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New Steps for Designing Complex Training / Learning Environments? European Scholars Evolve Systematic, Holistic Design Methods for Complex Training/Learning Contexts

As we evolve deeper into the knowledge age, this massive societal transformation is creating learning needs very different from those that our educational and training systems were designed to meet. For the success and stability of our society, it is essential that we redesign those learning systems. The key markers of our societal transformation provide some guidance as to how our learning systems should be redesigned. Additional guidance can be found in the other changes more closely related to learning systems: the growing complexity of tasks, the increasing reliance on collaboration in performing tasks, the growth of Web-based learning, the increasing power of performance support systems, and the emergence of personal tutor systems (Reigeluth, 2005, p. 211).

Background: Contextualizing the Van Merriënboer and Kirschner’s “Ten Steps”

This review begins by locating the new and innovative design approach on the topography of the instructional design (ID) field. It goes on to identify the potential readership/audience and the scope of the work in terms of authors’ intended use of the Ten Steps model. The review closes with a summary of chapter content.

Overall, the Ten Steps to Complex Learning concept is appealing. However, it is possible that this work is quite complicated for beginner readers in the design field to use well—particularly ID students who could find the steps easy to use out of the intended contexts outlined cutting-edge authors. As such, this review is written for experienced design readers who like the idea of holistic task-based design and I confess, after years of using case-based graduate ID design courses, I am such a reader.

Staying on the leading edge of significant work in the instructional design field means that we must read literature from scholars around the world. Indeed, many contemporary academics accept that instructional design is necessarily changing during the knowledge-based society. This is particularly true when designers consider issues related specifically to the design, instruction, learning and instructional in much more complex
There are different ontological responses to “Doing ID” (Wilson, 2005), so it may be worth locating this work on that landscape before outlying the Ten Steps content. In this field, our ontological compasses point to, ranges from direct design systems paradigm approaches, as in this book, to more social-relational or human resources paradigms (Visscher-Voerman, & Gustafson, 2004; Visscher-Voerman, Gustafson, & Plomp, 1999). Some scholars suggest that a big part of the answer to designing for today’s more complex learning environments is more a function of designer identity and relation-building than other model-use factors (Campbell, Schwier & Kenny, 2005; Schwier, Campbell & Kenny, 2007). From a similar and somewhat more macro perspective, Ten Steps to Complex Learning: A Systematic Approach to Four-Component Instructional Design is a guide for the training designer who designs learning while working (and perhaps leading) within an even greater context of integrated and continuously changing leadership, policy, community and social transformations (Duffy & Reigeluth, 2007).

Van Merriënboer and Kirschner (2007) and others like Spector, Ohrazda, Van Schaack and Wiley (2005) respond to the limitations of older design approaches by offering us a Ten Steps design blueprint process where they claim they do not follow the “traditional atomistic approach” (p. 9) because they focus on more general (task oriented) learning objectives that go beyond a limited list of highly specific objectives. Van Merriënboer and Kirschner propose here that by using this Ten Steps prescriptive method for designing a holistic instruction and learning environment, learners are invited to construct knowledge, skills and attitudes in very complex settings. By using their context and learning environment steps, they suggest that designers can now aim more precisely for the integration of declarative, procedural and affective learning in complex training settings: “So as to develop an integrated knowledge base that increases the chance of transfer of learning” (p. 7).

Though this reviewer had to read the text twice to contextualize this approach in terms of the sweep of theory and practice evolutions in the instructional design field among the various settings (i.e., training and development, K-12, higher education), the focus and audience for the work is clearly laid out by Van Merriënboer and Kirschner (2007):

The Ten Steps can be seen as a model of instruction design specifically directed toward programs of vocational and professional education, job-oriented university programs (e.g., medicine, business administration, law) and competency-based training programs in business, industry, government and military organizations. It will typically be used to develop training programs of substantial duration … to design—a substantial—part of the curriculum for the development of one or more professional competencies or complex skills (p. 10).

**Potential Audience**

The book is complicated in some ways. The authors use a mix of instructional design and development terminology from research grounded in Europe, perhaps, so for this Canadian reader, it took some time to learn the nuances in the lexicon and relate them to both design and development lexicon. This might be an issue for new designers and experienced designers reading from different cultures or academic backgrounds. As such, I suggest the use of this book in the university setting, particularly for graduate students in ID programs who have acquired general design theory and who have had exposure to other prescriptive model approaches. In a design class for example, it would be great designer learning to explore this fascinating progression from 4C/ID design into this more robust Ten Step model—I suspect we will see continued development of the approach over time (Van Merriënboer, Clark & De Croock, 2002).
Design practitioners with this background will also be able to employ this approach best as a bridge between classical ‘design’ and ‘development’ phases in a training project for example—particularly where high levels of learner competency achievements or task automaticity are a requirement required from the design project.

**Scope of the Book**

The graduate level ID students I teach at the University of Calgary tend to gravitate to the 4C/ID model because of it’s focus on the learning task as a whole—seemingly less theoretical at first. Indeed, this is part of the lure and constraints of the Ten Steps. In Chapter 3, the authors explain the scope of the Ten Steps model in the ISD context, referencing the ADDIE model to summarize: The Ten Steps is narrower in scope and focus on the first two phases of the instructional design process, namely, task and content analysis and design. In particular, the Ten Steps concentrates on the analysis of a to-be-trained complex skill or professional competency in an integrated process of task and content analysis and the conversion of results of this analysis into a training blueprint that is ready for development and implementation. ... [It] is best applied in combination with an ISD model in order to support activities not treated in the steps, such as needs assessment and needs analysis, development of instructional materials, implementation and delivery of materials and summative evaluation. (Van Merriënboer & Kirschner, 2007, p.36) The authors go on to point out that at the ‘front end’ this instructional design they assume that this design process works where a performance problem can be solved by training. They go on to say that at the ‘back end’ of design, the Ten Steps results in a highly detailed training blueprint that forms the basis for developing instructional materials (p.27). Indeed, the Ten Steps mark the transition (phase) between the classical ‘design phase’ to the ‘production phase’ and this is the scope of their intended application for designers. This is important detail for readers who might think that these steps work in all front- and back-end design contexts at this time—but that’s not the case. A detailed read of the algorithm used to lay out the systematic logic of each step shed new light on developing design for complex learning—and it’s fair to say that the steps and their sub-components make for careful, slow reading and a complicated logic.

**Content Organization**

Chapters 1, 2 and 3 aim at the development of a series of learning tasks that form the backbone of the educational blueprint with Chapter numbers matching step numbers: Step 1: Design Learning Tasks; Step 2: Sequence Task Classes; Step 3: Set Performance Objectives. These chapters should be read first.

Chapters 4 through 9 identify the knowledge, skills and attitudes necessary to perform each learning task in the progression of tasks: Step 4: Design Supportive Information: Step 5: Analyze Cognitive Strategies: Step 6: Analyze Mental Models; Step 7: Design Procedural Information (for automaticity in learner performance); Step 8: Analyze Cognitive Rules; Step 9: Analyze Prerequisite Knowledge. Chapter 10 focuses on the design of part-task practice for learners’ situations where their performance can cause danger to life and limb. The remaining Chapters 11 – 15 address media for learning tasks, self-directed learning and assessment and the future directions of this interesting model (research).

**Summary**

This book presents instructional designers with a more intuitive, holistic way to address complex learning situation design for learning and performance. I found it an exciting rearrangement and extension of ID
One of the tenets of complexity theory is that the work should render the infinitely complex more simple (Nicolis & Prigogine, 1989). These authors define complexity as the ability of a system “to switch between different modes of behavior as the environmental conditions are varied” (p. 218). By their definition, complex systems are able to adapt to their environments. Similar thinking appears embedded in the Ten Steps model, where complex learners can integrate knowledge, skills and attitudes. The approach is also embedded in inquiry, guided discovery, project based, case method and design based education approaches. The great difference is that these authors have provided a logic and complex, even potentially recursive design method for specific training—it is ideally suited for, and has already been used in enterprise training systems processes to augment training reality—perhaps this is part of the future of its evolution as it involves more of Wilson’s (2005) consensual learning (where learners help guide design).

As Reigeluth (2005) points out, “It is a great challenge to teach higher levels of learning and not to over-whelm learners with the great complexity of real-world tasks … for it is counterproductive to provide the learner with too much complexity at once” (p. 210). Van Merriënboer and Kirschner’s (2007) new Ten Steps approach provides a finely detailed, holistic design prescription with a lot of user latitude. It shows good potential for experienced designers to use if they want to avoid training (context) problems endemic to the Knowledge Era. This book is an important read for learning environment design professionals or scholars who trace the latest instructional design trends.

References


