Learning from the Pros: How Experienced Designers Translate Instructional Design Models into Practice

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Understanding how experienced designers approach complex design problems provides new perspectives on how they translate instructional design (ID) models and processes into practice. In this article, the authors describe the results of a study in which 16 "seasoned" designers shared compelling stories from practice that offered insights into their design practices. Specifically, the authors extracted "rules of thumb" from their stories and examined how, and to what extent, they incorporated ID models and processes. Results suggest that while the majority of the participants referred to the use of textbook models and procedures, they typically didn't use the procedures in a textbook manner. Rules of thumb related to how to adapt models and processes in the context of project constraints and how to minimize frustrations by using very specific types of communication strategies.

Introduction

While a number of researchers have suggested that instructional designers rarely use the design models they were taught in school (Jonassen, 2008; Silber, 2007; Wedman & Tessmer, 1993), there is evidence to

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suggest that, although *not used as learned*, these models continue to play a role in the approaches that experts use when solving instructional design (ID) problems (Ertmer et al., 2008; Wedman & Tessmer, 1993). One way this may occur is through the use of "heuristics," that is, general guidelines that experienced designers apply when making decisions under uncertain conditions (Dudczak, 1995). While many have argued that ID models are too linear (Silber, 2007), too structured (Gordon & Zemke, 2000), and/or too procedural (Jonassen, 2008) to be of any practical use, others have argued that when used as heuristics, they enable "an experienced designer to be both fast and useful because he or she will make good decisions about what to do and what to skip [in the ID process]" (Foxon cited in Zemke & Rossett, 2002, p. 32).

Winograd (1975) defined heuristics, or rules of thumb, as guidelines that tend to appear in an if-then format: "If you are trying to deduce this particular sort of thing under this particular set of conditions, then you should try the following strategies" (p. 190). Schank (cited in Davenport & Prusak, 2000) noted that rules of thumb enable designers to respond to complex situations more efficiently, as they offer "plausible routes through a maze of alternative solutions" (p. 11). According to Romiszowski (1981), experienced designers apply heuristics, based on the ID models taught in school, during ill-structured problem solving. In general, rules of thumb are not derived *directly* from textbook knowledge, but are drawn from the unique collection of previous experiences and prior knowledge an expert brings to a problem situation (Ertmer et al., 2008; Kolodner & Guzdial, 1999; Schank & Abelson, 1977).

Because novice instructional designers lack these stores of knowledge and experience, they need additional methods for learning how to analyze and solve learning and performance problems. Although there is disagreement regarding the *best* way to educate novice designers (Silber, 2007), a number of instructional methods have been proposed to address this gap, including the use of both direct (internships, practicum) and vicarious (case-based instruction, guest speakers) experiences. Still, it's important to note that these are often recommended as *supplements* to courses in which the basic ID processes and procedures, including ID models, are taught (Cennamo & Kalk, 2005; Milheim, 1996; Quinn, 1994).

Regardless of where these experiential activities occur within an ID program, the primary goal is to initiate students into professional practice. Ultimately the expectation is that they will begin to "think like" designers (Ertmer & Russell, 1995; Shulman, 1992) by merging their design knowledge with their design experiences. Yet, novice problem-solvers don't readily engage in the type of reflective thinking required to

learn effectively from experience (Hartog, 2002; Kitchener & King, 1990). That is, novices have a tendency to focus on the details of the task, experiment, or project as opposed to the underlying principles at play (Reiser, 2004). Furthermore, novices often find it difficult to manage early problem-solving activities, and are not necessarily able, or willing, to devote sufficient attention to reflection (Simons & Ertmer, 2006).

Fortunately, research has demonstrated that reflection can be scaffolded through the use of structured discussions (Kolodner et al., 2003), guided prompts (Davis, 2003), and/or modeling provided by experts (Pedersen & Liu, 2002–2003). According to Collins, Brown, and Newman (1989), modeling allows for a "post-mortem" analysis of the problem solution, in which a type of "abstracted replay" is employed "to focus students' observations and comparisons directly on the determining features of both their own and an expert's performance..." (p. 458). Simply put, modeling allows novices to benefit, vicariously, from both the experiences *and* the reflections of others. Furthermore, when these reflections appear in the form of stories (or rules of thumb) they can, as Jonassen and Hernandez-Sorreno (2002) noted, "support a broader range of problem solving than any other strategy or tactic" (p. 65).

This, then, was the assumption underlying our decision to interview a number of experienced designers to elicit their unique instructional design "stories," including rules of thumb applied in practice. By examining how experienced designers solve complex problems, including how they translate ID models into heuristics, we hoped to provide novice instructional designers with another avenue for learning how to approach complex ID problems. Thus, the questions guiding our inquiry were:

- *What rules of thumb do experienced instructional designers use when solving ID problems?*
- *To what extent do rules of thumb incorporate the use of ID models?*

Method

Research Design

We used a phenomenological research framework in order to "describe the meaning of the lived experiences" of veteran designers about a specific concept or phenomenon (Creswell, 1998, p. 51). In this case, the phenomena in question were the rules of thumb designers use when solving complex problems and the manner and extent to which they incorporate traditional or modified ID models. As Marshall and Rossman (2006) argued, "there is a structure and essence to shared experiences that can be narrated" (p. 104). Specifically in this study, we examined the experiences of our participants through semi-structured interviews that took the form of personal narratives (Creswell & Maietta, 2002).

Participants

We sent an e-mail to 30 "seasoned" professionals who regularly attend the annual AECT (Association for Educational Communications and Technology) conference, inviting them to participate in the study. Sixteen experienced designers (6 female, 10 male) agreed to participate and to share a compelling "story from practice" (see **Table 1**). On average, the participants had 23 years of ID experience, ranging from 10 to 44 years. Two participants were currently working in the corporate and business sectors, while the rest were academicians in higher education. In describing a story from practice, academicians typically referred to previous consulting experiences. Story contexts varied considerably and included military, corporate, and government environments.

Data Collection

Demographic data were collected through an online survey, while stories from practice were captured during semi-structured interviews, lasting between 30 and 90 minutes. Seven interviews were completed during the 2007 AECT conference in Anaheim, while the other nine were facilitated via telephone or videoconferencing during the same semester. An interview protocol was used to guide the process, and all sessions were video- or audiotaped. The interview began by asking participants to "tell us a story about an instructional design project in which you had to solve a challenging or complex ID problem." After the participants told their stories, we used probing questions to gather additional perceptions. Specifically, we asked about lessons learned, specific rules of thumb, advice for novices, and so on. Sample questions include: "Were there any aspects of the project that could have been improved?" "What types of lessons did you take away from this ID problem?" "After having these experiences, what advice would you give to someone who has just discovered that he or she is in the same situation?" "What is your greatest challenge when trying to solve ID problems?"

Data Analysis

Interviews were transcribed verbatim, then checked for accuracy with the interviewees. Following this, transcripts were read carefully and significant statements highlighted and extracted, specifically those related to general guidelines or principles that appeared to frame participants' ID decision-making. These statements were then organized into themes that were common across transcripts. For example, we combined all the statements that referred to using a design model or systematic process into a theme

Table 1. Participants' demographics and description of story contexts.

Participant	Years of Professional ID Experience	Current Work Context (years in position/rank)	Story Context
Bichelmeyer	20	Associate Professor (6 years) Faculty (14 years)	Industry, large telecommunications company Creating a new employee orientation program and building a company culture
Boling	25	Associate Professor (15 years)	Small independent company working with a large publishing firm to create early reading software (using Apple Ile's)
Branch	24	Professor (8 years) Faculty (25 years)	Training company (intern) Developed tax training for accountants working with clients of significant net worth Consulted with transportation company; led development of training development model for the learning service unit
Cates	34	Associate Dean (2 years) Professor (34 years)	Department of Defense (consultant) Building a multimedia engine for teaching thinking skills to middle school students
Dabbagh	11	Associate Professor (3 years)	Academia/Industry, project manager Managing an internship experience for students; partnered with an underground coal mining operation, to create a refresher training system for supervisors
Gibbons	33	Chair—Instructional Psychology & Technology Dept (4 years) Faculy (15 years)	Military (consultant) Multiple projects described (capturing the evolution of his design thinking) including: (1) Redesigning an existing course for marine officers (how to plan an amphibious invasion) (2) Creating training to teach helicopter pilots how to conduct anti-submarine warfare
Grant	10	Assistant Professor (5.5 years)	Academia Creating an assessment of Web-based instruction for another department
Loughner	15	President of Loughner and Associates Inc. (10 years)—company that develops custom content training	Pharmaceutical company; lean operations initiative leading to redesign of work processes and organizational change
Merrill	44	Retired from academia Visiting professor FSU (2 years) Consulting Prof BYU Hawaii (3 years)	Center for International Entrepreneurship (consultant) Creating online business course for non-business majors using real-world examples
Parrish	20	Managing Instructional Designer (9 years)—Atmospheric research group	National weather agency Introducing (demonstrating the benefits of) a small-scale numerical weather prediction model

Pedersen	10	Associate Professor (2 years) Faculty (8 years)	NSF grant, project manager Creating virtual learning environments for middle school science, designed to increase student engagement and ability to do scientific inquiry
Quinn	19	Associate Professor (11 years) Faculty (15 years)	Academia/Industry, project manager Managing apprenticeship experiences for students who developed training for a new version of company software
Simonson	34	Professor (24 years) Faculty (33 years)	Military (consultant) US Navy, Surface Warfare Threat Matrix Creating software to teach naval officers how to identify enemy ships, weapons, and aircraft
Spector	20	Associate Director, Learning Systems Institute (3 years) Professor (11 years)	Air Force Research Laboratory Creating CBT to teach research scientists acquisitions technology
Tracey	21	Associate Professor (1 year) Faculty (7 years)	Insurance company (consultant) Moving / Closing / Condensing call-centers
Wilson	30	Professor (20 years)	Exploring strategies, such as blogging, to increase student engagement in an online course

called "ID models." Other themes related to communication or documentation protocols, initiating ID projects, and the unavoidable influence of project constraints.

Results and Discussion

We begin our results with a caveat: Extracting rules of thumb from experienced designers is somewhat akin to asking subject matter experts to share things they know almost intuitively. As noted by Michael Simonson: "The thing about rules of thumb is that unless you think about them as rules of thumb, they are just something you do by nature." Dave Merrill voiced a similar thought: "You realize that, of course, those of us who use rules of thumb have no idea what we do, right?" Additionally, when you take these types of heuristics out of context, they can lose much of their significance (Jonassen, 2008). However, because our participants spoke in detail about specific design experiences in which they had been engaged, their rules of thumb "bubbled up" as it were, as they described (and at times, relived) the situations. Therefore, not every rule of thumb was automatically recognized as such by the participants themselves. For

example, as Elizabeth Boling described the importance of using visuals to communicate with a client (a rule that many other participants described as well), she commented: *People can almost never tell you what they want until you show them something they don't want.* We interpreted this statement as a related rule of thumb that guided her practice, and, not surprisingly, this was echoed by other participants also.

In the next section, we present rules of thumb that appeared across participants' stories. Specifically, in this article, we focus on heuristics related to four categories: using ID models/processes, applying the ID process in practice, designing within context/ constraints, and facilitating communication with clients and other stakeholders.

Using ID Models and Processes

Do experienced designers use ID models and processes in their practice? Apparently so. After reviewing participants' interview transcripts to find references to either specific ID models (e.g., ADDIE, Dick & Carey), or specific ID processes and procedures (e.g., looking for coherence between goals, activities, and assessment) we found that 14 of our 16 partici-pants used ID

models to frame their thinking about design problems. Use of the models ranged from following a fairly structured and systematic approach to incorporating model components in a more holistic or modified way. Only one participant claimed *not* to use models, while the remaining participant focused on the instruction being designed without explicating the design process used.

As expected, there were noticeable differences in the design models and processes described by our participants. As noted above, a number of participants (n = 6) described their uses of a structured and systematic approach to ID. For example:

Mike Spector: We were creating computer-based instruction to do all kinds of things and, we did, we followed the standard [ID] practice.

Mike Simonson: "We went through the whole ADDIE model in the process and wrote it up that way."

Rob Branch: "We were able to use the instructional design process. This was a group that was committed to the *entire* instructional design process."

Michael Grant: "I definitely have the models ingrained in my head really well, and so to me, that's a significant rule of thumb that I have, that I see analysis, design, development, implementation, and evaluation. I see that in my head."

Others, while not describing a specific model, described their completion of the major steps of an ISD model (n = 3). For example, Nada Dabbagh and Barb Bichelmeyer stated, respectively:

My basic rule of thumb, which always drives what I do, is aligning learning outcomes with the design strategy with the assessment, which to me is the core of instructional design, no matter what you're doing....Just to make sure, comprehensively, if [we] have gone through the whole process of analysis, design, development, implementation, evaluation.

I go from figuring out what is educational, then I figure out what objectives does somebody need, or what objectives can we clearly articulate that would represent those changes we want to have occur, and then what kind of practice and feedback experiences do we have and how much change do we need to have and how many different ways can someone see this.

Finally, four participants described their use of an adapted ID model. For example, Pamela Loughner stated, "We pretty much use that same [ID] process and we've adapted it now because it helps us internally all speak the same language." Andy Gibbons, in describing how he looks at design problems in terms of "layers" noted, "And what happens is...it's not that ISD goes away, all the tasks that are in ISD still have to be performed. It's just that they may come in a different order, slightly different order....What we are trying to do is to find a core principle that can generate our solution for us."

Given practitioners' uses of ID models, perhaps we need to reconsider Silber's suggestion (2007) that this is an inefficient way to teach our students. While it is not wise to suggest that ID models are applied rigidly in practice, they still seem to provide a solid framework for thinking about design problems. What might be more important (and that which is actually suggested by many textbook authors) is helping our students understand how the ID process is modified and adapted to fit changing needs. The stories shared by these practitioners provide one means for illustrating the flexible, or heuristic, use of ID models in practice.

Applying the ID Process in Practice

Even though the majority of our participants referred to the use of textbook models and procedures, they typically didn't use the procedures in a textbook manner. That is to say, when asked how they got started on an ID project, they didn't necessarily describe beginning with a needs assessment and ending with a formative or summative evaluation. Rather they described how they concentrated on aspects that provided the best focus or the best entry point into the project. For example, Barb stated, "I realized I would do much better and be much more effective and efficient when designing instruction, if I did it with the end in mind. It's very much about reverse engineering." Mike Simonson reported a similar approach: "I identify what the deliverables are, what do we want to be able to accomplish at the conclusion of the project, and then work backwards from there." For Nada, the context of the project provided a useful starting point: "First thing I do...Well, I try to learn about the context of the project. I try to learn, you know, what am I supposed to do, how well defined the project is." Similarly, Andy described the importance of knowing the constraints, "The first thing I do is I look for the constraints that have been placed on the project. Those constraints are the key to design." Two participants, Monica Tracey and Ward Cates, talked about the importance of knowing the learners, as they believed this paid big dividends in the long term: "Invest as much time as you can in your audience analysis because it pays probably the biggest returns of all of them" (Ward). Monica stated, "Always, always, always start with the learner....You know, how are we going to get them there [to the desired outcomes]? I always start with the learner, that's just one of my rules of thumb."

What becomes apparent in these stories is that practitioners tend to complete front-end analyses tasks in a very fluid manner, rather than in a prescribed or pre-determined order. This is similar to what Ertmer *et al.* reported (2008) in their study of seven expert designers who engaged in a think-aloud process while

reading and analyzing a complex ID case narrative: "...[participants] did not follow their models on a one-to-one basis like a recipe. Instead they used their models more broadly and heuristically" (p. 30). Many, many others (e.g., Romizsowski, 1981; Wedman & Tessmer, 1993; Zemke & Rossett, 2002) have suggested the same. The stories told by these practitioners suggest a *responsive* approach to gathering relevant information about the project at hand, that is, an approach that changed depending on the specific context in which they were working. As noted by Andy earlier, it's not that the various design tasks aren't completed. Rather, they are completed in a different order, including where the process begins. It is important that novices understand the relative fluidity of the design process so that when they begin an ID project, they can gather the information they need to move forward without getting stuck on completing a certain task (e.g., needs assessment) in a certain sequence, or at a certain point in time.

It's not surprising that almost every participant (n = 12), even those who didn't *start* with outcomes, noted the importance of determining end goals or learning outcomes as a key to successful design. For example:

Susan Pedersen: "My focus anytime I've got something to design, whether it's a class for graduate students, or I'm working on another project—my focus is on—what are our goals? What do we want to see down the line?"

Mike Simonson: "I identify what the deliverables are, what do we want to be able to accomplish at the conclusion of the project and then work backwards from there."

Jim Quinn: "There are two things I definitely want to know about. First of all is, what are the expected outcomes of the instruction and [2nd] what is the content?"

Brent Wilson: "That's the question I want to ask...How'd that [strategy or technology] connect to the learning goals that you have?"

Pat Parrish: "When I approach any ID problem, I always try to use the mantra that, "Okay, what do we want people to be able to do?"

While intuitively it makes sense to focus on outcomes, novices don't necessarily have these same kinds of intuitions. Perhaps textbook authors and ID educators should be more explicit about the importance of determining learning outcomes, suggesting that, in practice, many experienced designers use outcomes as the fulcrum around which the rest of the process revolves. As one of our own professors once stated, "If you only have enough time and money to do one thing, that one thing would be to determine the learning outcomes." This provides a very practical

starting point for many projects and is something of which novices should be more aware.

Being Sensitive to Context/Constraints

Despite the fact that the designers in this study referenced conventional ID processes and models in their stories, they were quick to point out that their design decisions fluctuated based on the context in which they were working. This is similar to what Campbell, Schwier, and Kenny (2006) reported in their study: While designers often referred to ID models and processes in their conversations with one another, their practices varied significantly, depending on the specific context. Constraints have a strong influence on what can be accomplished, as well as the manner in which things get accomplished. According to Jonassen (2008), "...successful design must address the constraints imposed by the context" (p. 26). Jim explained it this way: "We don't get to do the 'best' instructional design we want to do (if we define 'best' as being what the learners need) because of reasons to do with budget or time." Andy stated that the first thing he did was to "look for the constraints that have been placed on the project" as they are "key to design." Pamela agreed: "You have to be sensitive to the context. It's probably the biggest thing that will help you be successful or not."

Knowing how to create quality instruction within given constraints is an important lesson for novice designers to learn. Furthermore, it's important that they consider, not only the "optimal" design they could create to meet a given need, but also alternative designs that would "satisfice" (Jonassen, 2008), if specific constraints were imposed. As Brent stated: "Keeping the quality up with the resources that you've got and usually resources are...you don't have that much time and you don't have that much money and you've got to make compromises, not just in your models and theories, but in what you do. And so keeping the quality respectably acceptable within the constraints and—everybody knows that; that's just basic ID."

According to Michael Grant, one way to address those constraints is to identify them early on, and then to design with the constraints in mind. "It was really ingrained, very early in my head, about how limitations at the end impact what you are able to do at the beginning. And so understanding what those limitations are, really makes it more successful for you, to not have to redo work." Elizabeth used a similar approach in working with multiple stakeholders and production personnel: "If you are the instructional designer, you keep an eye on, you keep a hand in, if you can, you make every effort to be part of what is often called THE production process. You can't create a plan for the instruction, hand it to somebody and say 'make me stuff' and then get mad at them when they come back and

it isn't the stuff you want." Based on our participants' suggestions, novices need to be keenly aware of how design decisions are impacted by constraints. One way in which designers keep on top of current and potential constraints is through the use of strong communication strategies, discussed next.

Facilitating Communication

Although project management and communication are not common components of most ID models, many of the designers in this study explicitly emphasized the criticality of communication to the success of any design project. As Rob noted: "You need to know the process, you need to know the skills sets, but communication plays a prominent role." By and large the designers in this study had developed their own strategies and rules of thumb for communicating with clients. Since this is not typically taught in our ID programs, novice designers could benefit by understanding how experienced designers approach this task.

Six of our participants described the importance of using visuals to communicate with clients. For example, Monica described how she approached a client after an initial meeting uncovered a much larger problem than she had been hired to solve: "You know, I didn't come in with 'I think you should.' I came in with visuals and a documented process that I think they needed to follow. So really, it has to be documented. And they have to be very clear—a designer has to be very clear on their recommendations because the client doesn't know." Five others talked about developing a "scope" or "design" document or "work plan" as a way to communicate with the client. Susan explained that these types of documents helped to "raise decision-making to a conscious level." She elaborated, "I try to pin people down. I put things in writing and I say, 'Do you agree with this? Is this accurate? Let's change this until it's accurate.'"

Rob, Jim, and Barb talked about sending confirmation notes after face-to-face or phone meetings to clarify the decisions that had been made during the meetings. According to Jim: "When people see things in print, they are prompted sometimes to add something to it." Rob explained, "The confirmation message is worth gold. After a meeting, very soon after a meeting, same day if possible, 'thank you for the meeting; I look forward to taking care of these things/items that we discussed at the meeting which were...these things and here's the action item list I am drawing from that.'" Barb described her communication efforts as helping to educate her clients: "So, so much of what I do...is justifying why I'm doing what I'm doing, educating them about how this is a value to them, doing all those things so that really doing the actual instructional design is kind of a piece of cake in the end."

Finally, additional rules revolved about the importance of being "sensitive" to a client—culturally, politically, and interpersonally. For example, Elizabeth noted, "In your career you are probably going to need to educate 3,000 people on why you are doing what you are doing and you can't educate them by simply admonishing them." Rather, you pull people in by listening to them, asking questions, understanding their language and their perspectives. This was the approach that Brent described: "I listen and ask a lot of questions. And in very broad strokes, [I] sketch out the situation of what needs to happen in the situation. And that is, I just tell people, think out the problem. It's like, a lot of it's a mirroring process...validating what they [the clients] think." When Pamela was asked how she gained an understanding of her clients, she responded: "By listening to them. By listening to what questions they ask you." Similarly, Rob noted: "You need to listen more than you talk." While none of these rules would surprise most of us, we believe they provide a practical means for novices to begin to translate their ID book knowledge into meaningful strategies for practicing ID in real contexts with real clients.

Implications and Conclusion

Although designers may not be able to readily articulate the rules of thumb they use in their practice, storytelling seems to be an effective means for extracting them from practitioners. In this study, asking participants to "share a story" enabled them to think and talk about their design practices in the context of a very specific situation. Furthermore, while rules of thumb are very individual, they often have a universal quality about them as well. That is to say, when we hear other's rules, it's easy to find ourselves nodding in agreement. This, then, suggests that not all rules of thumb are idiosyncratic, but rather, may be commonly used by experienced instructional designers. Thus, sharing rules of thumb may allow others to benefit, vicariously, from the rules we have developed through experience. Furthermore, when presented as "lessons learned" or rules of thumb, extracted from designers' stories (and thus holding onto the relevant contextual details), they could prove beneficial to novices. According to Wilson (2007): "Near the core of IDT is a prescriptive stance, a valuing of design principles to help solve learning and performance problems. Seeing practitioners as designers of solutions adds to this prescriptive stance with greater emphasis on stories and shared experiences over formal design models" (p. 344).

We believe that the results of this study have implications for the education of designers. Based on the stories told by the 16 practitioners in this study, we suggest the following possibilities:
(1) Given that 14 of our 16 participants described

explicit use of ID models and processes, we believe that we should continue to teach our students about these models and processes. However, we temper this recommendation with the suggestion that students should also be given the opportunity to listen to the stories of experienced designers so they begin to understand the fluid manner in which the models are applied.

(2) In teaching our students about ID models, we should remind them that the design process can begin at any number of possible points: for example, with learning outcomes, constraints, the intended audience, or with the type of learning experience we want the learners to have. The core of ID, as noted by Nada, may have more to do with alignment of goals, strategies, and assessment than with the order in which these components are addressed.

(3) We do not design in a vacuum and it's important to uncover, as early as possible, the context in which the design will be created and delivered, including the constraints that will impact both the design process and the deliverables. While a context analysis is typically part of the front-end analysis of many ID models, many of our students never learn how to design within a variety of constraints. As recommended by Rob, perhaps we should get in the habit of requiring students to propose at least two viable options to meet a design need. Furthermore, consideration must be given to the associated budgets and timelines for any option proposed.

(4) Finally, we need to help our students learn how to become effective and responsive communicators. While not part of most ID models, communication was stressed by almost all of our participants. Their strategies for working with clients, including the use of visuals, post-meeting communications, or detailed design documents, offer wisdom and practical advice from which novices can benefit.

We began this study with a question about how designers use rules of thumb to guide their practice and with the additional goal of identifying the extent to which ID models played a role in that practice. While we agree with Silber's (2007) assertion that "there are issues with the way we teach ID" (p. 5), we urge caution in assuming we must toss out our linear ID models and processes and teach *only* principles and heuristics. Rather, we suggest supplementing these models and processes with stories from practice that can effectively illustrate how these models and processes are adapted in light of given constraints. As Schunk (2001) noted, "vicarious learning accelerates learning and saves us from experiencing many negative consequences" (p. 128). According to Terry Bickman (cited in Zemke & Rossett, 2002), there's value in both the algorithmic and heuristic aspects of ISD. Teaching students a step-by-step algorithmic ID procedure, while also stressing that the process can serve as a set of guidelines or heuristics when making complex decisions, offers a method that appears to more closely mimic what designers do in practice.   □

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Transmergent Learning and the Creation of Extraordinary Educational Experiences

Peter C. Honebein

Transmergent learning is a macro instructional strategy that increases the likelihood of exceptional educational experiences, where creativity and innovation reign. By blending the principles of transformational experiences with evolutionary and emergent properties of complexity theory, instructional designers are able to craft an educational experience weaving ten instructional tactics that together simulate a neural network. The result is an environment in which students can create new knowledge and tangible results that are more than the sum of the parts, that is, extraordinary learning.

Wow! That's what I say when my students, whether they be undergraduates or working professionals, do something in class that is truly extraordinary and inspiring. It may be a project they complete, a question they ask, or a statement of perspective they make. Whatever it is, I (and most likely the other students in the class) sit in silence for a moment while the full impact of what we've just witnessed is absorbed. It is brilliant, enlightening, and provocative. I say to myself, "That's much better than I could have done."

Imagine, the instructor, a recognized expert in the field, being outperformed by his or her own students! Some people might resent such an event. I find it to be Wow! Extraordinary!

In this article, I share my research from the past five years into something I call *transmergent learning.* Transmergent learning is an instructional strategy that

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