing structure (or structures, in the case of a matrix) that is missing from the epiphenome.

4.3 This process is repeated until all concepts in the organizing structure(s) have been allocated to different levels of elaboration.

Using the kinds conceptual structure shown in Figure 1 as the organizing structure, the epiphenome would include the concepts of animal, cold-blooded animal, and warm-blooded animal. The first level of elaboration would include the next level of concepts: reptile, fish, birds, and mammals (see Figure 1 above). The second level of elaboration would consist of the next level of subordinate concepts, which includes: turtle, fresh-water fish, flightless birds, and land mammals. And the third level would consist of the next level of concepts, which includes: snapping turtle, carp, penguin, and dog (see Figure 1 above). The result of this step is similar to the blueprint shown in Figure 4.

Step 5. Identify Supporting Content for Each Organizing Content Idea
In this step the designer should help the teachers to identify all the supporting content ideas that are highly related to each concept in the organizing structure. If it is not highly related (i.e., the teachers do not really expect the students to learn it), then it should not be included as course content. To do this step, you should follow these substeps:

5.1 For each concept that was identified in Step 2 as important but is not included in the organizing structure, decide what organizing concept(s) it is most closely related to, and allocate it to that concept's level of elaboration. In general, supporting content should not be included before it is highly related to some organizing concept which is being presented. It may be best to teach many of these supporting concepts after all organizing concepts have been taught.

5.2 Identify all important principles that are highly related to each concept. Be sure to only include those principles that are important, given the goals of the course. Allocate each such principle to the level of elaboration in which its first highly related concept appears. If it is not highly related to any organizing concepts, it should be presented after all organizing concepts have been taught.

5.3 Identify all important procedures that are highly related to each concept. Allocate each to the level of elaboration in which its first highly related concept appears. Again, it may be presented after all organizing concepts have been taught.

5.4 Identify all important facts that are highly related to each concept. Allocate each to the level of elaboration in which its highly related concept appears, or after all organizing concepts.

5.5 For each of the ideas identified above (including principles and procedures), identify all learning prerequisites down the level of entering behavior for the target student popula-
Table: 

<table>
<thead>
<tr>
<th>HERBIVORES</th>
<th>CARNIVORES</th>
<th>OMNIVORES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TURTLES...</td>
<td>SNAKES...</td>
<td>LEOPARD...</td>
</tr>
<tr>
<td>COWS...</td>
<td>LIONS...</td>
<td>LIZARDS...</td>
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<tr>
<td>CHICKADEES</td>
<td>VULTURES...</td>
<td>DOGS...</td>
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<tr>
<td>MINNOWS...</td>
<td>SHARKS...</td>
<td>ROBINS...</td>
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<tr>
<td>ANTS...</td>
<td>LADY BUGS</td>
<td>CARP...</td>
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<tr>
<td></td>
<td></td>
<td>BLACK STINK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BUGS...</td>
</tr>
</tbody>
</table>

Figure 3. A portion of a matrix structure (or table) combining two kinds conceptual structures. 
KEY: In this matrix structure, each box is a kind of both its row heading and its column heading.

<table>
<thead>
<tr>
<th>LESSONS</th>
<th>ORGANIZING CONTENT (Concepts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Epitome</td>
<td>animal</td>
</tr>
<tr>
<td></td>
<td>cold-blooded animal</td>
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<tr>
<td></td>
<td>warm-blooded animal</td>
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<tr>
<td>2. First level of elaboration</td>
<td>reptile</td>
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<tr>
<td></td>
<td>fish</td>
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<tr>
<td></td>
<td>bird</td>
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<tr>
<td></td>
<td>mammal</td>
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<tr>
<td>3. Second level of elaboration</td>
<td>turtle</td>
</tr>
<tr>
<td></td>
<td>snake</td>
</tr>
<tr>
<td></td>
<td>fresh-water fish</td>
</tr>
<tr>
<td></td>
<td>flightless bird</td>
</tr>
<tr>
<td></td>
<td>sea bird</td>
</tr>
<tr>
<td></td>
<td>land mammal</td>
</tr>
<tr>
<td></td>
<td>sea mammal</td>
</tr>
<tr>
<td>4. Third level of elaboration</td>
<td>snapping turtle</td>
</tr>
<tr>
<td></td>
<td>bat turtle</td>
</tr>
<tr>
<td></td>
<td>garter snake</td>
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<tr>
<td></td>
<td>rattlesnake</td>
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<tr>
<td></td>
<td>trout</td>
</tr>
<tr>
<td></td>
<td>carp</td>
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<td></td>
<td>shark</td>
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<td></td>
<td>tuna</td>
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<td>ostrich</td>
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<td></td>
<td>dog</td>
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<tr>
<td></td>
<td>rat</td>
</tr>
<tr>
<td></td>
<td>seal</td>
</tr>
<tr>
<td></td>
<td>dolphin</td>
</tr>
</tbody>
</table>

Figure 4. A partial "blueprint" illustrating the nature of the results of steps 1-1.
Step 6: Allocate Content within Each Level to Lessons and Sequence Them

This step entails allocating all the content on each level of elaboration to different lessons and deciding on the sequence for those lessons. Sequencing could be fixed or variable. If it is fixed, then all students will be forced to follow a simple, linear pattern of progression from one lesson to another. In this case, the designer and teachers must decide what sequence of lessons will be best. If it is variable, then the students will be following different patterns of progression through the lessons. Hence, the designer and teachers need to decide what sequencing options will be permissible among the lessons.

6.1 Allocate each organizing concept on a level to a lesson and put all supporting content in the same lesson as its corresponding organizing content. Each lesson should be neither too large nor too small (neither too many nor too few ideas and facts). If it is too large, achievement and motivation will suffer, and there will be too much content to be effectively synthesized at the end of the lesson. If it is too small, the high frequency of the review and synthesis will reduce the efficiency of the instruction and demotivate the learner. The proper amount of content for a lesson is referred to as the "optimal learning load," which varies with the difficulty level of the content in relation to the ability level of the learners. We roughly estimate that it should represent about an hour of instruction, but research is needed to test this estimate. The amount of content in a lesson can be adjusted to the optimal learning load by adding another organizing concept (along with its supporting content) if the load is too light (see Step 6.2), or by splitting some supporting content into a separate lesson if the load is too heavy.

6.2 Whenever two or more organizing concepts need to be grouped into a single lesson to create an optimal learning load, you must decide which concepts should be grouped together. They should be grouped on the basis of relatedness. If the concepts being considered for grouping are about equally related, then size may be the most important factor for making grouping decisions.

In reference to the biology example, Lesson 1 will include all the organizing and supporting content listed for the episteme (see Figure 5). Lesson 2 will

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### Figure 5.

**A partial "blueprint" illustrating the nature of the results of steps 1-5.**

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### Figure 6.

**A partial "blueprint" illustrating the nature of the results of steps 1-6.**
include two related organizing concepts from level 1, reptiles and fish plus all the supporting content related to those concepts. Lesson 7 will contain all the remaining organizing and supporting content on the first level of elaboration, and so on. Figure 6 shows an incomplete example of the results of this step.

Step 7. Sequence All Content within Each Lesson

This step entails sequencing all the organizing and supporting content within each lesson. The following are the substeps to be followed:

1. Sequence the organizing content according to the following rules:
   a. teach a superordinate concept before its parts or kinds;
   b. teach the concept which is easiest and most familiar to students first; then gradually progress to the more difficult and less familiar concepts;
   c. teach the concept which is most important first; then gradually progress to the less important concepts;
   d. use the teachers' intuition and experience to decide upon the best sequence.

2. Sequence the supporting content (with the exception of learning prerequisites) according to the following rules:
   a. if the supporting content is highly similar or interrelated from one concept to another, present all of it after all of the organizing content; otherwise, present each concept's supporting content directly after the concept;
   b. teach the content which is easiest and most familiar to students first; then gradually progress to more difficult and unfamiliar content;
   c. teach the most important content first; then gradually progress to the less important content;
   d. teach superordinate supporting content before its subordinate ideas;
   e. use the teachers' intuition and experience to decide upon the best sequence.

3. Sequence the learning prerequisites for all organizing and supporting content according to the following rules:
   a. present each learning prerequisite as late as possible (i.e., present it just prior to the first time it is needed), unless considerable efficiencies can be realized by grouping highly related prerequisites together.

Step 8. Design and Develop the Micro-level Strategies

The instruction on each individual idea and fact should now be designed and developed according to component display theory specifications (see Merrill, in press; Merrill, Reigeluth, & Faus, 1975; Merrill, Richards, Schmidt, & Wood, 1977). Test items are usually developed first for each idea and fact, and usually enough are created for use as practice items as well. Since most course goals call for students to be able clearly labeled as examples or practice.

Some concepts are more difficult for students to learn than others. If you expect a concept to be fairly difficult for the students, you should include a larger number of examples and practice items. You might also consider some additional techniques that can make the learning easier, such as an alternative

"The content of cognitive instruction is comprised of facts, concepts, principles, and procedures."

representation (e.g., a line drawing or other kind of visual), and an attention-focusing device (e.g., underlining or color which highlights important points). For more information about what these micro strategies are like and when they should be used in the design of instruction, see the papers by Merrill referenced above.

Step 9: Create the Synthesis Test Items and the Remaining Components of the Instruction

In addition to the synthesis test items, a number of components of the instruction remain to be developed for each lesson: the introduction, motivational strategies, internal summaries, and expanded epitome. The following substeps can be used to accomplish this popout of activities:

9.1 Develop a large pool of synthesis test items for the lesson. Create a large enough pool of items to serve as practice items as well as items for several versions of the lesson test.

9.2 Help the teachers to plan an introduction to the organizing content (concepts) for each lesson. Such an introduction will often make use of an analogy, which relates what's about to be learned to something (outside of the content for this lesson) that the students already know. Encourage the teachers to try to think up an analogy or two that could help students to understand a group of related ideas. For more about when to use analogies, see Reigeluth & Stein (in press). Then the teachers should write the introduction for each lesson.

9.3 Have the teachers indicate the anticipated motivational needs for the instruction to meet, based on the nature of the subject matter and the students.
Then select and plan out an appropriate motivational strategy to meet each of those needs. For details about how to help the teachers to assess those needs and to select and plan out appropriate strategies, see Keller (in press).

9.1 Help the teachers to develop the internal summarizer and synthesizer according to component display theory specifications (that is, in generality-example-practice format). The generality for the summarizer is a concise statement of each idea and fact that was taught in the lesson. For the synthesizer, it is one or more subject matter structures (Reigeluth, Merrill, & Bumderson, 1978; Reigeluth & Stein, in press) plus the necessary verbal description to clarify their meaning. The examples for the summarizer are reference examples (i.e., highly typical, easy-to-remember examples), and for the synthesizer they portray the interrelationships among the ideas. The practice for the summarizer is a diagnostic, self-test item or two on each idea and fact that was taught, and for the synthesizer it is a set of diagnostic, self-test items on the interrelationships among the ideas.

9.5 Help the teachers to develop the expanded epitome for each lesson. The expanded epitome contains a cumulative summarizer and synthesizer for a set of lessons, and is also prepared according to component display theory specifications (see Reigeluth & Stein, in press, for details).

Summary

The nine steps discussed in this paper are summarized below:

Step 1. Decide to use a conceptual organization. Determine that knowing the "what" (the concepts) of the subject matter is basically more important than knowing the "whys" (the principles) or the "hows" (the procedures).

Step 2. Select all the concepts to be taught and arrange them into kinds and parts conceptual structures. Have the teachers start with the most general and inclusive concepts and proceed to break each down into both kinds and parts until you reach the desired level of detail for the course. Check to make sure that all important, and only the important, concepts have been identified.

Step 3. Decide which of the conceptual structures should be used as the organizing structure for the course. Decide which conceptual structure contains the most inclusive and most important concepts in the course. See if two structures might be usefully combined into a matrix structure to provide an even more inclusive and important set of concepts.

Step 4. Allocate all concepts in the organizing structure to the levels of detail. Prune the organizing structure from the bottom up until you are left with a small enough amount of content (including supporting content) for a single lesson. Then allocate the next level of the organizing structure (the last level that was pruned off) to the first level of elaboration. Allocate each additional level of the organizing structure to the succeeding level of elaboration until all levels have been allocated.

Step 5. Identify the supporting content for each organizing content idea. Identify all other concepts (ones not included in the organizing structure), all principles, all procedures, and all facts that are highly related to the organizing content or to recently selected supporting content and hence are important to teach in each class. Also identify all learning prerequisites for all organizing and supporting content selected so far) that have not yet been mastered by the target student population.

Step 6. Allocate all content within each level to lessons and sequence them. On each level of detail, group the most highly related organizing content together, along with its respective supporting content, in such a way that the total amount of content in each lesson represents the "optimal learning load" for the target student population and subject matter content.

Step 7. Sequence all content within each lesson. First sequence the organizing content within a lesson, then intersperse the non-prerequisite supporting content, and finally intersperse the learning prerequisites, all according to the rules described earlier.

Step 8. Design the test items and instruction on each individual concept, principle, procedure, and fact within each lesson. Design and develop the test items and presentations for each idea and fact within each lesson, using the prescriptions of the component display theory. For the ideas, this will usually mean generality-example-practice instruction whose level of richness is adjusted to the difficulty level of the idea in relation to student ability and experience.

Step 9. Create the synthesis test items and the remaining components of the instruction for each lesson. For each lesson, design and develop the synthesis test items, the introduction (preferably with an analog), the motivational strategies (based on an analysis of the motivational needs of the students in relation to the content), the internal summarizer and synthesizer (in the generality-example-practice format), and the expanded epitome (also in generality-example-practice format).

Teach the concept which is easiest and most familiar to students first; then gradually progress to the more difficult and less familiar concepts.”

Table 1

<table>
<thead>
<tr>
<th>Glossary of Terms</th>
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</thead>
<tbody>
<tr>
<td>Cognitive Strategy Activator — an instructional strategy component which either requests or forces the student to use a cognitive strategy.</td>
</tr>
<tr>
<td>Component Display Theory — a prescriptive theory for designing instruction on a single concept, principle, procedure, or fact.</td>
</tr>
<tr>
<td>Concept — a set of objects, events, or ideas that share certain characteristics.</td>
</tr>
<tr>
<td>Conceptual Organization — a way of structuring (or sequencing) instruction based on relationships among concepts, such as their superordinate, coordinate, and subordinate interrelationships.</td>
</tr>
</tbody>
</table>
Epileme—a special kind of overview lesson which epitomizes (in the standard dictionary sense of the word) the remaining content. Specifically, epitomizing entails presenting a few highly representative ideas, and those few ideas are taught at the application level, which means that examples and practice are used in the epitome as well as generalities.

**General-to-Detailed Sequence**—a sequence of instruction that starts by presenting the more inclusive, more basic, more fundamental content, and proceeds to present ever less inclusive, less basic, less fundamental content, one layer at a time.

**Learner Control**—the capability of students to make instructional decisions. For example, learner control over pacing means that the students can decide the pace at which they learn. Learner control is largely implemented by formatting the instruction in certain ways.

**Learning Prerequisite**—a concept, principle, procedure, or fact that must be learned before a different concept, principle, or procedure can be learned.

**Levels of Elaboration**—the first level of elaboration is content that provides more detail about the content in the epitome; hence it should not be taught until after the epitome has been mastered. The second level of elaboration is content that provides more detail about the content in the first level of elaboration; hence it should not be taught until after its related first-level content has been mastered.

**Macro Strategies**—components of methods of instruction that relate to many related concepts, principles, procedures, and/or facts. Such components include different patterns of sequencing instruction and different types of previews and reviews.

**Micro Strategies**—components of methods of instruction that are used for teaching a single concept, principle, procedure, or fact. Such components include rules, examples, non-examples, mnemonics, visuals, practice, feedback, and easy-to-difficult sequence of examples and practice.

**Motivational Strategy Component**—a method for increasing the students’ desire to learn the content.

**Organizing Content**—the type of ideas whose interrelationships provide the basis for sequencing the major chunks of course content. It may be either concepts, principles, or procedures.

**Organizing Structure**—the knowledge structure around which the course is organized. For example, for a conceptual organization the organizing structure would probably be a taxonomy in which each concept is a kind of its superordinate concept.

**Principle**—a change relationship which is cause-and-effect or correlational and may be either deterministic or probabilistic.

**Procedure**—a set of ordered actions for achieving a predetermined goal.

**Summarizer**—a specific kind of review which provides a concise generality, a reference example, and some self-test practice items for each idea taught in the lesson.

**Supporting Content**—concepts, principles, procedures, and facts (including learning prerequisites) which should be taught in addition to the organizing content ideas. They support the learning of the organizing content.

**Synthesizer**—an instructional component which teaches relationships among the ideas that have been taught. It presents a subject matter structure which shows the interrelationships, some integrated examples which illustrate the interrelationships, and some integrated practice items which require the student to use the interrelationships to solve new problems.

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Book Reviews

The Computer in the School: Tutor, Tool, Tutee, edited by Robert F.

This book is a collection of articles and presentations by five prominent
practitioners in the field of computers in education: Alfred Bork, Thomas
Dwyer, Arthur Luehrmann, Seymour Papert, and Patrick Suppes. In his
introduction to the book, Taylor provides a framework to help the reader
categorize the uses of the computer into three areas: 1) Tutor, 2) Tool, and 3)
Tu tee. He suggests that all educational uses can be broken down into these
three categories. The ‘computer as tutor’ presents subject matter, accepts
student responses, reacts to the responses, and keeps track of how the stu-
dent is doing. The ‘computer as tool’ uses the computer’s various capabil-
ties, such as calculation, word processing, graphics, etc., to relieve students
and teachers of these tedious and routine tasks. The ‘computer as tu tee’ helps
the learner and the teacher “gain new insights into their own thinking” by
‘teaching’ the computer to do something. As Taylor points out, “extended
use of the computer as tu tee can shift the focus of education in the classroom
from end product to process, from acquiring facts to manipulating and
understanding them.” (p. 4).
The Computer in the School offers 19 articles, a selected bibliography from
each of the authors, and an index. The editor himself admits that the selection
of authors and the diversity of the book is limited. He feels that these limitations
will help reduce possible confusion for those “approaching such a complex
area for the first time.”

Alfred Bork’s first article, “Preparing Student-Computer Dialogs,” deals with
the planning of the dialog or ‘conversation’ between the computer and the
learner. He describes various types of dialogues such as: tests, in which the stu-
dent receives immediate feedback from the computer; remedial, in which the
computer, after testing the student, provides assistance in those areas where
the student is found to be weak; and the ‘interactive problem,’ in which the stu-
dent is guided by the computer in solving a problem. In his second article,
“Interactive Learning,” Bork begins by saying, “We are at the onset of a major

“A few of the topics discussed in this article are: individualization, student control of pacing, student
control of content, testing as a learning mode, and student management.”

revolution in education, a revolution unparalleled since the invention of the printing press. The computer will be
the instrument of this revolution” (p.53). He explains that the computer will allow students to be participants
rather than spectators in the educational process. A few of the topics discussed in this article are: individualiza-
tion, student control of pacing, student control of content, testing as a learning mode, and student management. Bork
also speaks to the changes that would be necessary in educational institutions to foster this type of education. In his final
article, “Learning Through Graphics,” Bork discusses the important role ‘grap-
hics’ plays in the learning process and its utilization on computer systems.
Unfortunately, this article is outdated. Published in 1977, it does not mention the expanding graphics capabilities of the new microcomputers. Rather, the article dwells on the problems presented by using graphics on the larger systems.

Thomas Dwyer's four articles describe his philosophy of learning, what he calls 'solo' learning. Dwyer states, "the word 'solo' describes a pedagogy based on the intensity of involvement and accomplishment that occurs when something is a personal quest" (p.120). The first article "Heuristic Strategies for Using Computers to Enrich Education," states that one should use 'heuristic strategies' when designing instruction. He describes four tenets: 1. Instruction should not transmit accumulated experience, but rather the models of that experience; 2. Human relationships are important; trust, expectation, and recognition are important to teaching; 3. Learning must take place in a fun environment; and 4. Teachers must become expert and enthusiastic in an area that students admire. The author then describes a mathematics education project called Soloworks.


Arthur Luehrmann's first article, "Should the Computer Teach the Student, or Vice-Versa?" begins with a parable about the development of a new teaching technique called Writing Assisted Instruction (WAI). WAI led to literacy for the populous, but it had its critics and problems. Luehrmann then asks us to substitute CAI for WAI and think how ridiculous the criticisms of computer literacy and CAI are. He goes on to stress that computers in the schools should not be used just for CAI, but must be used as tools by all students. In the next three articles, "Prepared Statement on Research, Development and Planning for Computers and the Learning Society," "Pre and Post- College Computer Education," and "Technology in Science Education," Luehrmann continues to argue for the teaching of computer literacy. In fact, he predicts, "it is not safe to guess that CAI will not be a great success within the school system but that it may have much to offer the non-school environment" (p.147), meaning public libraries, museums, and the home.

Seymour Papert's four articles, "Teaching Children Thinking," "Teaching Children to Be Mathematicians Vs. Teaching Mathematics," "Personal Computing and Its Impact on Education," and "Computer-Based Microworlds as Incubators for Powerful Ideas," are all based on Papert's belief that "children learn by doing and by thinking about what they do" (p.161). This concept has led to his development of LOGO, a computer language for use by primary school aged children. LOGO allows the student to experiment and to work on projects rather than just doing problems. He describes the use of a 'turtle' that draws on a screen for the learning of geometry. The student commands the turtle to move on the screen and learns the effects of angles, and distances, on what is drawn. The student thus learns by doing and by thinking through the commands which must be issued to the turtle.

Patrick Suppes' four articles describe experimental programs with which he has been involved at Stanford University. The first article, "Computer-Based Mathematics Instruction," describes a 1964-1965 CAI project for teaching math to first, fourth, and sixth grade students. The second article, "The Teacher and Computer-Assisted Instruction," describes some of the uses of the computer in the classroom. In the article, Suppes hopes to reduce the fears of teachers by covering such topics as individualizing instruction, the teacher's role, and the replacement of teachers by computers. The next article, "Impact of Computers on Curriculum in the Schools and Universities," covers three aspects of computer use in instruction: diversity of content, individualization, and productivity of faculty in times of declining budgets and faculty sizes. This 1975 article includes an outdated cost analysis. Suppes' final article, "The Future of Computers in Education," is mainly a review of the history of CAI at Stanford. This article repeats most of the information presented in his other articles. He does discuss four "technological possibilities"- computers that talk, computers that listen, computers that know, and computers that aid learning.

In summary, The Computer in the School is a collection of outdated articles, ranging from 1965-1979. Some of the articles provide the reader with historical information and descriptions of projects which have been conducted. The five authors are leaders in the field of CAI and certainly they are persons whose opinions on computers in education are important. However, the particular articles Taylor has selected are often repetitive and out-of-date. I could find little in the book that will help an instructional designer improve his/her skills in CAI. A book that I might suggest you to read instead is: Computer-Based Instruction: A State-of-the Art Assessment, edited by Harold F. O'Neill, Jr. New York: Academic Press, 1981, 260 pages, $23.50 Reviewed by Dr. David M. Sharpe, Assistant Professor, Department of Educational Technology and Librarianship, San Diego State University.


In Instructional Technique, Davies attempts to be responsive to the instructional needs of the training community by creating a resource to guide the activities of the "direct trainer." Since for several years I have felt a need for a quality resource that takes into account the activities of the stand-up trainer, the goals of the training enterprise, and the practicalities of the training setting, while still presenting the best of in-
structional wisdom and practice. I was a very interested reader. Is Instructional Technique the textbook and reference for which I had been looking? I regret to say it is not; Davies' intent is worthy, but the book does not successfully serve its audience.

The book is intended for both new and experienced instructors who wish "to make more effective presentations or speeches, learn how to improve discussion skills, use audiovisual aids more effectively, learn how to instruct or develop instructional skills." This brief panegyric note hints at what has gone aright. The goals are too broad, too disparate, to be met even in this lengthy manuscript. It also points out the book's central weakness: a lack of a coherent point of view that integrates the bits of conventional, training, and managerial wisdom presented throughout. Compounding this fundamental flaw are additional problems in format and content.

"The unfortunate terminology shows up an apparent, and all too common, misunderstanding of the systematic approach to the design and delivery of training or instruction."

Illogical Structure

After reading the book I had to return to the preface again to verify its basic intent, since its purpose had faded during the over 350 pages in nineteen chapters. Many of the activities of the stand-up trainer and teacher had been covered, but I was left wondering for what end? I feared that the new trainer would not really know how to purposefully create and deliver instruction after reading this book, and the low level of sophistication made it inappropriate for the experienced trainer. Certainly, the reader was exposed to things that need to be done - e.g., methods to be chosen, lessons to be formatted, audiovisual aids to be used - but much of it seemed pedestrian.

Structure was the major contributor to this loss of purpose. Davies divides the book into three sections which deal with strategies, tactics, and the concerns of instruction. Strategies and tactics - or as Davies describes them, the "why" and "how" of instruction - initially appear to be a simple, common sense way of looking at the training process. But upon more closely examining the elements that have been included in each section, the partitioning becomes less attractive and useful. After an introduction on the roles of an instructor and the first chapter on "Efficiency and Effectiveness," I was surprised to find a discussion of methods presented next without the previous development of the concepts of needs assessment and objectives. In Davies' scheme, assessment of needs and objectives are considered tactics, and they are only outlined a third of the way through the book in chapter six, long after the presentation of methodology. The placement of the chapters on methods, lesson planning, and lesson structure, as well as their content, encourages the choice of method and design of lesson plan before assessing needs and defining objectives. This runs directly counter to sound principles in the management of training, the design of instruction, and the planning. Davies lists three approaches to planning lessons and in doing so reveals why some of the essential integrity of instructional design has been left out of Instructional Technique. He suggests that lesson planning can be systematic, expeditious, or piecemeal. The systematic approach, which takes into account the objectives to be realized, is described as ideal. The expedient approach, which identifies the methods available and then defines the objectives, is termed prudent. The piecemeal approach, which ends and means define each other, is taken as realistic. The unfortunate terminology shows up an apparent, and all too common, misunderstanding of the systematic approach to the design and delivery of training or instruction. Whether the effort is to design and deliver instruction or to carry out other endeavors like evaluation, the basic concept of a systematic approach takes into account the constraints and resources of the specific context or environment in which the effort is taking place. Contrary to Davies' suggestion that the systematic approach is ideal, by definition it is also realistic.

This juxtaposition of the ideal and the real is not simply a point of semantic precision. It affects the thesis and impact of the entire book, contributing to the devaluation of front-end analysis described earlier. Although I appreciate Davies' underlying concern for the applicability of Instructional Technique to the real world training situation, the lack of emphasis on the systematic approach greatly diminishes the utility of any of his techniques for accomplishing the ultimate aim of any instructional experience - improved human competence. The systematic approach is the best means we have of ensuring that instructional techniques and activities bring about human competence. If the activities in the trainer's repertoire are not directed to that end as well, the trainer is left to do mere busywork.

Another point of view that Davies chose not to adopt, but if it had been developed further would have contributed much to the utility of the book is that of experiential learning and group process training. There are brief excursions into material related to interpersonal and group process skills in the two chapters that deal with nonverbal communication and discussion techniques. However, I am left less conti-
dent than I would wish about the awareness of group management skills that the beginning trainer would develop through reading this book.

Management and Training
By beginning the book with a chapter on "Efficiency and Effectiveness" and outlining two major roles for the trainer, those of the operator and the manager, Davies lets us know early that management is a topic of interest to him. Intermittent references to the trainer as manager throughout the book, along with occasional quotes from Peter Drucker and Douglas McGregor keep the management theme going. What is difficult to reconcile with the apparent concern for management issues in training is the singular lack of the development of the concepts of evaluation and accountability. If management concerns are to be taken seriously, then evaluation of the training process is integral to both the operator and the manager of the training process. Accountability for resources invested in the training effort is a key management issue that Davies does not address, and once again a good intention is not developed into useful application.

The promise of the book is not carried out. Regrettably we must yet wait for the seminal work on the "direct trainer." — Reviewed by Ruth de Blicick, Office of Research and Development for Education in the Health Professions, The School of Medicine, The University of North Carolina at Chapel Hill.


Ivor Davies' Instructional Technique is exactly what the title implies: a text covering the strategies, tactics, and concerns for planning and implementing instructor-delivered training. At the outset, the author clearly states the purpose of the book:

In recent years, a great deal of attention has been given to the design and development of more efficient and effective training programs. However, if the training process is to work, attention also needs to be given to the techniques of teaching. This book sets out to redress the balance... (Preface, p. vii)

In the ensuing twenty chapters, Davies draws from both research and his own experience in training to offer extensive lists of guidelines, procedures, and cautions that cover the entire gamut of classroom training.

The author is quick to point out in the Preface that his audience consists of all "direct trainers," whom he defines as "anyone who, in any shape or form, directly helps someone learn" (p. vii). This audience potentially consists of anyone from training professionals to grandmothers, in that "regardless of age and education, everyone is a direct trainer" (p. vii). However, because the examples used in the text are drawn almost exclusively from business and industry settings, the book is more properly oriented toward beginning and intermediate trainers in that sector of the profession.

The text is divided into three parts: Strategies of Instruction, Tactics of Instruction, and Instructional Concerns. In Strategies, the author discusses the mastery approach to instruction management. He also addresses teaching tactics not included in the second part: discussion techniques and homework assignments. Davies finishes the text with a discussion of the personality characteristics and the common behavior of good instructors.

Throughout the book, the author's writing is clear, straightforward, and enjoyable. The many examples drawn from the author's training experience provide a rich context to which the reader can relate the book's content. The sequence and format of the book are also clear, with two exceptions. First, although the lists of guidelines in each chapter facilitate the noting of important points as one reads, it is difficult later to ferret out information for actual use. Although the text is clearly not designed to be a handbook, a synthesis of the author's points in summary form would make the book far more useful to trainers. Second, the chapters on discussion techniques and

"The book is more properly oriented toward beginning and intermediate trainers in business and industry."
(p. 87), in which many of the suggested behaviors are ambiguous or unobservable. Needless to say, the lack of precision in specifying objectives leads to a similar lack in specifying assessment items.

In addition to the lack of clarity in specifying learner outcomes, the book tends to be weak in three other areas: learning theory, assessment techniques, and use of audiovisual aids. The chapters on learning theory and assessment techniques are both too general to be of much practical value. Each chapter provides a good overview of the topic, but specific strategies for planning—so prevalent in the rest of the book—are not given their fair share of attention. The chapter on audiovisual aids is also well done on a general level, but specific guidelines for selection and use of tools other than overheads, slides, and films are sparse. A media selection chart (Kemp, 1975) is provided, but no guidelines for using the chart are included.

On the flip side of the coin, the volume is particularly strong in areas often deemphasized or ignored by instructors: instructional settings and their influence on learning, lesson and time organization, questioning and discussion techniques, and verbal-nonverbal communication processes. No matter how well-designed instruction may be, the act of teaching depends heavily on these aspects of the teaching-learning process. Thorough knowledge and competence in these aspects of instruction are required for success in industrial training and development, and it is in these areas that the author provides his most important contributions in the book.

All in all, Instructional Technique should be a valuable resource to the beginning trainer or teacher. Although the novice teacher must translate the training examples into more familiar academic settings, the information to be gained is worth the effort. Instructional designers probably have little need for this book unless, of course, a little improvement in their own classroom teaching is in order. —Reviewed by John Maher, Instructional Design, Arizona State University.

### ERIC Reports on ID

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This report describes the evaluation activities associated with the development and production of POWERHOUSE, a motivational television series designed to help 8- to 12-year old children take an active, personal responsibility for their own health and well being. The evaluation was divided into two major sections: the Writers' Notebook and the original formative research. The Notebook consisted of a literature review and analysis. The establishment of a health knowledge information base that target age children would bring to the viewing of the series was the first task accomplished by the original research. Focus-interviews with children and follow-up questionnaires using a larger sample provided information on knowledge of drugs, sex, body systems, and general health and nutrition. The next evaluation procedure was an assessment of the reactions of children, teachers, and youth leaders to narrative versions of three different scripts. At the same time that the script treatments were tested, pictures and brief character descriptions of potential series regulars were also evaluated. In November of 1980, a test of the pilot series was conducted in a representative demographic market, Toledo, Ohio. An 85-item bibliography is attached.—Microfiche 91¢, paper copy $2.00 plus shipping as document ED 206 269. Using TV to Teach High Order Thinking Skills, M. Virginia Biggy. Paper presented at the National Conference on Technology and Education, Washington, DC, January 28, 1981, 10pp.

This paper describes the instructional design activities used to create ThinkAbout, a video series intended to teach fifth and sixth graders skills essential for learning, i.e., inquiring, analyzing, synthesizing, seeking alternatives, and creative problem solving. Two basic tenets or underpinning statements served as guidelines for the development of the series: (1) Skills, whatever they are, require constant use to keep them operative; (2) The more practically, realistically, and often a skill is properly applied in a variety of contexts by students, the more likely it will actually belong to and be used by them. Components of reasoning and thinking which formed the core of the series were organized in such clusters as finding alternatives, estimating and approximating, giving and getting meaning, and collecting information. The clusters were further developed to permit various strategies for achieving the purpose of the cluster. After one year of use, the cumulative effect of working with the series seems to be that students are looking more carefully at the route to solutions for problems.—Microfiche 91¢, paper copy $2.00 plus shipping as document ED 206 271.


The research reported includes a profile of all 60 ThinkAbout programs with respect to demographic balance, personal/social behaviors portrayed by major characters, and value-laden content. The profile is a summation across a five-stage content analysis which was integrated with other formative evaluation techniques in the three-year ThinkAbout production process. Emphasis is
given to the unique contribution of the content analysis data in comparison to other formative evaluation strategies. While the traditional ThinkAbout formative strategies provided information for possible changes within a specific product unit, the ThinkAbout content analysis system was devised to provide continuity of information, and to feed information forward to the development of future program units in the series, monitoring concepts and illuminating needs for changes or improvement. A list of 12 references is included.—Microfiche $1.60, paper copy $3.65 plus shipping as document ED 206 274.


Designed to provide pre- and inservice vocational education administrators with the skills necessary to guide the development and improvement of instruction, this competency-based learning module consists of an introduction and three sequential learning experiences. Each learning experience contains an overview, required and optional learning activities, a self-check section, and a series of model answers for use with the self-check section. Topics covered in the first experience include the scope of the administrator's responsibility in developing and improving instruction, facilitating the conventional approach to instruction, assessing instruction, and facilitating the competency-based approach. Evaluating the performance of an administrator in a given case study on guiding staff in the selection and use of a new instructional strategy and in creating a climate for improving instruction are discussed. The final learning experience involves guiding the development and improvement of instruction in an actual administrative situation.—Order from National Center Publications, The National Center for Research in Vocational Education, 160 Kenny Rd., Columbus, OH 43210 (LT 58B-8, $5.50); or EDRS: microfiche $1.60, paper copy $3.65 plus shipping as document ED 204 495.


A brief review of recent demands and trends in adult education for nontraditional students is followed by a discussion of the design and purpose of audio-cassette programs offering full and transferable college credit toward a degree. The development of audio courses is traced from the Ohio School of the Air presented on radio in 1929 to the present, and the current program at West Virginia Wesleyan College is described. A review of the literature on the effectiveness of audio instruction concludes the paper, and a 17-item bibliography is attached.—Microfiche $1.60, paper copy $2.00 plus shipping as document ED 206 307.


This ERIC Information Analysis Product is intended to provide current, succinct, and accurate information regarding the use of television, especially telecourses, in two-year postsecondary institutions. To provide a comprehensive overview of the subject, the monograph is divided into three major sections: (1) current developments in telecommunicati ons in two-year postsecondary institutions in the United States; (2) what the research says about the use of telecommunications with adult learners; and (3) how to get started using the new media to provide cost-effective instruction in community and junior colleges. Material is presented in a question and answer format to aid individuals who are asking similar questions and cannot take the time to read an entire publication to find help on one specific matter. References are provided for each section as well as a list of additional readings.—Order from Syracuse University Printing Services, 125 College Place, Syracuse, NY 13210 (IR-51; $5.00 prepaid), or EDRS: microfiche $1.60, paper copy $3.65 plus shipping as document ED 206 329.


Stressing the existence of a wide range of instructional resources available to teachers planning field trips,
On Teaching Well What Shouldn’t Be Taught At All

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For millennia, mankind has effectively transmitted valid and valued knowledge to succeeding generations of artisans, soldiers, scholars, and craftsmen, orally, by demonstration, and in writing. By the same methods, the ignorance, errors, and superstitions of the culture and the ages have been similarly communicated. For only the past fifty years, instructional psychologists have been able to improve the effectiveness and efficiency with which the wisdom of the ages is communicated. Instructional design, however, is a neutral method; it can improve equally the learning of sense and nonsense.

In my view, the major problem facing instructional developers today is the failure to stress content validity to the same extent they stress instructional processes. The quality of the content is far more important than the efficiency of the instructional method. Certainly anything not worth learning is not worth learning well.

A review of the existing literature, interviews with practitioners, and a sampling of papers presented at professional meetings have allowed me to conclude that instructional developers are remarkably casual in the procedures they use to establish valid content. While we invest extensively in methodology designed to improve performance, we fail to invest with equal vigor in the quality of instructional content. In one recent survey of forty instructional design models, Andrews and Goodson (1980) failed to report significant procedure or discussion concerning valid content development, although, once the content has been “given,” many models explain how to analyze content into behavioral objectives and how to teach those objectives. I believe this lack of a good content validation procedure to be a fundamental and risk laden flaw in the majority of proceduralized instructional design approaches. Most basic books in the area do not even address the validity issue directly.

The Threat of Lawsuits

Independent of the professional competence issue, trainers and supervisors have been sued for “vicarious liability” when the content and quality of training programs for which they had primary responsibility proved faulty. In addition, product liability lawsuits have been filed, though so far as I know none has been successful, charging the designers and publishers of instructional materials with negligence when students were injured using their materials.

Other lawsuits have successfully challenged employee selection procedures that had adverse impact on affected classes under equal employment opportunity legislation. These cases have centered both on selection procedures and on training programs. The selection cases have normally challenged diploma requirements and traditional selection tests, while training cases have been concerned with the job relatedness question, particularly where the relationship between the job and the selection and training requirements could not be proved. (Griggs v. Duke Power, 1971; Washington v. Davis 1976; Miner and Miner, 1979.)

From a survey of lawsuits and administrative rulings it would seem reasonable to conclude that instructional developers must either become considerably more proficient in the establishment of valid content, whether for academic instruction or for job training programs, or they must face the prospect of being sued. While instructional technologists overconcentrate their attention on media selection or the improvement of instruction, in the absence of content validation procedures they could easily be developing instruction on erroneous content. The user then learns bad content in a highly efficient manner.

In an examination of several references on instructional design and associated topics, I found repeated references to the necessity of using “subject matter experts” to provide the content. The general opinion seemed to be that any old subject matter expert would do. There was very little in the way of specific methodology on how one should use the SME’s to establish valid knowledge, although students are now given charm school courses on the proper treatment of faculty members as “clients.” On the other hand, in graduate courses, students are required to learn elaborate design schemes and pet media selection strategies, even in the absence of empirical evidence establishing their validity.

It seems to me that the implicit message as well as the explicit message all of these courses give students is that the form of the instruction is far more valuable than the content. All students become proficient at formative evaluation—finding out how well instruction works, but few of them learn equally precise techniques to establish valid content. Obviously, this gap is not the result of an intentional plan, but it exists, nevertheless.

Content Validity in Job Training

Instructional content may be divided into two classes: job content, and science or discipline content. One can subdivide job content into:

1. Tasks
2. Supporting principles, science, and technology
3. Skills

There are a number of well established procedures for job analysis which
thoroughly describe either the work to be done or the kind of people necessary to do the work (McCormick, 1979). These procedures all contain content validation methods. The result of a careful job analysis is a complete and comprehensive description of the status quo. Job analysis methods are not intended to describe what ought to be done on the job, only what is done.

There is often a conflict among job-holders, supervisors, training developers, and managers over the content of a job. We have all heard the experienced supervisor tell a new employee, "Forget about what they told you in school, this is the way that we do the job here." Certainly the rational response of the new employee to such advice is not to engage in spirited debate over the right and wrong way to do the job.

Such discrepancies often exist because of the organizational structure and management reporting within the organization. Perhaps the operating employees are performing tasks that have not yet reached the training department, or the operations staff has not yet implemented new directives or procedures, or the training has become obsolete, or all of these. Regardless of the cause, these differences between training programs and jobs do exist, and will continue to exist as the organization evolves. Job structure will not remain static.

Any method used to establish valid job content must provide for periodic review and revision as the job changes and the training becomes obsolete. Like a piano or engine, it must be periodically tuned to give effective performance. Having done a craftsmanlike job analysis, this analysis must be updated to remain valid, and it is validity that is of the utmost concern.

Content Validity in Academic Settings

What about the content validity of an academic discipline or science? Interviews with university and community college instructional development specialists working in campus service organizations have convinced me that content validity is a keenly sensitive area to faculty. So long as the instructional development project is intended to serve one faculty member in a single course, that faculty member is for better or worse the SME. Since those individual faculty members are professors of record, lawsuits would seem more likely to be directed at them than the instructional developer. But, what about multi-section courses in which several faculty members share responsibility?

Such courses present different methodological—and psychological—problems. The first is to obtain consensus on course content from faculty holding divergent views. The second is to achieve agreement on the tests and scoring rules. The third is to keep the instruction and tests matched over several terms. The fourth is to match the instruction to the empirically derived entry skills of the students, and still maintain faculty consensus. In working with a number of faculty to design a course, the instructional developer will most certainly be in the middle of the content validity question.

From either the professional competence or the legal points of view, it appears that there is a considerable need to improve the awareness, knowledge, and skill of instructional systems scholars and practitioners in the area of content validity. What is learned is the critical element in any instructional program—how it is learned is definitely second priority. We are urging a new look at content validity development and would welcome any comments, objections, suggestions, or support that we can get.

Imagine the quality and gusto with which a course on Scientific Creationism could be developed. Thunder, lightning, bells, and blinding lights; multi-image in full stereo; revision and rumors of revision until that great ultimate criterion in the sky is achieved: All students score 100% on the posttest. A beautiful example of the craft, perhaps, but does that make it right?

References

Microcomputer Applications Sought

The Center for Educational Technology is seeking examples of the successful application of microcomputers in several areas:

- the use of microcomputers to improve scholarly productivity of faculty members in their own disciplines;
- the use of microcomputers in instruction at the college and university level;
- the use of microcomputers in the collection and analysis of research data in a wide variety of fields, not limited to the social and physical sciences.

If you know of good successful instances of these uses of microcomputers, please contact us by one of these methods:

1. Write a brief description and send it to the address below; or
2. Call us at (904) 644-4720; or
3. Let us know where we can call you.

We intend to compile this information and make it available to interested persons. We will be glad to share our results with you if you are interested.

The Center for Educational Technology (a division of Learning Systems Institute) is located at Tully IA, Florida State University, Tallahassee, FL 32306.

Letters to the Editor

JID invites your comments. We will publish letters from readers on any topic of interest in the field of instructional development. We especially welcome letters in response to JID articles and format.

Address: Kenneth H. Silber, JID Editor, Governors State University, Park Forest South, IL 60466.