Toward a Model of Development for Instructional Design Expertise

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The Need for a Model of ID Expertise Development

The nature of instructional design practice, its skill set, and the quality parameters for its process and products have been fairly well-documented. It has now been well more than a quarter of a century since terms such as "the ADDIE model," "the Dick & Carey model," and Gagné's "nine events of instruction" entered our collective vocabulary. The field of instructional design (ID) has come into its own, championed by national and international organizations and educational institutions. It is taught in academic programs around the world and draws professionals by the thousands to conferences and training events every year. Instructional designers can point to myriad sources, including the *Instructional Design Competencies* (Richey, Fields, & Foxon, 2001), to see the nature of how expertise is defined in the field of instructional design.

We have identified the "gurus" in this field; however, one might naively ask, "what makes an ID guru an ID guru?" In more academic language, we might ask: "What are the essential elements of expertise in instructional design and how are they communicated?" What are the signposts on the pilgrim's path to greatness in instructional design? We know how to identify an expert designer and can reasonably define the skill sets that serve as goals for the development of ID expertise, but we have yet to develop a compass that points the way to get there. In short, we know what it is to *be* a good instructional designer, but we know less about how to *become* one.

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Unpacking the Characteristics of Expert Instructional Design

In applying theories of expertise to instructional design, it is necessary for us to first identify what expertise in instructional design looks like. Unlike expertise in a skill area such as chess, which is measured by victories and losses, identifying expertise in instructional design is a somewhat fuzzy affair. Generally our field has taken a product-based approach to assessing instructional design. That is, we are interested in creating efficient and effective instructional products. The expert instructional designer is one who generates products that work. These products should consistently meet the goals for which they were created and do so in a manner that is not only effective, but efficient and perhaps somehow elegant as well.

However, our view of expertise in instructional design goes well beyond the product. We are also interested in the *practice* of expert instructional design. Expert practice across domains involves extensive content knowledge, flexible retrieval of that knowledge, sensitivity to patterns of meaningful information, the development of organized conceptual structures to guide problem representation, and the adaptive application of a knowledge base to address diverse needs and contexts (Bransford, Brown, & Cocking, 2000). Expert practice in the specific field of instructional design has been found to involve complex thinking, a thorough and systematic design approach, strategic global planning, the use of iterative and integrative processes, and the reflective selection and use of design strategies (Perez & Emery, 1995).

The Development of Expertise

In seeking to better understand how expertise develops, Anderson (1985) and Ericsson (1996) emphasized the role of practice in the development of expert skills. However, Sternberg (1996) and Winner (1996) have emphasized that practice is not enough to develop true expertise and that ability or talent may play a key role. Others view expertise development as a complex, individualized process influenced by many factors, and these propose models to explain that process. The National Research Council synthesized a set of *characteristics of experts* in contrast to novices across domains, and then, based on these characteristics, proposed using instructional principles for nurturing the development of expertise (Bransford, Brown, & Cocking, 2000). What this brings us to is that we have four models for the development of expertise: a talent model, a practice model, a unique process model, and a "follow the characteristics of experts" model.

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Each of these approaches has merit and brings us closer to understanding the nature of expertise across domains. We can come closer still by specifically addressing the development of expertise in instructional design.

The Development of Instructional Design Expertise

Instructional design is a complex problem-solving task, which is creative, active, and iterative. To become expert in a complex problem-solving task, novices must develop adaptive expertise. Because the specific features of each problem vary, problem-solving experts must develop fluency in applying requisite principles to develop a solution that matches the need while adapting to nuances in relevant problem features (Perez & Emery, 1995). The development of expert ID knowledge underlying the recognition of problem types requires organized conceptual structures to guide how problems are represented and understood. It further requires the development of complex knowledge sets organized by conditions of use, since knowledge must be thus conditionalized to be readily activated when needed.

Beyond the adaptive application of expertise, problem-solving experts are metacognitive, able to monitor their current level of understanding and recognize when it is inadequate. In problem-solving tasks (such as instructional design), the ability to metacognitively monitor one's approach to problem solving is an important aspect of expert competence. To become problem-solving experts, novices must learn to step back from their initial simplistic interpretation of a problem or situation and question their relevant knowledge and strategy. Because the nature of ID expertise is highly integrated, support for its development needs to be integrated, treated as a holistic system rather than as a set of discrete principles.

Empirical Support for a Model of ID Expertise

Our research has focused on tracking the development of novice instructional designers over a year-long course sequence in ID. Clearly we are not transforming absolute novices to high-level experts in a single year. However, we have seen what we believe are important patterns of development toward more expert-like thinking and practice in that time, and those developmental patterns are of interest here.

The participant group is diverse with respect to cultural background and national origin, in career fields, and in prior ID knowledge and experience. Briefly, we have seen the following patterns of development in ID expertise across this diverse group:

- (a) Novices who begin with less prior knowledge and experience tend to take a didactic approach to ID and to omit detail in their work. In contrast, novices with more prior knowledge and experience produce designs that are highly organized and detailed.
- (b) Some novice characteristics that promote more effective development of expertise are: persistence, skill in rational analysis, and attention to instructor feedback. Some characteristics that create difficulty for novice designers in developing ID expertise are a reluctance to reflect on one's own work and hesitation to criticize the work of colleagues.
- (c) Course elements that, from the students' view, tend to more effectively support their development of expertise are: collaborative assignments, peer feedback, and individual interactions with the course instructor.
- (d) Novices with teaching experience are more familiar with the notion of learner-centered design. Those with corporate or military backgrounds find resonance with the systematic method of instructional design. Thus, students' professional background and experience also influence their perception and understanding about instructional design and have implications for the development of ID expertise.

A Conceptual Model of ID Expertise Development

A model of expertise development must address at least two key elements (see Table 1 and Figure 1): (1) the differential characteristics of novices and experts (the "before" and "after" profiles), and (2) a trajectory or model for the change process. Based on the literature of instructional design expertise and our teaching and research experience, we propose the following conceptual model.

Table 1. Characteristics of ID novices and experts.

	Novices	Experts
Thinking	Simplistic Limited Representation Superficial	Complex Multiple representation Reflective
Design Practice	Didactic Linear Mechanical Assumptions	Integrated Holistic Strategic Rationales
Design Product	Brief Outlines Discrete Single Solutions	Thorough Details Organized Alternative Perspectives

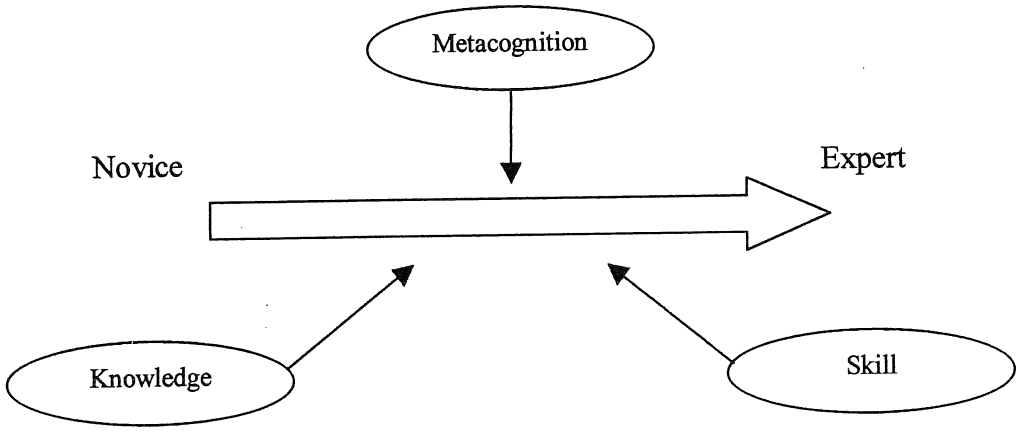

Figure 1. This model depicts the progress from novice to expert thinking, practice, and production. This progress is facilitated by the influence of knowledge, skill and metacognitive reflection.

Differential Characteristics of Novices and Experts

(a) In terms of thinking, experts' thinking is more complex than that of novices. While novices' problem representation and solution development tends to be more limited, that of experts tends to consider multiple alternatives. Experts also tend to be more reflective, utilizing metacognitive skills to adaptively apply instructional design principles to various contexts.

(b) With respect to instructional design practice, experts tend to integrate instructional design knowledge, skills, and tools and apply them effectively and holistically. In contrast, novices tend to be more didactic in applying instructional design principles and using them in a linear fashion. Experts are more strategic in their ID approach, whereas novices may be more mechanical in following instructional design procedures. Experts are able to articulate rationales for design strategies, while novices often present design decisions without offering any rationales.

(c) Regarding design products, experts are more thorough and detailed, while novices are brief, generating sparse outline structures in their design work. Experts also are more organized and systematic in design work, while novices are more random and discrete. Experts tend to seek unknown information and understand various potential constraints that may hinder progress toward goals and provide alternative solutions, while novice work tends to be more linear. Novices seem to be limited to providing single solutions, while experts incorporate multiple, alternative perspectives.

A Model for the Change Process

We recognize three dimensions of expertise which are important to transformation of a novice into an expert instructional designer: expert-like thinking, design practice, and design products. Achieving expertise in these three dimensions requires three layers of knowledge and skill. The first layer is "knowing," that is, domain-specific factual and structural knowledge about instructional design principles. A second layer involves the skillful and adaptive use of various instructional design tools in different design contexts. A third layer of expertise involves metacognition, the self-awareness and self-regulation of one's problem solving activity. These three layers are presented here in order of increasing complexity. However, they are not arranged in a discrete hierarchy parallel to the three dimensions of ID expertise; instead, they may be seen as underlying the three dimensions of expertise in ID.

While it is important to use the "practice model" to develop novices' expertise through hands-on experience over time, it is also important to use the "follow the characteristics of expert" model to bring a novice instructional designer to the expert level. Instructional strategies based on this model include modeling, coaching, and scaffolding. The different characteristics of experts and novices, with the three layers of expert knowledge and skills, provide powerful guidance for expert modeling by clarifying the gap

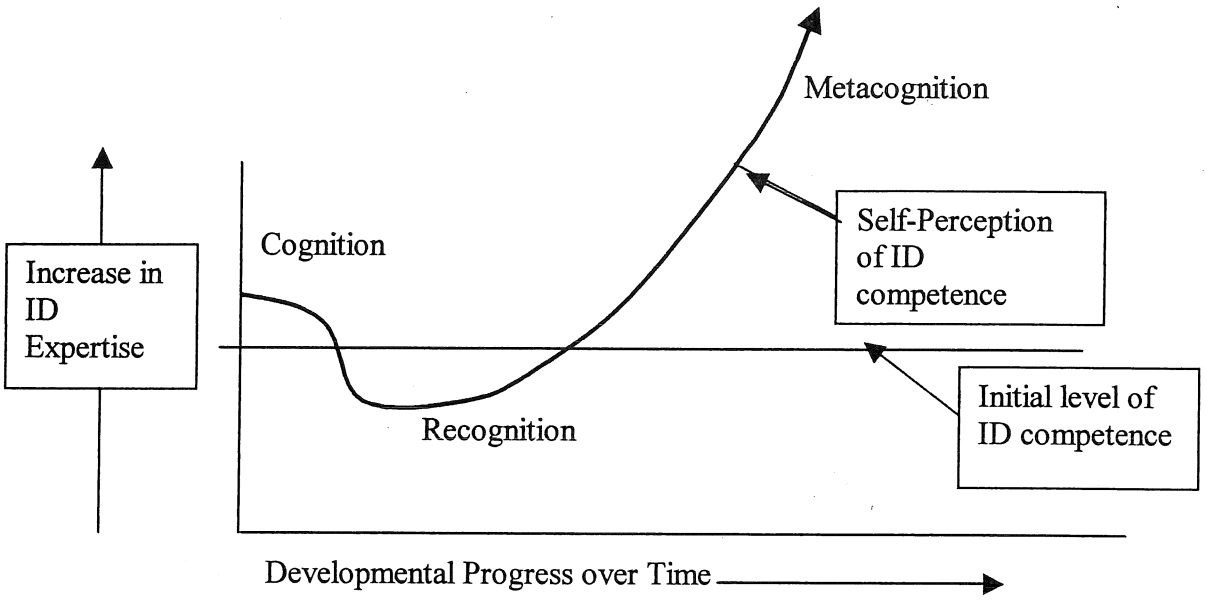

Figure 2. As students of instructional design begin the journey toward expertise, their initial thoughts about ID and their perception of their own competence in ID decrease. This recognition of their lack of expertise is then remedied though a metacognitive process during which they regulate their practice towards growth in ID expertise.

between novice and expert designers, not only in product but also in process.

Modeling can be done through comparing expert and novice design thinking, design practice, and design products. Instructional support can be provided to facilitate novices acquiring the three dimensions of expertise in instructional design. In addition, instructional support should be provided to develop students' expertise in solving ill-defined instructional design problems in areas of problem representation, developing rationales, and using metacognitive skills.

We know that self-perceptions are critical to the development of expertise, especially with regard to recognition of what is known and not known relative to the goal of expert practice. When learners first approach a new skill, they may perceive themselves as more knowledgeable than they are. Recognition of their lack of knowledge (the gap between their current knowledge and the target level of expertise) creates a perceived decrease in knowledge.

If learners are mentored and coached effectively, they respond to the challenge of this gap by focused learning and development, closing the gap. This process is typical for novices in ID who have backgrounds in teaching and related fields, since they often begin with unrealistically high perceptions of their own knowledge and skill in designing instruction. For these reasons, we propose a curvilinear trajectory in some novices' perceived development of ID expertise (see Figure 2). Because self-perception (relative to the target level of expertise) is so critical to development, novices should be given frequent and detailed feedback on their progress toward the target of expert ID thinking, practice, and product.

Conclusion

While our research findings are still emerging, the model which has emerged from them may provide some guidance for those seeking to foster the development of ID expertise in others as well as those seeking to improve their own design practice. Specifically, ID educators must create opportunities for students to develop toward expert characteristics in their design thinking, design practice, and design products. ID students' thinking should move from the simplistic to the complex, from one-dimensional interpretations to multiple representations, and from the superficial to the reflective. Students' design practice should become more integrated, holistic, and strategic, and should be supported by solid rationales. Students' design work should be thorough, detailed, and organized, and should include alternative approaches. This model may serve as a compass to guide our work in developing expertise in instructional design for ourselves and for our students.

Although this approach has emerged out of research into the development of expertise in ID, this model has obvious implications for the development of expertise in other areas as well. There is certainly much overlap in the process of expertise development across domains. ID, as a complex problem-solving domain, should have features in common with other fields characterized by complex problem solving and in which skilled practice involves similar processes. Thus, the model we are developing, and which our research supports, may be applicable to similar professional fields. However, we are cautious about applying it more generally without empirical research to support that application. We simply observe here that it could apply to other fields beyond ID, because the theoretical linkages suggest the potential for broader application. □

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