A Scenario-Based Instructional Design Model

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INTRODUCTION

Instructional design models address important issues of learning, content, and context during the development of instruction. The prescriptive premise behind instructional design is that if an *instructional design* is followed, the learning outcomes identified in the design will occur. As one evaluates the extent to which learners achieve learning outcomes, changes in the instructional design may be warranted. Documenting these changes provides designers and users of the model with feedback on its efficiency and effectiveness. Despite these attributes, the merits of *instructional design* have not been achieved in some settings, and some users, including teachers and product developers, are looking elsewhere for instructional development guidance. But should they? The premise of this chapter is to propose a *scenario-based ID model* that addresses a major shortcoming of instructional design—namely, the gap between formative design decisions and design review. *Scenarios* are used to keep people designing, reflecting, and re-designing.

BACKGROUND

Instructional design has been criticized as being too prescriptive, taking too long to use, and not being appropriate to specific design tasks. Early generations of *ID models* attempted to depict one approach to address all instructional problems (see Tennyson, 1995, for a generational history). Some of these linear, step-by-step cycles and flow charts helped to understand the ID process and were suitable for teaching instructional design (Dick, Carey, & Carey, 2005; Morrison, Ross, & Kemp, 2004), while others provided procedural guidance to instructional development (Gagné, Briggs, & Wager, 1992; Tripp & Bichelmeyer, 1990; U.S. Air Force, 1999). Some models were aimed at teachers, particularly providing procedures to develop instructional materials (Gerlach & Ely, 1980; Heinich, Molenda, Russell, & Smaldino, 2001). More recent approaches (Tennyson, 1997) have attempted to model the complexity of instructional development using a more iterative, nonlinear approach.

All of these approaches present a challenge to instructors of ID. Visiting each phase of ID in a linear fashion appears appropriate for novices in a course setting. However, students come to view ID as a linear activity, which starts and ends. ID is depicted as a process that begins with an instructional problem and action is taken to solve the problem. The intensity of the problem is lessened; consequently, there is less action to solve the problem, but the problem remains (Fritz, 1989). A circular representation (Morrison, Ross, & Kemp, 2004) helps to alleviate this linear process, but newcomers ask: "Where does one start?" The circular view is more akin to artists who imagine possibilities; imaginations are brought into reality, inducing the next creation. In the top-down view, the process ends, while in the creating view the process continues. Sustaining the process, whether creating or designing, appears valuable.

Carroll, Kellogg, and Rosson (1991) depict a circular *task-artifact cycle* in software development in which tasks suggest requirements for new artifacts. Designed artifacts then suggest new possibilities and redefined tasks. The main feature here is that human activity drives the process. However, an underlying issue is that design decisions have consequences. How much time and resources should be committed to a decision? With a decision, one commits resources and is likely to remain committed to this option. The challenge is not to shut down the consideration of possibilities prematurely and deny candidate approaches a fair appraisal. One representation of instructional design borrowed from computer programming is *rapid prototyping*. Design an early version with just enough resources, then test the initial version with users, and revise based on user performance and suggestions. Rapid prototyping, however, requires a good "first guess," as one commits to a choice and subsequent investment of resources. The result is not an iterative process but more of a spiraling-down process.

Another feature of development work, involving teams of designers, users, and developers, involves the use of periodic or benchmark reviews. These may be limited to specific technical features of the work without appraising the overall potential of the design to address user needs. Here design reviews stop design. The review focuses on features and functions rather than on potential use. Similarly in ID instruction, reflective critique of students' ID decisions is frequently removed from design activity. In classroom settings in which ID is being taught, students typically hand in design work and make revisions based on instructor feedback. This traditional form of instruction distances students from thinking about responsive design decisions, those that directly impact learners. Student thinking concentrates on instructor feedback rather than focusing on learner needs.

The purpose behind the *analysis* component in instructional design is to give designers sufficient information to make a "first guess." With ongoing information gathering, data collecting, and other analysis or needs assessment activities, more informed design decisions can be made as one develops instructional materials. In general, people want to move to a solution in light of existing experience (Simon, 1996). However, students in ID courses resist analysis activity unless required. Left to their own devices, meaning their skills and experiences, students will move quickly to a design solution and are likely to proceed directly to an option they have in mind.

Analysis as a formal design component prompts designers to think about the context of the problem. *Context* resists analysis because it is complex and difficult to abstract, summarize, and database. A limitation to the development of learning environments which incorporate technology-based tools failing to address the social context of learning, such as the culture of the classroom and the school, and the beliefs and decisions made by teachers in those classrooms. How does one account for context in design? Bielaczyc (2006) suggests a *Social Infrastructure Network*, which examines cultural beliefs, practices, socio-techno-spatial relations, and external interactions. Within the ID field, the problematic nature of *context* has been discussed. Tessmer and Richey (1997) suggest a process of *contextual analysis*, while Jonassen and Hernandez-Serrano (2002) suggest *stories* as a formal case-based means to formalize context.

Thus, thinking about the implications of one's design decisions is an important activity (Rowland, Parra, & Basnet, 1994). Schön (1983) observed that *design reflection* is frequently separated in time from design activity. Depending on the instructional development process used by a teacher, designer, or consultant, significant time may pass between a design decision and a design review. As is common in a college course, usually several days or a week may pass before a student receives feedback from an instructor. A challenge for an instructor is to help students keep their decision making moving forward, but in the context of thinking and reflecting on these decisions given existing information. *Scenarios* are used to address this de-coupling of reflection from design. Bødker and Christiansen (1994) suggested scenarios as a tool to initiate and continue design conversation in the context of the design work itself. Subsequently, Gay and Hembrooke (2004) use *activity theory* as an approach to representing context and placing context in the center of design activity rather than on the periphery. Activity theory provides a conceptual or thinking tool to examine people, work, rules, tools, and artifacts. What would an ID model look like if the model addressed context throughout its process? A *scenario-based instructional design model* (SBID) is described, one variation for newcomers to ID and a second variation for ID practitioners. Such a model would be meaningful in the design of any learning setting, as one model would assist both in the teaching of ID and the use of ID across diverse settings.

MAIN FOCUS: THE SCENARIO-BASED INSTRUCTIONAL DESIGN MODEL

Scenarios are typically used as written case studies, simulations, or a set of options developed by others to serve as teaching or decision-making tools (Schwartz, 1996). Within the SBID, scenarios are user developed, rather than supplied. Carroll (2000) characterizes scenarios as "condensed descriptions" of proposed solutions to instructional needs. Scenarios involve discussions and written descriptions of individual or group decisions. Discussion raises merits and identifies issues and constraints from which participants make improved choices. Outside information can inform the subsequent decisions, but the flow of decisions occurs within a continual cycle of communication. Carroll, who uses scenarios in computer system development,

acknowledges that scenarios are rich and concrete, but incomplete. However, scenarios allow "immediate immersion in realistic domain activities" (p. 150). *Scenario descriptions* tap existing knowledge, and because descriptions are brief and quickly constructed, revisions are possible. *Scenarios* also resist what Engeström (1990) called "downward contextualization," or the filtering out of options and possibilities.

The SBID Model for Learning ID

The SBID model uses the *ADDIE* (i.e., Analysis, Design, Development, Implementation, Evaluation) components to systematically address important educational issues, such as learning outcomes, assessment, and teaching options (see Figure 1). Scenario activity occurs within each phase of ID, so the scenario approach could be used in variations of the ADDIE model, depending on how one teaches the course. In addition to the traditional ADDIE components, a *context* stage is suggested in which individual beliefs about teaching and learning are discussed, as well as different ID models (Shambaugh & Magliaro, 2001). Although *externally developed scenarios* or case studies can be used by an instructor to depict different types of instructional problems and responses (Ertmer & Quinn, 2003), *student-developed scenarios* have individual students or groups suggest a response to an instructional problem. Options are written down, discussed, and reflected upon, then revised. The configurations of individual, peer, and group activity can vary depending on the course and context. Overall, the goal is to couple design thinking and reflection as one designs, keeping the design cycle moving forward. Iterative cycles of envisioning, detailing, critiquing, and revisioning create every growing detail of an instructional design.

The scenario activity can be used at any stage of the ADDIE model, but a particularly helpful stage for scenario activity is at pre-needs assessment and-post *needs assessment* (Shambaugh, 2004). Prior to conducting a needs assessment, students discuss and write a scenario description in a class session, pairing up individuals with similar projects. This initial peer writing and sharing provides students with a draft from which to revise and submit the following week. This initial scenario description consists of three sections: a "Vision statement" describing a successful implementation of the design, a "Reality" statement qualifying the constraints on the vision, and "Next Steps" or new design decisions. Following this submission, students conduct a needs assessment, researching the content to be learned, the range of learners by learner characteristics, and the reality of the context using a *context analysis* (Tessmer & Richey, 1997). From the research findings, project goals are determined and a Project Intent document is submitted. The Intent document includes a revised scenario, a statement of the instructional problem, the major features of the proposed educational intervention, and project goals (see Table 1).

Students' *scenario descriptions*, especially at the early stages of instructional design, are typically narrative stories, which provide some insight into the student's view of the instructional problem. From the initial scenario activity, students tend to think more

Figure 1. ID course sequence and use of scenario activity during needs assessment

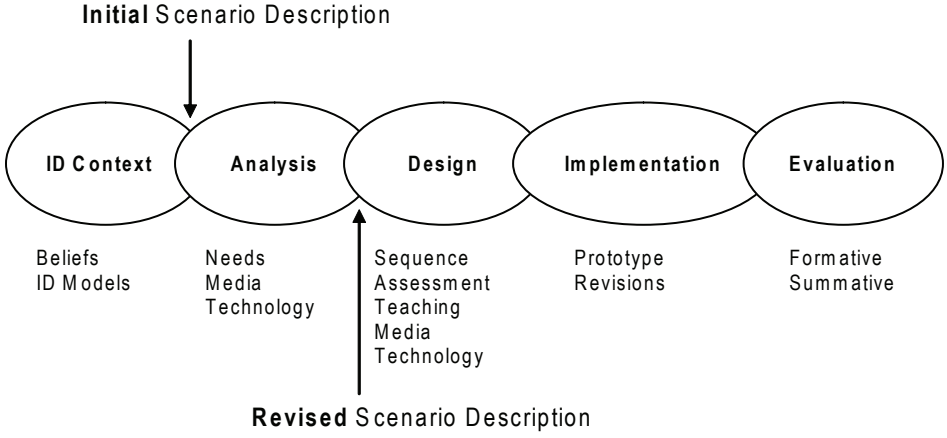


Table 1. Scenario sequence during needs assessment

Initial Scenario	Needs Assessment	Revised Scenario
Peer Review—Individual Reflection • Vision • Reality • Next Steps?	Individual Activity • Content Knowledge • Pedagogical Content Knowledge • Learner Profile—Learner Characteristics • Context Analysis • Project Goals	Individual Activity • Scenario Narrative • Instructional Problem Statement • Project Goals

clearly about what they want to accomplish with their project than in their first design activity, which asks them to identify an instructional need and how they would address this need. In their Vision-Reality statements, students write about the tensions they are feeling, such as helping their students to learn the content, balancing software skill learning with its use in learning other content, deciding who "my learners" are, and searching for different ways to teach. The form for the revised scenarios, submitted after the needs assessment, tends to evolve from "this is what I want to do" to an increasing use of narrative to depict the implementation. These narratives may consist of several points-of-view, including class scenarios, in which the scenario describes how teaching unfolds. *Scenarios* may focus on a hypothetical student case or teacher case and the specific use of learning activities. Some students may be able to focus on short-term and long-term goals. Revised scenario descriptions tend to be shorter and describe specific teaching or assessment approaches. Students have reported that the scenario activity gives them an opportunity to visualize and re-evaluate their original ideas. Students have cited the value of peer discussion and revision of their notes to link ideas, throw out others, and articulate the words to define the instructional problem.

Student-developed scenarios within different phases of ID enable students to build on what they know and reflect on the design *as* they design and re-design. Thus, scenarios apply the situated perspective, that "…learning [is] a continuous, life-long process resulting from acting in situations" (Brown, Collins, & Duguid, 1989, p. 33). Scenarios help students to envision a learning situation and what might occur in these envisioned settings. Student-developed insights, though incomplete, provide higher motivation to use needs assessment. Early scenario descriptions allow students to address the mental tension between what they would like to accomplish and what could be implemented given known constraints. Students' initial "goals" could be used to structure subsequent analysis activity. An interesting question is: To what extent should needs assessment be modified or even eliminated? This option may be worth considering in actual development work, in which team members employ scenarios in a continual cycle of design-reflect-reframe, as long as critical questions keeping learning in the forefront are used. However, the value of needs assessment as a tool in an introductory ID course to learn more about content, learners, and context still appears useful in this regard.

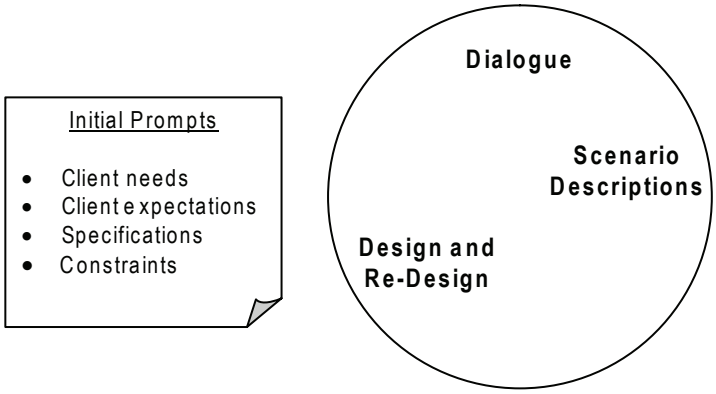
Scenarios provide individual and participatory design artifacts through ongoing cycles of designing, reflecting, and reframing of the design response based on growing understanding of the instructional problem, and awareness of options and realities. Although scenarios are limited by their incompleteness, they provide rich descriptions of the complexity of design work, and how the designer views the problem and subsequent design decisions. *Student-developed scenarios* merit consideration as a learning activity in instructional design, particularly when connected to needs assessment.

FUTURE TRENDS: THE SBID MODEL FOR USING INSTRUCTIONAL DESIGN

For more expert users of ID, the *scenario-based ID model* can still be used. The difference is that as the scenario activity continues, critical issues—such as sequencing, assessment, teaching options, and media and technology use—emerge from the dialogue, written scenario descriptions, and revisions. A continuing cycle of dialogue, scenario descriptions, and design/re-design activity occur (see Figure 2).

Dialogue, however, is more than discussion or conversation, but focused participation. Arnett (1992) argues that dialogue requires a willingness to enter

Figure 2. Emergent instructional design using scenarios and prompts



conversation about ideas and one's position, a commitment to honesty and to maintain relationships between participants, and a desire to ask value questions about the implications of one's ideas. In dialogue one must understand that the outcome cannot be predicted, implying also a willingness to take risks without knowing the outcome of an exchange of options. Why dialogue might be appropriate for instructional design use is that ID is sometimes viewed as problem solving or problem posing (Freire (1998), in which teachers and students are always "cognitive" as learners and in their respective roles as teacher and student. As students are posed with "problems relating to themselves in the world and with the world, [they] will feel increasingly challenged and obliged to respond to that challenge…Their response to the challenge evokes new challenges, followed by new understandings; and gradually the students come to regard themselves as committed." (Freire, 1998, p. 62).

Scenario descriptions consist of written records of a group's current design thinking, resulting in a design version, which can be field tested or revised. A number of dialogue-scenario cycles might take place before an actual design version is attempted. To keep important issues in the forefront and that certain issues are addressed, the dialogue can be facilitated by prompts that may differ depending on stages of a project. For example, as shown in Figure 2, an initial set of prompts involving a new project will likely focus on client needs. As in many development and consulting projects, making decisions about what the client wants and what the client really needs remains a tension. The dialogue-scenario can "play out" some options for internal or client review. The value of this approach over rapid prototyping is that a design version is not fixed too early into the development, keeping options open for consideration.

Organizations need a process that is client-responsive in terms of timeliness and effectiveness. Across many development projects, an *ID model* provides an accountability tool for scheduling and quality control. Control of information can become a critical issue, as designs are considered for archiving and possible re-use. One model cannot hope to accomplish these requirements. However, scenario activity taps the human ability to size up a situation given available information and adopt a solution. Scenarios use verbal and written language, another human attribute, to identify problems and opportunities, and to frame them for immediate use. Critical appraisals of these scenarios by others provide a dynamic form of reflection which facilitates the re-design.

CONCLUSION: IMPLICATIONS

It is hoped that the SBID is flexible enough to help novices learn instructional design as well as use it in actual instructional development. The novice variation of the SBID allows an instructor to introduce students to the value of educational issues in a systematic fashion, but to use scenario descriptions and discussion to examine the features of an ID component in the context of an actual ID problem. It is proposed that contextual prompts be available to assist the use of scenarios in actual instructional development, particularly in organizations. SBID for novices, then, is a cycle of envisioning and revisioning, while SBID for experts

is a circular dialogue where emergent issues are addressed immediately and ID prompts assist the design team to address important issues. These ID prompts can differ depending on type of instructional problem and contextual issues, such as client expectations and deadlines.

The SBID model, with its use of scenario descriptions to document the flow of design and re-design, illuminates the tensions between the systems approach and what Carroll (1990) advocates as a *minimalist model*. A major feature of the *systems approach* is specifying the learning objective, which helps the learner and teacher recognize when learning has been achieved. A downside is that learners focus on meeting performance criteria as opposed to learning. The minimalist approach is to have people design and act throughout, helping the person to immediately apply knowledge and support skill transfer. A potential downside is that the learning task is much more complex, requiring significant responsibility, and possibly creating high anxiety. The SBID for learning instructional design helps students appreciate the range and complexity of instructional problems, as well as the value of human-based dialogue and design in making decisions and taking responsibility for those decisions. The SBID requires humans to take center stage rather than the model. In earlier generations ID models provided the direction, the procedures for all problems, a reality that influenced the development of what Tennyson (1995) calls *fourth-generation ID models* and more context-sensitive, dynamically used approaches.

The SBID model may be more appropriate to what early systems theorists believed design should be about. Banathy (1996) believed that instructional design is not systems design at all. Design in his view should support transcending education over improvement, a revisioning over revising of education, and transforming education rather than reforming education. Banathy viewed ID as a closed system, as a means to design an instructional or training system, which includes defined instructional objectives that are derived from a larger instructional or training program. The design activity in educational systems involves those "who are serving the system, those who are served by it, and those who are affected by it" (Banathy, 1996, pp. 89-90). However, more contextual emphasis in instructional design has attempted to cast ID as an open system, addressing societal expectations and values, the context of the learning setting, and the beliefs of the instructor (Shambaugh & Magliaro, 1997). Scenario activity within an ID model keeps humans within the model rather than on the outside.

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KEY TERMS

Activity Theory: A system that connects contextual factors, such as individuals, groups, work settings, rules, and tools.

Instructional Design: A systematic process for responding to instructional problems, needs, and opportunities.

Instructional Design Models: Representations of how instructional design is conducted or how the analysis, design, development, implementation, and evaluation of an instructional design is conceptualized.

Scenario Descriptions: Written narratives of how one or more instructional designers envision an intended response to an instructional problem, need, or opportunity.

Scenario-Based Instructional Design: An iterative approach to instructional design where one's envisioned and designed intent is continually critiqued. Opportunities and constraints are considered in revised and detailed versions of the scenario. The goal is to couple design-and- reflect activity so that ongoing dialogue is maintained between the design team keeping the needs of the learner forefront in the instructional design.

Scenarios: Developed options for action used to consider the implications of one or more choices.

Task-Artifact Cycle: A pattern of activity, described by Carroll (2000), in which tasks depict requirements for designed artifacts, which in turn suggest possibilities and limitations for redefined tasks.