A Reflexive Model for Teaching Instructional Design

Neal Shambaugh
Susan Magliaro

Although there are numerous models to practice instructional design (ID), few instructional models to teach instructional design have been documented. This article documents a five-year study of two instructors who collaborated on formally studying their teaching of a master's level instructional design course. A reflexive instructional approach was used, in which the teachers examined their teaching while students were being prompted to reflect on their learning of instructional design through a course-long ID project. In this article we summarize our views on learning, teaching, and instructional design. A design and development framework from developmental research (Richey & Nelson, 1996) was used to describe our teaching in terms of the design decisions, model implementation, and model evaluation across six deliveries of the ID course from 1994–1998.

A *model of teaching* is a plan that can be used to design teaching in classrooms or tutorial settings and to shape instructional materials (Joyce, Weil, & Showers, 1992). Pragmatically, an *instructional model* is a "step-by-step procedure that leads to specific learning outcomes" (Gunter, Estes, & Schwab, 1995, p. 67). Models provide new teachers with a new approach and give experienced teachers a "jumping-off place" to expand their repertoire. Teaching models give teachers a conceptual as well as a practical technology from which to teach. Considering and implementing new teaching approaches can help a teacher to understand one's view of the content to be taught, as well as to reflect on one's view of learning, the learner, and the role of the teacher (Shambaugh, 1999).

The purpose of this article is to describe the development of a model for teaching instructional design (ID) that is based on five years of collaborative examination of our teaching of a master's level instructional design course. The article is divided into two major sections. In the first section, we (a) outline our views on learning, teaching, and instructional design, (b) describe the ID course, and (c) explain our reflexive instructional model as it is currently conceptualized. In the second section, we summarize our developmental research activity (Richey & Nelson, 1996) that supports our work. We explain the methodology and how the model evolved over six iterations of the course from 1994–1998, and discuss the findings and future implications of our work.

A REFLEXIVE APPROACH TO LEARNING INSTRUCTIONAL DESIGN

An Explication of Our Theoretical Perspective

Learning and teaching

Three complimentary tenets from contemporary learning theory serve as the foundation of our instructional approach: (a) that learning is a constructive process (e.g., Bruner, 1990); (b) that learning is situated and mediated in social contexts (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991); and (c) that teaching is "assisted performance" (Tharp & Gallimore, 1988).

We begin with the notion that learning is a constructive process (e.g., Bruner, 1990), with knowledge and skills developed through building, linking, and clarifying the personal experiences that arise as learners make sense of their worlds. This purposeful quest toward making meaning of life's complexities involves many aspects of the learning enterprise, including culture, cognition, affect, and individual differences. We recognize that learning is developmental and historical (John-Steiner, 1997; Vygotsky, 1978); that prior learning experiences, along with available strategies, influence how learners perceive their world and their possibilities within it.

Our second tenet holds the notion that learning is situated and mediated in social contexts (Brown et al., 1989; Lave & Wenger, 1991). The cognitive and communicative functions that are inherent in any specific social activity are intimately entwined within everyday experiences (Lave & Wenger, 1991). Higher mental processes, such as reflection, have their origins in the social community of learners in which one resides (Moll, 1990). As Vygotsky (1978) has written, learning is first at the interpersonal level, but capable others (i.e., parents, peers, and teachers) help one to move learning to an intrapersonal level. Such joint activity is reciprocal in the sense that it requires *and* cultivates individual engagement (Salomon, 1993). Furthermore, attention to the social setting is another means of supporting intellectual activity by helping participants to fully realize their creative and problem-solving potential (John-Steiner, 1997).

Our third tenet adopts Tharp and Gallimore's (1988) view of teaching as *assisted performance,* which identifies multiple ways that a teacher can support learners, including modeling, contingency managing, feedback, instructing, questioning, cognitive structuring (Tharp & Gallimore, 1988), and reflecting (Shambaugh & Magliaro, 1995). This assistance may be the overall intent of most teachers, but by identifying and making explicit these options, a teacher becomes more aware of multiple ways to support individual learners (i.e., Vygotsky's Zone of Proximal Development, 1978). This tenet of teaching also acknowledges the heritage of learning theories, incorporating what we have learned about learning and linking "areas of knowledge into an articulated structure" (Tharp & Gallimore, 1988, p. 44). This notion of assisted performance provides us with such a structure for our weekly instruction.

Instructional Design

We view ID as a complex, intellectual process to address instructional problems (Nelson, Magliaro, & Sherman, 1988). Such ill-structured problems (Simon, 1973), in which learners and their contexts are dynamic and individualistic in nature, require a process sophisticated enough to address their complexity. Learning ID requires that newcomers practice many of the same cognitive activities required of ID experts to facilitate transfer to actual settings (Norman, 1978). These settings, however, are messy and ambiguous and require a heuristic approach (Shambaugh & Magliaro, 1996). While prior knowledge and experience enable novice instructional designers to enter the ID arena, it is through the assistance of more capable others (i.e., instructors and developers) that they can actively build on what they already know about instructional design and the instructional problem (Brown et al., 1989). Our adoption of the view of teaching as assisted performance attempts to provide this assistance. If individuals construct their own meaning from experiences in a particular context (e.g., Rogoff, 1990), then teaching should be based on teaching concepts and principles in their context of application (Rowland, 1992).

Based on these views, Rowland and colleagues (Magliaro & Shambaugh, 1997; Rowland, Fixl, & Yung, 1992) suggest ID instruction to include three elements: (a) learning design by actually designing; (b) modeling of design expertise; and (c) including reflective activities. Acknowledging Schön's (1987) idea that the best way to learn design is to actually design, the first element in ID instruction is the use of authentic ID tasks, such as a project to address an actual instructional problem. The second element involves the modeling of design expertise, such as visits from experts, developmental efforts, near-authentic projects, peer critiques, public presentations, and internships (Rowland, Parra, & Basnet, 1994). A third element includes reflective activities, which help to deepen one's understanding of the complexities of an instructional problem (Rowland, 1992). Instructional design reflection involves an ongoing cyclical or spiraling monitoring, evaluating, and revising of an instructional design and the development of competence in ID processes (Pollard & Tann, 1993). A reflective practicum for ID learning, according to Winn (1989), could adopt Schön's (1987) reflection-about-action and during-action. Such an approach is used by other professions, including engineering (Koen, 1984), social work (Siegel, 1984), and teaching (Clark & Peterson, 1986). We have added a fourth element to teaching instructional design—the need for feedback between participants on both the course content and process (Shambaugh & Magliaro, 1997). We believe that design and teaching are enhanced through collaboration with others, and that this feedback between students and instructor must be genuine, continual, and consistent.

Course Description

In our ID course we have attempted to incorporate the above four elements into ID instruction: including (a) authentic ID tasks principally through a project; (b) the modeling of design expertise by the instructors (ongoing study of the course and supporting materials); (c) reflective activities within design tasks; and (d) ongoing feedback between participants.

The instructional design process includes nine phases, including (a) learning beliefs, (b) design tools, (c) needs assessment, (d) instructional sequence, (e) assessment, (f) instructional framework, (g) instructional media, (h) prototype lesson, and (i) program evaluation. For each ID phase we distribute a task sheet, which provides the rationale for the phase, subtask procedures, and performance criteria. For example, in the assessment phase, performance criteria include timely task submission, identification of assessment purposes, rationales for assessment tools selected, timeline for their use, and match of assessment tools to project goals. We comment on weekly submissions of these design tasks, which are returned the following class session.

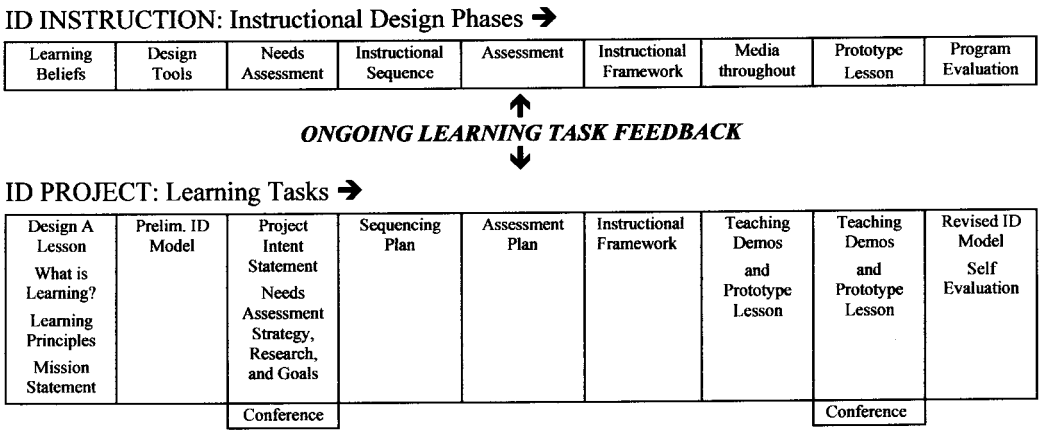
The course can be best described by visualizing and discussing the ID phases in the course sequence (see Figure 1).

Setting the Context

The first three weeks of the 15-week semester course establish the context for instructional design and include two phases: learning beliefs and design tools.

Learning beliefs. Four initial learning tasks help students think about instructional planning and their beliefs about learning: (a) design a lesson, (b) what is learning/instruction? (c) learning principles, and (d) mission statement. The design-a-lesson task gives us a means for students to reveal what they know about instructional design through a lesson plan, a task familiar to many teachers. In the what-is-learning/instruction? task, students record on paper their definitions of learning and instruction. From these definitions, we list key words on the board and inform students that many of the topics will be discussed in the course. A learning-principles task asks students to read assigned educational psychology articles and from these draw up a list of learning principles they value. This task helps activate students' tacit learning beliefs inherent in prior knowledge and current teaching practice and is used in class to discuss learning theories and their implications for instructional design. Students subsequently

Figure 1 ☐ Course sequence and learning tasks.



write a draft mission statement to consolidate their views of learning and teaching. We prompt for clarification, examine overall consistency of their statements, and encourage revision. The mission statement ultimately helps us to assess to what extent these beliefs are consistently applied in students' ID projects, and to connect educational psychology and instructional design.

Design tools. In the design-tools phase we introduce students to a range of ID models. Our purpose here is to impress on students the value of representing the ID process through models or some conceptual means of communication. We ask students to sketch a visual of their own ID model and provide an explanatory narrative, a task that articulates one's stance as a designer of instructional events. This preliminary ID model frequently adopts a broad range of personal metaphors (e.g., tree as growth) and may reveal student perceptions of educational issues, learners, and the teacher's role (see Shambaugh & Magliaro, 2000 for an analysis of these models). Students also choose an instructional problem for a project and record their initial understanding of the problem using an intent statement, which specifies target learners, intended change, length, and supporting details. We suggest ways to clarify, elaborate, or narrow the problem.

Needs assessment

The purpose of needs assessment is to learn more about an instructional problem in order to determine appropriate project goals for subsequent design decisions. Students submit a content outline, research on teaching options, learner and instructor profiles, context analysis of resources and constraints (Tessmer, 1990), and project goals, which are based on what students discover in their needs assessment. A personal conference between instructor and student, scheduled during this phase, provides one-on-one assistance with project selection and review of a needs-assessment strategy. This strategy task was implemented to help students decide what to study, with whom to talk, what references to consult, and how to summarize findings.

Design

The next seven weeks address the design phases, which include instructional sequence, assessment, instructional framework, instructional media, and prototype lesson. During the design phases, we use student mission statements (consistency of learning beliefs across project) and project goals (overall coherency of id decisions) to evaluate their projects. A second personal conference scheduled at the end of the course addresses individual project issues.

Instructional sequence. The purpose of the instructional sequence phase is to determine the order of instruction. We prompt students to match their learning goals with learning types (i.e., taxonomies) to help them appreciate the complexity of learning across different learning domains. This deeper understanding of learning outcomes provides them with a basis for translating a topical content outline to an instructional sequence, using the taxonomies as tools to sequence instruction, including simple to complex (cognitive), the degree of attitude internalization (affective), or the degree of physical coordination (psychomotor). Bringing forward data from their needs assessment, we remind students to take into account the specific needs of the targeted learners (learner characteristics), as well as the realities of the instructional setting (e.g., class size, semester length, facilities).

Assessment. The purpose of the assessment phase is to match assessment purposes with appropriate assessment methods. In this phase we point out multiple purposes to assessment, using Gronlund and Linn's (1994) classification, including nature of measurement, how the assessment is used in the classroom, and how results are interpreted. We also look at assessment tools in terms of their use as a process assessment (performance over time) or a product assessment (artifact), or in combination, such as with developmental or showcase portfolios. In this phase, students construct an assessment plan, in which they summarize the major purposes to assessment in their project, the selection of assessment tools appropriate to these purposes, and where in the instructional sequence these tools are used.

Instructional framework. The purpose of the instructional framework phase is to determine instructional strategies that address project goals. We introduce students to families of instructional models based on learning theories (Joyce & Weil, 1996). These models are examined in terms of their procedures, social system, and instructional (direct) and nurturant (indirect) effects. We encourage students to consider multiple teaching options to fully support their instructional goals. The instructional framework phase includes a written summary of the teaching approaches used in the project and a rationale for their use. Students also demonstrate in class a teaching model or strategy giving them experience in enacting this approach and receiving feedback from peers.

Instructional media. The purpose of the instructional media phase is to examine explicitly the possibilities for media and technology to support learning. Although formally depicted late in the course sequence, instructional media issues are also examined within the needs assessment and design phases as they relate to the content, learners, and instructional strategies. In this phase students identify media and technology options, justify how these options support project goals, and list considerations in their use.

Prototype lesson. The prototype lesson gives students an opportunity to synthesize the design components into one lesson for their project and to make adjustments in the overall project based on what they learn from elaborating on the details of a particular lesson. In the prototype lesson students identify learning outcomes, the location of the lesson in the instructional sequence, activities and assessment, instructional media and technology, and alternate plans of action (i.e., "Plan B"s).

Program evaluation

The final two weeks of the course address program evaluation as a systematic process to determine the effect of an instructional design on educational programs. We introduce students to the different purposes for program evaluation and suggest ways to lay out formative and summative program evaluation. During this phase of ID, students reflect on their experiences in the course through written Likert-scale and open-ended response evaluations of the course and their learning. Students also revise their ID models and present them to the class noting the differences from their initial versions.

Reflexive Model Description

Two goals of the reflexive model are to provide learners with opportunities to (a) use the ID process to think and make decisions about ways to promote learning and (b) examine their beliefs about learning and teaching. The first goal addresses ID process understanding and the uses of tools (e.g., task analysis, learning taxonomies) and processes (e.g., feedback, revision) to analyze instructional problems, design, and evaluate written responses to these problems. The second goal ensures that students as designers examine the personal or institutional beliefs that will influence how they think, design, and act. The model is reflexive because an instructor examines his or her learning, design, and teaching, and students examine their engagement and performance on learning tasks (Gergen, 1995).

Model components

The components of the model include (a) learner and teacher characteristics and roles, (b) coparticipation structures, and (c) feedback within the structures (see Figure 2).

Learner and teacher characteristics. Teachers and students are seen as coparticipants and colearners. All participants bring with them a set of beliefs about learning and teaching, including that within a reflexive approach, self-examination of these beliefs is necessary to understand one's actions as a designer or teacher. Each participant also contributes individual knowledge, competencies, experiences, human sensibilities, and motivation to the learning environment. Instructor roles within the model include those of learner, designer of an instructional environment, and teacher responsive to learner needs. Student roles include that of learner with a willingness to engage within the participation structures and perform learning tasks.

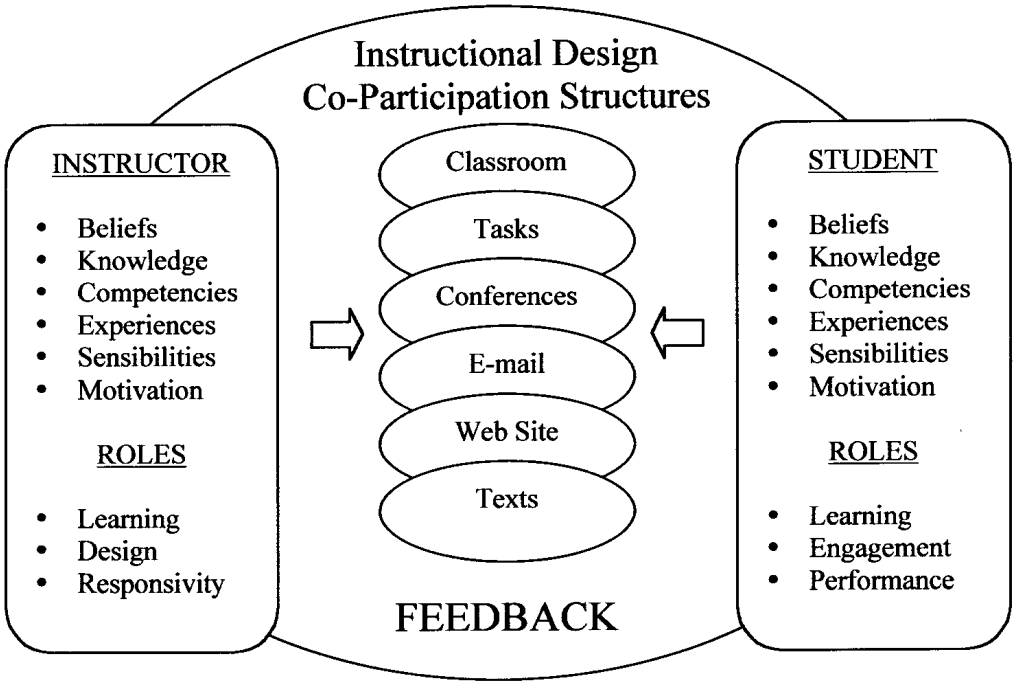
Coparticipation structures. Coparticipation structures include classroom activities, learning tasks, individual conferences, e-mail, Web site, and texts (see Table 1). Classroom activities and out-of-class learning tasks are common structures in most courses. With individual conferences, e-mail, and a Web site, we have increased options for support of student learning. We have given particular attention to how an ID text could be structured to guide learners through the ID process (Shambaugh & Magliaro, 1997). Although careful consideration must be given to the design of these structures, some negotiation of their features by students is also encouraged. The key is being open to feedback and periodically "stepping outside" a teacher's perspective to consider these suggestions.

Feedback. Feedback, a third model component, is crucial within these structures. For example, in a group activity, dialogue between the partic-

Table 1 ☐ Participation structures and features of participation.

Participation Structure	*Learner Participation*	*Teacher Participation*
Classroom	Take risks, discuss, share, reflect, work together, change roles	Structure, listen, prompt, encourage, reflect, model, solicit feedback
Learning tasks	Commit decisions to writing, revise, reflect	Structure, provide prompt feedback, prompt, encourage, question, summarize student work, and share findings
Conferences	Verbalize, think aloud, share previous experiences	Listen, question, guide, prompt
E-mail	Question, respond to student queries	Promptly respond to queries; post agendas, reminders, resources
Web site	Consult, provide feedback	Structure, update, solicit and respond to feedback
Text	Read, negotiate features, reflect, provide feedback	Structure, relate to course acitvities, solicit feedback

Figure 2 ☐ The reflexive teaching model.



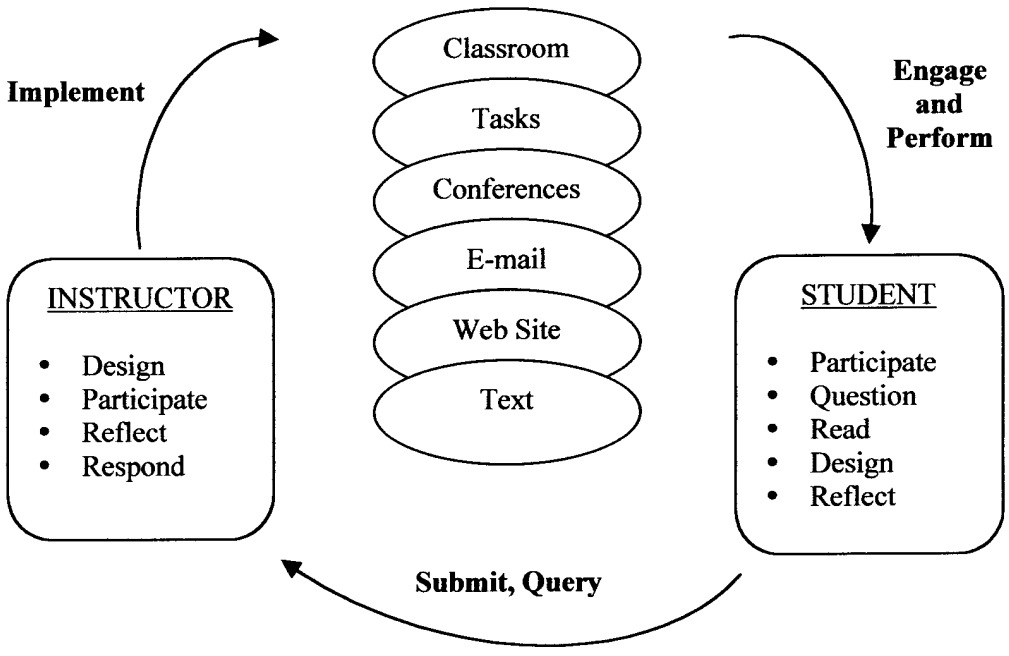
ipants enables ID knowledge and one's views and experiences to be shared in an open and testable way, initiating a shared reflective process. Cooperative learning, presentations, and peer-teacher evaluations are key strategies in this aspect of the model. In this interactive participation a class community of learners is supported. Within the structures, reflective tasks promote understanding of instructional design and one's own thought processes. Weekly written project drafts and feedback help to support the development of reflective activity.

A cycle of responsivity (see Figure 3) helps to visualize how interactive feedback within the participation structures comes into play. Initially, the instructor's role as designer creates participation structures, such as classroom activities, learning tasks, and texts. Within these structures, a learning environment is created in which students participate, question, read, design, and reflect on their learning. Students ask questions through the participation structures to provide more insight into their thinking and ID decisions. Based on student questions, queries, and task performance, the instructor responds to student needs through written comments on student work, personal conversation, e-mail, conferences, and classroom feedback. Shifts in instruction, including tasks, group activities, and instructor presentations, may be necessary. Although this cycle would be highly individualized, its representation acknowledges that any choice of a teaching model or strategy is based somewhat on how the teacher views learners and the notion of participation (Wenger, 1998).

Classroom syntax

The procedural syntax of the classroom participation structure includes (a) setting the stage, (b) representing understanding by participants, and (c) debriefing the participants. This syntax description is based on a 2-hr, 50-min class session, meeting once a week. In setting the stage, which may run from 10–30 min, the teacher welcomes students and checks for overall concerns. The teacher presents the agenda for the

Figure 3 □ Responsivity cycle.



class session, provides reminders of upcoming events and class activities, and addresses other "housekeeping" activities. Work submitted from the previous class is returned and the teacher's assessment of student performance is discussed.

The next phase, representing understanding, requires two hours. Two types of paired activities are used: group activity and minilecture. Either of these activities may begin this phase, depending on how the instructor has appraised student needs or the nature of the content. A group activity may be used to activate student thinking on a topic. A structured task is distributed in handout form. The purpose of the activity is explained, usually a task to explore this ID component or to apply what one has learned from the minilecture. Students are divided up into groups along some rationale, such as mixing professional experience, similar-dissimilar projects, or student choice. Typically, the structured task asks the group members to discuss and record a summary of issues, decisions, or questions to be reported back to the class for discussion. This inductive approach takes time, and results are unpredictable. Group activity may last more than an hour, particularly if student interactions are productive or the task is complex. The instructor may decide that what students are "representing" in their discussions and summaries requires a shift in instruction or individual response.

A more deductive approach would use a 20–30 min minilecture, or lecturette. A minilecture would typically include a visual review of "where we are" in the ID process, using a visual organizer to structure the conceptual aspects of the ID process component. With needs assessment, for example, the first lecturette would describe the benefits, features, and examples of a needs assessment, while a subsequent group activity would help students identify important learner, content, and contextual issues that a needs assessment would inform. The presentation and discussion would describe the component's purposes, rationale, uses, and subcomponents, and issues surrounding the component. Examples of its use by other students

might also be presented. Handouts of articles that address this ID component could also be distributed.

In the final phase of the classroom participation structure, the instructor debriefs students on a particular topic. The instructor explains the purpose of the next week's topic (i.e., ID phase), suggests ways to work through the task using a task sheet, and provides assessment criteria and due date. In debriefing, students are reminded of readings and activities, and are asked for written feedback through "exit slips" or e-mail.

DEVELOPMENTAL RESEARCH OF THE REFLEXIVE MODEL

The design and development cycle (Richey & Nelson, 1996) provided the framework for study of our teaching of instructional design over six iterations of the course, from 1994–1998. The objectives that guided and organized model modifications reflect the major phases of the design and development cycle (Richey & Nelson), and serve as the organizer for our findings presented case-by-case in this article:

- Describe the *design decisions* for each delivery of the course.
- Describe the *implementation* of the design decisions.
- Describe *student learning* on ID projects and *student perceptions* of their learning and our teaching.

This report of developmental research is organized into three components: (a) methodology, (b) findings, and (c) discussion. The methodology component of this section describes the research design, our participants, data sources and collection procedures, data analysis procedures, and research limitations. The findings component explains what we learned from each iteration and how the model evolved based on the decisions that we made as a result of our reflection on our teaching and student learning. The discussion component highlights the critical features of the model, the instructional and nurturant effects of the model on our students, and commentary on the future of this model for teaching ID.

Methodology

Research design

We gathered data as a normal routine of teaching efforts during each class delivery, resulting in a more refined methodology over time. The case study approach, however, was consistently used to report this research in order to describe classroom and contextual complexities inherent in teaching (Yin, 1994). As "a phenomenon . . . occurring in a bounded context" (Miles & Huberman, 1994, p. 25), the unit of analysis was defined by each course delivery. Each case, or course delivery, could be characterized as a social unit or activity setting (Tharp & Gallimore, 1988) consisting of participants and their decisions and actions (course design or requirements and participant performance) across time (semester) in a physical setting (classroom). Multiple cases "offer the researcher an even deeper understanding of processes and outcomes of cases . . . and a good picture of locally grounded causality" (Miles & Huberman, p. 26).

Participants

Case One was a five-week summer course with nine contact hours per week. Cases Two through Five were 15-week fall semesters, which met for three contact hours per week. Case Six involved K–12 teachers from a school district-university–sponsored master's program, during a 15-week spring semester, which met off campus for three hours once per week.

Given the reflexive nature of this research, the participants included 113 students *and* the two instructors (i.e., coauthors of this article) in a master's level instructional design course from a university instructional technology graduate education program. Of the 113 students, 73 had teaching experience. Instructional levels of interest included 18 elementary school, 15 middle school, 26 high school, 6 overall K-12, 29 college, and 19 training. The largest content area focus of the participants was science and technology (19), followed by language (17), computing (14), and special education (12).

The instructor of record (i.e., second author) for the six cases has taught the ID course for over

13 years and has written several papers related to the ID process, an instructional design text, and an instructor's guide. In addition, she has taught in public schools for 9 years in both general and special education settings, has developed two off-campus master's programs for K–12 teachers, and has conducted numerous workshops for teachers. The professional ID experiences of the first author include developing customized training materials for corporate clients (6 years) and producing audio and video materials (15 years). From 1994 through 1998 he assisted the instructor with the course and developed a jointly-authored ID textbook and instructor's guide. Since 1999 he has taught educational psychology and instructional technology courses at a state university. Joint pedagogical research on this model has been reported at educational research conferences since 1995.

Data sources and collection procedures

The data sources and collection procedures are explained in terms of the objectives that guided this research and development effort.

Design. We collected data to describe the design decisions for each delivery of the course (see Table 2). Data sources for design decisions included working logs, e-mail, and syllabi. Working logs recorded the first author's notes on design decisions for a new course iteration (see Table 2). E-mail between instructors also recorded precourse planning. A syllabus recorded major design decisions for each case, including course objectives, instructional materials, assessment, and course sequence.

Implementation. We also collected data to describe the implementation of our design decisions. Data sources for model implementation included working logs, e-mail, draft ID projects, and Conference #1 interviews. The first author recorded in working logs student comments and observations of student-instructor performance after each class. Outside of class he recorded his perceptions on what occurred in class, summa-

Table 2 ☐ Availability of data across cases.

Data Sources	*Case One S94*	*Case Two F94*	*Case Three F95*	*Case Four F96*	*Case Five F97*	*Case Six S98*
Teaching Model Design Decisions						
Working logs	3	2	4	4	2	2
E-mail[1]			×	×	×	×
Syllabus[2]	×	×	×	×	×	×
Teaching Model Implementation						
Working logs	3	2	4	4	2	2
E-mail[1]			×	×	×	×
Draft ID project	13	22	20	19	16	23
Conference #1 tapes		9	17	24	15	8
Teaching Model Evaluation						
Final ID projects	6	4	9	5	13	13
Course evaluations	13	22	20	19	16	23
Self-evaluations	13	22	20	19	16	23
Conference #2 tapes		22	19	19	12	

Notes: 1. e-mail collected across semester 2. A course syllabus was developed each semester

rized weekly student work, and made notes from weekly instructor meetings. E-mail was another source of instructor dialogue on weekly shifts in instruction and discussion of student needs. Comments on weekly ID project submissions were returned to students the following week. Conference #1 was scheduled prior to needs assessment and consisted of an hour-long meeting to discuss a student's mission statement, preliminary ID model, project choice, and needs assessment strategy. The conferences were tape-recorded with student permission, and a human subjects form describing our research and gaining permission to use their work was collected in class.

Evaluation. Data were also collected to describe student learning and student perceptions of their learning and the course. Data sources for model evaluation included completed ID projects, Conference #2 interviews, course evaluations, and self-evaluations. Required project components included mission statement, intent statement, needs assessment-goals, instructional sequence, assessment plan, instructional framework, instructional media, prototype lesson, and program evaluation. Conference #2, at the end of the course, also audiotaped with student permission, provided feedback on projects nearing completion. Course evaluations included Likert-scale questions (both university-developed and instructor-developed) to record student perceptions of instruction, instructors, and materials. Typical university-developed Likert-scale questions asked for student perceptions of the instructors' knowledge of subject, success in communicating, making the subject stimulating, concern and respect, grading fairness, class administration, and an overall rating. Instructor-developed Likert-scale questions asked for students to respond to their perceptions of specific learning tasks not addressed in the university instrument, such as task sheets, individual conferences, and the text. In a self-evaluation of their learning, students summarized what they had learned in the course, what would they do differently, and suggestions for the course.

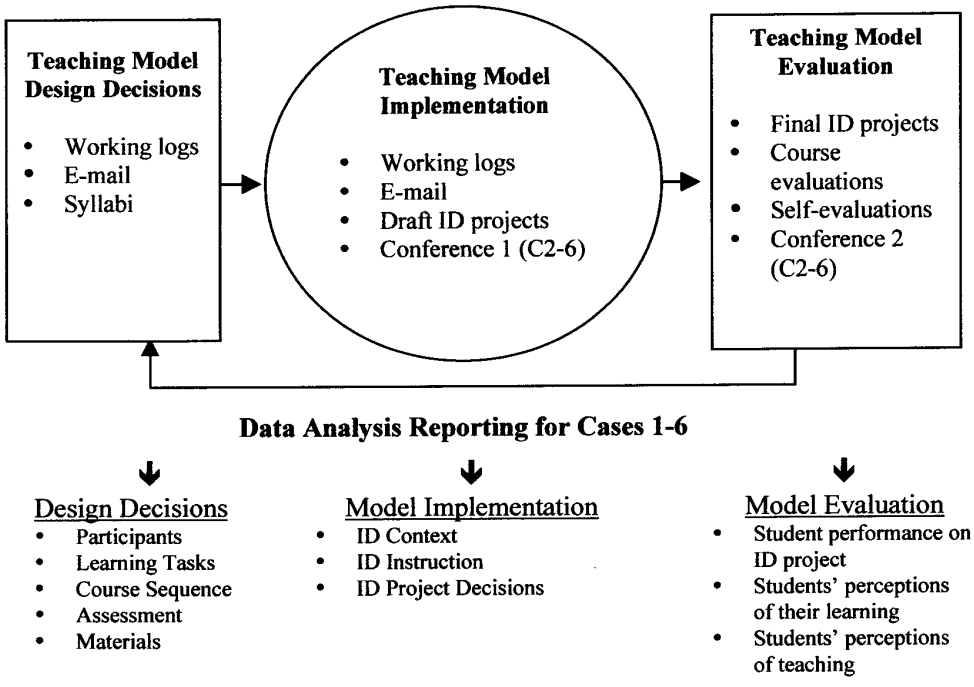
Data analysis framework and procedures

Design decisions were analyzed by describing participants, learning tasks, course sequence, assessment, and instructional materials (see Figure 4). Model implementation analyzed student performance and responses to instruction and instructor's assistance during ID context-setting activities, ID process instruction, and ID project decisions. Evaluation of the teaching model analyzed student performance on the ID project, student self-perceptions of their learning, and student perceptions of instruction. Data analysis consisted of data reduction from data sources and display of this reduced data into tables that enabled conclusions to be drawn (Miles & Huberman, 1994). Details of data analysis are described below.

Working logs, e-mail, syllabi. Design decision notes from working logs and e-mail were transcribed and categorized by course sequence, learning tasks, instructional materials, and assessment. Notes on what occurred during each class were categorized by ID context-setting activities, ID instruction, and ID project decisions. These categories were selected because they related to our teaching sequence. The syllabus for each case was compared with the syllabus from the previous case and differences summarized in terms of course sequence, learning tasks, instructional materials, and assessment.

ID projects. Weekly submissions of ID project components were evaluated in terms of performance criteria for each project component. For example, our criteria for assessment included: (a) Identify purpose of assessment, (b) provide rationales for assessment tools chosen, (c) provide a timeline for each tool's use, and (d) was there a match of tools to project goals? Final projects were analyzed for completeness, consistency of learning beliefs across design components, and coherence of design components. *Completeness* was evaluated in terms of all project components being submitted. For *consistency of learning beliefs,* the ID project was reviewed to determine to what extent students' learning principles were addressed in the projects. This was determined by consulting the

Figure 4 ☐ Data sources and analysis framework.



mission statement. For example, if a student wrote about the importance of students working together in the mission statement, we looked for this feature in the project. For *coherence* a judgment was made concerning whether or not design components, such as outcomes, content, teaching, and assessment, were in alignment with each other.

Conferences. Student comments from Conference #1 were listened to and transcribed, based on learning tasks discussed (e.g., mission statement, project choice) or course concerns, such as questions about texts, in-class discussions, or group activities. Conference #2 comments were transcribed, based on categories of student performance on the ID project, student self-assessment of learning, and student perceptions of the course.

Self-evaluations. Students were asked what they had learned in the course and for suggestions for course improvements. These written responses were coded as to instructors, instruction, instructional materials, or learning tasks.

Course evaluations. Student perceptions of instruction on university-developed Likert-scale questions and instructor-developed questions were tabulated in terms of mean frequency. Any student comments on these forms were transcribed and categorized by instruction, instructional materials, and learning tasks.

Research limitations

The data sources, which were based on observations, interviews, or documents, evolved over time and served our instructional needs to watch, ask, and examine (Wolcott, 1992). These observations, interviews, and documents were in place prior to developing the conceptual framework and methodology of the study. As a result, the data sources were not as complete, tightly defined, or structured across the six cases as if they had been researcher driven. The variation in quality and completeness of projects reflected two changes in project-model acquisition (refer to Table 2). First, project components became more numerous over time. In many

cases, certain features of projects were more well developed and worthy of note than others. Second, the policy for project collection changed. Initially, only exemplary projects were saved, but over time projects were saved because they had exemplary sections, were topics of general interest, or were simply available.

Data displays, structured summaries, and tables allowed a condensed view of the data sources and revealed that some further analysis was needed, such as coding of structured summaries to reveal themes as well as to identify exceptions and differences. In an effort to extend external validity, what participants "did, said, or designed," was examined in multiple cases. The processes of participation and feedback within participation were examined in six different configurations and can be viewed as replications of the study. The description of the model, based on what was found from this analysis, provided a set of generalizations on how the model was implemented, as well as conditions necessary for its use. The danger to this generalization was that "multiple cases will be analyzed at high levels of inference, aggregating out the local webs of causality and ending with a smoothed set of generalizations that may not apply to any single case" (Miles & Huberman, 1994, p. 194).

Sources for possible bias in this study included a large amount of data, which may have led to missing important information or overweighting some findings because of focusing on a particular and large set of data. Personal involvement with the course also increased the possibility that recorded observations in working logs highlighted particular incidents while ignoring others. Another shortcoming was not checking descriptions with students of each case and peer review outside of the coinstructor.

To address these shortcomings, multiple data sources were used to check for agreement of one data source with another. Multiple sources of data, such as working logs, e-mail, and syllabi, also provided different strengths and complemented each other. Syllabi compactly recorded design decisions, while working logs and e-mail documented thinking that influenced these decisions. Working logs served as a reflexivity journal (Carney, 1990) to record observations or design decisions that would have been lost to our collective memories over the five years of involvement. The coinstructor also audited the methodology, analysis procedures, findings, and conclusions.

Findings

Case One—Summer 1994

Case One was a five-week summer course with nine contact hours per week, and 13 students enrolled.

Design. Learning tasks included a list of learning principles, a preliminary and revised ID model, midterm exam, daily preparation and final ID project, peer feedback, teaching presentation, text feedback, and self evaluation. The ID process consisted of eight phases: (a) design tools (ID models), (b) needs assessment, (c) lesson sequence, (d) assessment, (e) teaching models, (f) sample lesson, (g) media, and (h) program evaluation. Smith and Ragan (1993) was adopted as the text, based on its use of learning principles and coverage of instructional models.

Implementation. All students identified a mix of theory-based principles in their learning principles list. Areas of disagreement identified in a class activity included teaching for individual differences, whole-to-part versus part-to-whole approaches, and content learning versus how-to-learn strategy instruction. One concern from the needs assessment activity was "How much research is enough?" Of the 13 students, 9 were judged by us to have insufficient research to inform their projects. Task and instructional analyses were introduced during the sequence phase to help students analyze the complexity of learning tasks. Of the 13, 6 were unclear about instructional and task analyses. Those students who identified a procedural task were more successful in conducting a task analysis than those selecting higher-order tasks. Some prototype lessons did not include a task analysis but did include an instructional analysis. Some students mixed the two tools. Assessment tools proposed in the projects included group feedback, portfolios, multiple choice tests, essays, observations, projects, diagnostic tests, and surveys. Teaching

presentations included group investigation, whole language, synectics (Gordon, 1971), PSI (Personalized System of Instruction, Keller, 1968), the van Hiele method (Fuys, Geddes, & Tischler, 1988), and empathy building. Customized informational packets were distributed for each student.

Evaluation. Because this developmental study was implemented after several iterations of the course were completed, only 6 of the 13 projects were available for analysis. Of the 6 projects, 4 included all ID components, 4 of the 6 achieved consistency of learning principles across ID components, and 5 of 6 exhibited coherent features, such as assessment methods with teaching; 3 of the 6 did not incorporate ID decisions from previous components into the sample lesson. Ten students who responded to the course evaluation rated their learning in the course (on a 1–3 scale) in terms of gains in knowledge and theories (2.9), problem solving abilities (2.7), and subject appreciation (2.8). Student comments from the self-evaluation included early concerns as to the "big picture" of instructional design, the language of educational psychology, constructing a project, and understanding the readings. Students rated their effort in the course as *greater than average,* that needs assessment was time-consuming, and suggested that learning beliefs be formally included in the ID process.

Case Two—Fall 1994

Case Two was a 15-week semester course, meeting three contact hours per week, with 22 students enrolled.

Design. A learning beliefs phase was added to the beginning of the ID process. Learning beliefs had always been a course activity, but not as a distinct phase of ID. A mission statement task was developed to help students consolidate their learning principles. The midterm exam was replaced with a student-teacher conference to obtain individual appraisal of student work and concerns.

Implementation. Of the 22 students, 9 reported that their learning beliefs were "expanded" after the learning principles task. All students had initial mismatches between their learning principles and their mission statement; 5 students integrated the project context into their mission statement. The form of the mission statement ranged from one sentence to a multiple-page narrative. Some students included a revised learning principles list with a short narrative. During the teacher-student conferences, student-raised ID issues included honoring student points of view, individual needs, cultural differences, and hypermedia use. Other student concerns included instructional purpose, project possibilities, consulting experts and students, and media possibilities. We prompted students to examine the scope of their content, assessment methods, safe environments, and the design of workshops. Instructional media were addressed with an in-class presentation and a discussion in a campus computer lab.

Evaluation. All of the four projects available for analysis included the required components. Two projects involving a workshop and the World Wide Web (WWW) lacked research on how these settings supported learning and the contextual issues that might limit their implementation. All four individual projects showed a consistency of learning beliefs across the project. Three of the four projects exhibited coherence across design components. These three students were familiar with the setting, learners, and intended to implement their ID. However, two of these three projects ignored the design issues of proposed workshop materials and a student handbook. The project judged to be less coherent lacked details of how the WWW could be used to help international students learn about the United States and lacked details on maintaining a Web site.

Students rated their learning on a 1–3 scale in knowledge gains (2.8), problem solving (2.6), and subject appreciation (2.6). Of the 18 students who completed the self-evaluation, 16 cited self-assessment features as helpful; 5 cited working together as a positive activity; 9 responses reported that their learning beliefs were "expanded or clarified in the course," while 6 reported no change. Students identified critical moments in the project as needs assessment (7 of

18 responses), project selection (4 of 18), and teaching models (2 of 18).

Case Three—Fall 1995

Case Three was a 15-week semester course with three contact hours per week, and 20 students enrolled.

Design. During Case Three, performance criteria were added to each of the tasks to communicate our expectations. A second conference, scheduled during the last week of the semester, was used to discuss the project and revised ID model, and for a self-evaluation. A "Listserv" was added to increase communications among students and between instructors and students.

Implementation. In the classroom, five student groups were arranged by project similarity. Discussion in these groups was structured around needs assessment issues, instructional media, and assessment options. In Case Three, we increased our discussion of assessment to include the different functions for assessment and assessment terminology, and introduced students to validity, reliability, and practicality measures of assessment tools. We added a "flexible understanding" lecturette to help students think about new ways to view content, and learners, teachers, and sequencing (see McDiarmid, Ball, & Anderson, 1989). E-mail was limited to instructor communication on class agendas and deadlines.

Evaluation. Of the nine projects available for analysis, five included the required components. Six projects revealed consistency of beliefs. Of the three that did not, one used an institutional mission statement but did not include any features that addressed it; a second project did not include a mission statement; and in the third the writing was unclear. Only three of the nine projects exhibited a coherence across their project features. In four projects goals were not identified in the assessment plan, teaching approaches, or program evaluation plan. The university evaluation gained response from 15 students, who reported their gains in knowledge (2.9), problem solving (2.7), and subject appreciation (2.7). All students regarded the effort in the course to be greater than average. Regarding our grouping strategy, 2 students wanted to stay in the same groups, 3 were dissatisfied with them, 1 expressed difficulty understanding group language, 1 was comfortable with teacher talk, and 2 had difficulty making decisions in their groups.

Case Four—Fall 1996

Case Four was a 15-week semester course with three contact hours per week, and 19 students enrolled.

Design. We implemented a new activity, a design-a-lesson task, to help students write about learning issues and introduce themselves. Course texts included the publisher's prototype of a new text, with Smith and Ragan (1993) as an optional title. Supplemental readings, which in earlier cases had been distributed in class, were available at the university library.

Implementation. The design-a-lesson task raised 21 issues. The issue most cited by students was "to provide instruction meaningful to learners." The implications of this principle for ID were discussed in class. A mission statement workshop gave students hands-on practice in writing mission statements. A Listserv allowed students to ask questions on project options and allowed us another means to prompt their thinking on what was discussed in class. The assessment phase was introduced in class by asking students to give their perceptions of assessment. We represented these terms on the blackboard as a web to visually represent assessment purposes and options. Students were divided into six groups to identify assessment issues, which were later posted on the course Listserv. Teaching options were addressed by student demonstrations.

Evaluation. Of the five projects available for analysis, four included all required components. All five exhibited a consistency of learning beliefs across the project and coherence of design decisions across all components. As one project example, a student sought to improve

language competency and cultural awareness for Korean English-speaking tour guides. The project specified a foreign-language learning model, an instructional method that contextualizes language form (e.g., sound system, word formation, syntax) instruction into a whole language lesson. The project recommended a community-oriented instructional strategy to address cultural issues of the learners. The project identified 16 weeks of lessons using television, audio, reading, games, and conversations. The student identified seven assessment tools and used a prototype lesson to illustrate how the foreign-language learning model would be used in a lesson, including assessment tools and lesson options.

Students rated their gains in knowledge and theory (2.9), problem solving ability (2.8), and subject appreciation (2.8) as *average.* Students rated group activities highly (4.4 on a 1–5 scale). Membership in the classroom groups was based on project similarity. Assessment issues differed in these groups. A staff development group asked how to assess learning in workshops. A technology group asked about how to assess learning online. A novice teacher group asked about strategies for students who did not participate in activities or hand in assignments, how to assess process versus product forms of assessment, and how to convert rich process activities to a grade. An experienced-teachers group asked how to assess students who learn at different paces and how to move away from negative connotations of assessment.

Case Five—Fall 1997

Case Five was a 15-week semester course with three contact hours per week, and 16 students enrolled.

Design. A Web site was added to increase student access to task guidelines, ID process learning hints (e.g., how to use the text), and links to resources. In-class groups were mixed early in the semester to promote diversity of discussion, while grouping by similar projects midway through the course was designed to help students learn from each other. All participants sat in a circle to increase eye contact and participation, and to change the traditional teacher-up-front and student-as-audience roles.

Implementation. In classroom groups student learning principles lists were exchanged and discussed. An in-class reading on curriculum ideologies (Eisner, 1994) was used to help participants discuss ways to view curriculum. Of the 16 projects, 8 were targeted for implementation, including 5 workshops, 5 courses, 4 Web sites, 1 summer camp, and 1 curriculum redesign. During the first conference students talked about the conflicts of designing for client expectations versus client needs. Other challenges identified in the conference included personal and academic commitments, difficulties moving thinking to paper, and the lack of a specific site to investigate an instructional problem. Questions were raised in class on how to sequence and assess on the Web. For the assessment phase, we organized a panel discussion including three faculty and students from a college teaching course. Students demonstrated a teaching model they would specify in their ID project's prototype lesson, a strategy that was formally implemented in Case Six.

Evaluation. Of 12 projects available for analysis, 5 had all required components; 11 of 12 achieved consistency of learning beliefs across design components. For example, 1 project proposed a reflective classroom community by using John Dewey's ideas (1916) as content, while another featured a teacher who documented her instructional approach to teaching writing in middle school. Overall coherence across the project was exhibited by 10 projects. An example of 1 project that achieved this coherence incorporated computer-aided design (CAD) into a middle school technology education curriculum. Goals for both instructor and learners were listed, and the instructional sequence was specified by CAD skills development and application. Cooperative learning and direct instruction were cited as instructional approaches, while assessment concentrated on skills.

Students rated their gains in knowledge and theory (2.7), problem-solving ability (2.4), and subject appreciation (2.6). From an end-of-the course evaluation, three students found group

discussion "enjoyable, felt it brought the class closer together," while two others cited the small group presentations and group interaction as positive. One student requested more time to work with groups, another more interaction, "if only for a few minutes to touch base or bounce ideas off one another." Another requested that a time limit be assigned for each person in the group to talk and to give groups enough time for discussion.

From an in-class course evaluation one student commented, "With this class I took the time to look at it [instructional problem]," while an experienced teacher said the course "caused things to come to the surface." A novice teacher said the course presented "a lot of things I hadn't thought about." Students asked for more interaction with other students on projects, and one student requested a group project to capitalize on individual strengths. When asked what students would do differently, comments included the challenge of "trying to figure out what my project was," "narrowing sooner my problem," and making decisions earlier: "I was ten weeks into the course before I made important decisions."

Case Six—Spring 1998 off-campus

Case Six was a 15-week semester with three contact hours per week meeting off-campus, and 23 students enrolled.

Design. The ID process components now included learning beliefs, design tools, needs assessment, sequencing, assessment, instructional frameworks, instructional media, prototype lesson, and program evaluation. All of the participants were practicing public school educators, participants in a master's cohort. As a result, we combined the teaching demonstrations with the project's prototype lesson and addressed instructional frameworks and assessment together, since the teachers worked with both on a daily basis. We simplified the needs assessment activity with the use of a modified KWL (what students *k*now, what students *w*anted to know, what students *l*earned) chart (Carr & Ogle, 1987), a tool familiar to these teachers. The KWHL chart recorded what they already *k*new; what they *w*anted to know; *h*ow they could find this information; and what they *l*earned (Barell, 1995). Shambaugh and Magliaro (1997) was adopted as the text.

Implementation. Group membership was varied across grade levels to encourage teachers to talk to each other. In these groups each person acted as a formative evaluator of the other's work as they discussed their learning goals, lesson sequence, and teaching options. The teachers also met on the university campus for needs assessment to meet with experts. One visit enabled four of the high school teachers to talk with three of the middle school teachers. As one of the high school teachers commented, "I feel we made a breakthrough with some of the middle school teachers. . . . I really felt I got to know some of them better."

Evaluation. The 22 teachers developed 13 individual or group projects. Only 2 out of 13 projects had all project components in place; 10 out of the 13 projects used our recommended KWHL approach to organize their needs assessment. All projects, however, lacked any research on what it meant to teach their content (e.g., spelling, science, video as a persuasive medium, calculator use, aerospace, geography). None of the projects brought forward research findings from a previous educational psychology course they had taken in the cohort sequence. Of the 13 projects, 2 by special education teachers provided more learner description than others, while 6 featured incorrect or missing task or instructional analyses.

Of the 13 projects, 9 achieved a consistency of teachers' learning beliefs across their projects. One teacher expressed in her mission statement a desire to "assist learners to reach their goals through collaborative partnerships" but did not specify what *assistance* or *collaborative partnerships* meant. Another mission statement advocated "active involvement . . . using a variety of instructional methods . . . to produce self-directed learners," but the project described only direct instruction. Achieving consistency of beliefs across components was not always responsive to learner needs. One teacher cited being "practical and hands-on" in his mission

statement, which was exhibited in activities, but these activities were judged by us as inadequate to support the conceptual learning called for in the project.

Coherence across design components was found in 11 of the 13 projects. In the 2 projects that lacked coherence, a six-week lesson outline did not match activities with goals. A second project specified goals in a mission statement, but these goals were not identified in later design components. Lesson activities were keyed to state learning standards.

The teachers rated their increases in knowledge (2.5) and problem solving ability (2.4). Teachers cited a number of benefits for their teaching, including looking at planning in detail and creating something they could use in the classroom, "being able to take the time to do some in-depth work in what I'm teaching." Others cited improvements in communication and collaborative skills, as well as increased problem-solving and creative-thinking skills. Teachers cited the course as providing "different ways to think about the learners" and "forc[ing] the teacher to look at lots of details to designing instruction and curriculum," although one student said "It would take me forever to do this for all my units." Of the 21 respondents to the self-evaluation, 12 cited *time* as the number-one constraint and negative aspect of the course. Some teachers felt the assignments were *overwhelming* and *stressful*. Suggestions included adding more hands-on activities, submitting work electronically, and reducing the number of assignments at the end of the course. Feedback on the projects included the time it took to complete them and the difficulty of meeting with group members.

Summary of modifications across cases

Design. Important changes in design decisions across the six cases are listed below:

- Learning beliefs was added as a distinct component to the ID process (Case Two).
- A mission statement task helped students to consolidate their learning principles and provided a benchmark for ID project decisions (Case Two).
- A student-teacher conference replaced a mid-term exam as a more appropriate assessment tool (Case Two).
- Performance criteria for learning tasks communicated our expectations for learning in each ID component (Case Three).
- An electronic Listserv provided another means of communication (Case Three).
- A Web site increased student access to course materials and additional design activities (Case Five).
- Grouping of students was accomplished by diversity early in the course; by project similarity midway through the course (Case Five).
- Based on the participants being a cohort of practicing teachers, we combined instruction of assessment and instructional frameworks and used a KWL chart modification for recording their research in a needs assessment.

Implementation. Implementation findings across the six cases are listed below:

- A mission statement helped us to see how student learning principles were reflected in the project.
- Goals from needs assessment were often unclear, too numerous, or were a mix of broad goals and activity objectives.
- Students found it difficult to identify specific cognitive and affective dimensions for intellectual, problem-solving activities.
- Topical lists of content tended to remain the basis for students' instructional sequence.
- Students used much of their project to specify activities, but did not always identify project goals in these activities.
- The prototype lesson and teaching demonstrations allowed students to develop the details of a lesson, including content, assessment, instructional media, and teaching approaches.
- Students found task and instructional analyses confusing, with procedural tasks being the easiest to analyze.
- Students generally used our suggested program evaluation chart, which laid out When

to evaluate, Who to talk to, and What questions to ask.

ID project performance. Projects were evaluated in terms of completeness, consistency of learning beliefs across design decisions, and coherence of design decisions. Our findings across the six cases included the following:

- Projects generally lacked much detail in needs assessment, particularly in terms of a learner profile (learner characteristics), a literature review of teaching options, or context issues.
- Students generally were consistent in their learning beliefs across the project and coherent (i.e., an alignment of content, assessment, and teaching) in their design decisions across the project. Less coherent projects tended to be unclear in their project goals or did not identify these goals in the project.
- A range of instructional media was cited, but lacked supporting details. Exceptions were Web-based projects in which the media for delivery was the principal concern. Projects that included workshops or seminars did not describe the details of supporting media, such as presentation materials, handouts, workbooks, or booklets.

Student perceptions of their learning. Overall, students reported their perceptions on a 1–3 scale of gains in knowledge (averaged 2.8), problem solving (averaged 2.6), and subject appreciation (averaged 2.8). Students also cited changes in their thinking, such as "I totally changed the way I see the world" and "I can think and listen in terms of a designer." Student perceptions of group activity were both positive and critical. Students generally regarded groups as positive activities, as opportunities to share ideas and take risks, making the discussion of reading more interesting, and helpful when confused on tasks. Comments requested more group opportunities that were better structured, more task focused, and more sensitive to members who did not understand "teacher language."

Some students cited the ID process as helping them to examine their beliefs about teaching, the complexity of an instructional problem, and "different ways to think about the learners." However, some students regarded the process (and course) as "very difficult," with too much information. Some students stated that there was too much to do to complete the project and some initially experienced confusion on the scope of the project. However, comments were largely favorable: "The project was not as hard as I thought," and use of the project was "the best way to learn instructional design."

Student perceptions of our teaching. Seven different means of "assisting learner performance" were used: (a) instructing, (b) feedback, (c) questioning, (d) contingency management, (e) modeling, (f) reflecting, and (g) cognitive structuring. Overall *instruction* averaged 3.9 on a 1–4 scale, including knowledge of subject (3.9), communicating subject (3.7), making subject stimulating (3.7), and class administration (3.8). In terms of *feedback,* students rated fairness in grading at 3.9 (on a scale of 1–4). Conferences and group activities were another source of feedback and *questioning,* in which students acknowledged one-on-one discussion and concern and attention on my work, and working with peers in class on their projects. The *self-reflection* task, conducted at the end of the course, was rated at 4.2 (on a 1–5 scale), which was just above the lowest-rated learning task, the preliminary ID model, rated at 4.1.

In terms of cognitive structuring, explanatory structures (Tharp & Gallimore, 1988), which organized content, predominated in this analysis and included course organization, task sheets, instructional texts, and project outline. Meanwhile, thinking structures, such as principals, guidelines, and heuristics, included project recommendations, such as "Keep your list of goals to five" for manageability.

Overall, course organization averaged 4.6 on a 1–5 scale. Some students regarded the course organization as helping them to negotiate the course and the weekly assignments as making the final project easier. Some students thought the pace was too rapid, with too much to do and too much paperwork. Task sheets averaged 4.6 and were cited by some as "overwhelming." while others wanted more structure. Students generally liked the specific criteria and expectations provided by the task sheets. Both texts

received the same rating when averaged over the six cases (4.3). Student-constructed cognitive structures included the ID model, ID project, learning principles, and mission-statement task. Students rated the preliminary ID model task lower (4.1) than their revised ID models (4.4). The ID project was rated at 4.9. The learning-principles task rated higher (4.6) than the subsequently-assigned mission-statement task (4.4).

Discussion

We have suggested that ID instruction should include four elements: (a) authentic tasks, (b) modeling of design expertise, (c) reflective activities, and (d) feedback (Magliaro & Shambaugh, 1997; Rowland et al., 1992). The way in which these features were implemented is summarized below, followed by the effects these elements have had on our students and us.

ID Instruction

Authentic ID learning was achieved through an ID project, in which student motivation stemmed from their freedom to negotiate the choice of an instructional problem (Dewey, 1916). Tackling an instructional problem provided many possibilities and challenges for ongoing and final assessment as students developed their project over time, not unlike those activities found in cognitive apprenticeships (Collins, 1991). As the instructional problem and project were cast as an academic task, the problem's complexity was changed (Doyle, 1983). Ambiguity and risk are inherent in academic tasks as they include evaluation. Task structuring and guidelines helped to reduce the ambiguity of the ID process for students, although the range and differences of ambiguity toward these cannot be predicted. Task selection and structuring also helped students to process new information and reflect on decision-making, and signaled task accountability.

Explicit modeling of the ID process was principally accomplished through our continual self-appraisal of the course, asking students to give us feedback on its features, and showing students the conference papers we wrote about the class. We also shared ID projects from previous classes to show that other students had successfully negotiated the course. As Rowland said, "We have to help them more naturally build on the skill repertoires they already have available" (1993, p. 37).

Schön (1983) cited reflectivity as characteristic of the professional. Applied to instructional design, we strove to practice a genuine concern for the "aims and consequences of teaching" (Pollard & Tann, 1993, p. 90). Through reflective questions and feedback, we encouraged an ongoing recursive reflectivity in which our prompting helped students gain an understanding of their instructional problem and designed features, as well as an appreciation for the ID process. We openly encouraged students to examine instructional possibilities before "closing down" their thinking on ways of teaching and assessment. Reflective activities within ID instruction are also compatible with the view that teachers working in a complex environment must experiment, reframe, and reflect before, during, and after teaching (Clark & Peterson, 1986; Schön, 1987).

Feedback between instructors, between instructors and students, and between students themselves was a critical element in our teaching approach. Effective feedback requires a genuine desire for a teacher to learn from students and what they say about you. Adding personal conferences and e-mail provided us with new venues for feedback. The development of an ID text emerged from student feedback on ways to guide newcomers through the ID process. As we discovered from student feedback, instructional design, with its own language emanating from the systems approach and educational psychology, represented a significant obstacle for some students.

Improvements. Areas for course improvement include the following:

- Improving explanations and activities for task and instructional analyses.
- Motivating students to conduct research on different ways to teach content.
- Constructing student activities to assist in goal identification from needs assessment.

- Improving explanations and examples for content sequencing rationales.
- Incorporating design thinking (e.g., systematicity, recursiveness, big-picture–details) as lesson objectives.
- Providing examples of design practice from previous ID projects, guest visits, or case studies.
- Revising group activities to improve transfer of thinking of ID understanding to ID projects.
- Examining ID issues of instructional media and technology throughout the ID process.

Model Effects

Instructional effects. According to Joyce et al. (1992), the effects of any learning environment can be instructional (direct), or nurturant (indirect). The instructional effects of a reflexive approach for instructional design included (a) examining beliefs about learning and teaching and (b) using the ID process to develop appropriate instructional interventions to promote learning. A mission statement was used to assess to what extent learning beliefs were evident in design decisions. Students were prompted to consider the consequences and influences of their learning beliefs (personal or institutional) in their design decisions. During the course, students confronted their learning beliefs by the design decisions they made and our feedback or "roadblocks" that we as instructors threw in front of them. Those participants who had taught for several years found themselves without words when we prompted them to make their beliefs explicit or provide the rationale for their design decisions.

Understanding of the ID process was evaluated by what students designed (Schön, 1987). Students were held responsible for their own design decisions, by reaching beyond their knowledge and experiences through a needs assessment, and making decisions on how this design should be constructed, enacted, and evaluated. Analyzing final ID projects by completeness, consistency, and coherence was a strategy chosen for this research; however, a more holistic assessment was used in the actual evaluation of the course. We asked ourselves what was reasonable to expect from a student's first tour through instructional design. The structured tasks and performance criteria communicated task expectations, but the overall engagement of the student to the activities and feedback was important, too. Self-examination, attention to big picture-details, iterative revisions, consulting outside sources, and examining possibilities for each of the ID components were valued as important behaviors.

Being participants in the course, we as instructors learned a great deal from students. As we modeled the ID process by requesting feedback on our course, task structure, and supporting materials, we learned from students the complexity of the ID process and what we were asking them to do. Our reflexive approach gave us increased understanding of how students viewed our representation of ID and prompted our need to reappraise our approach and to make adjustments to these representations, learning tasks, and participation structures as needed. Supporting student movement between ID process understanding and ID project decisions was an ongoing challenge as each student had unique understandings of the instructional problem and the ID process.

Nurturant effects. A number of indirect, or nurturant effects, emanated from a reflexive approach. Trust is necessary before participants can share, take risks, and learn from each other. Such trust was developed over several weeks via our provision of opportunities for students to take risks, coupled with the support we provided with each task. Timely, consistent, and genuine feedback also contributed to trust building—often after the initial uneasiness from a heightened degree of attentiveness wore off. A second nurturant effect, one inherent in a reflexive stance, was "stepping outside oneself," to learn from other points of view and to consider the possibilities in addressing instructional problems. A third nurturant effect was developing in students a sense of professional identity that comes from helping them to examine their learning beliefs and gain a firmer foundation of their role in the teaching and learning enterprise. A fourth nurturant effect was developing

habits of reflectivity by all participants. Finally, a fifth nurturant effect was seeing that teaching is worthy of study and that instructional design becomes a serious tool to systematically examine one's own teaching. Thus, what was an indirect effect of a reflexive approach has emerged into a potential instructional effect—the use of instructional design to study one's teaching.

Present status and future development of the reflexive model

The reflexive model is in a descriptive stage of development, a first step in describing a learning environment for learning of ID. Subsequent inquiry may use the model for exploratory or experimental purposes, which would allow for systematic variation of the phenomena to be further described and explained (Rowe, 1987). For example, future developmental research might include trying out inductive approaches to learning activities in which students might immerse themselves in a case study or an actual instructional problem.

Our reflexive instructional approach may be generalizable to other process-oriented curricula, in which instructors have similar views of teaching, learning, and the ID process. The reflexive model depicts participation structures for instructors and learners to engage in learning the ID process together, as instructors come to better understand the ID process from student thinking about the process. True coparticipation, the idea that all participants, teacher and students, are learners within the same setting, requires at least three conditions: (a) the willingness to share control and responsibility for learning, (b) a readiness to learn from one's students, and (c) a genuine desire to be reflexive in one's teaching and learning.

We see the systematic features of instructional design helping to keep learning in the forefront for our students. We also see the ID process as more than a tool to design learning environments, but also as a systematic means for practitioners (designers and teachers) to examine their practice. Research into one's instructional practice is a valid avenue of inquiry (Clandinin, 1986; Schön, 1987). Despite the problematic issues of researching one's own activity, inquiry by teachers and designers is essential to the development of professional practitioners. The reflexive model, although designed for ID instruction and perhaps suitable for teaching other complex human processes, is one way to operationalize practitioner inquiry and reflectivity involving teachers, designers, and learners. □

R. Neal Shambaugh is Assistant Professor, Instructional Design & Technology, at the College of Human Resources & Education of West Virginia University at Morgantown. He can be reached at nshamba@wvu.edu.

Susan G. Magliaro is Associate Professor, Teaching & Learning, at the College of Human Resources & Education of Virginia Polytechnic Institute & State University at Blacksburg. She can be reached at sumags@vt.edu.

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