Instructional Design in 4 Dimensions

Charles Reigeluth, PhD

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Q: In your Elaboration Theory, you emphasize the importance of building from simple to complex concepts in instructional design. How do you see this approach evolving in the context of current technological advancements in education?

A: Advancements in virtual reality (VR) and augmented reality (AR) primarily impact the ability to foster learning in authentic project environments – they enhance project-based learning. The Elaboration Theory's Simplifying Conditions Method (SCM) offers powerful guidance for sequencing projects for learning a complex task that is composed primarily of procedural components, primarily heuristic components, or any combination of procedural and heuristic components. There is little need for any further evolution to greatly support the design of projects that utilize VR or AR.

I see advancements in artificial intelligence (AI) primarily improving designers' ability to offer personalized tutorials to each learner, for use just-in-time during each project. But it can also be a tool for instructional designers. SCM is irrelevant to the former, but as AI learns about SCM, it will be able to design sequences of projects for designers. Here also, there is little need for further evolution of SCM. A sound sequence is a sound sequence, regardless of what technology you use.

Q: Your Simulation Theory offers a framework for the instructional design of educational simulations. How have you seen this theory be best integrated into modern e-learning environments, especially with the rise of virtual and augmented reality in education?

A: I don't have access to how people have used what I have written, and people don't tend to share that information with me. However, that article is one of the most highly referenced that I have written, so apparently quite a few people have paid attention to it. It is still highly relevant today for the design of immersive learning environments and virtual worlds.

Q: Your books, 'Reinventing Schools' and 'Vision and Action,' advocate for learner-centered education systems. Which of your recommended strategies and approaches do you think could be impactfully applied for adults who are learning in the workplace?

A: There are two sides of the coin: vision and action. Vision is about what learner-centered instruction should be like, and action is about how to transform from the teacher-centered paradigm to the learner-centered paradigm. The vision is laid out most clearly in the Vision and Action book. The principles most relevant

for adult learning in the workplace are:

Competency-based learning (CB targets, CB progress, CB assessments, and CB records)

Learning by doing (project-based, problem-based, task-based, maker-based, etc.)

Instructional support (coaching and just-in-time tutorials during projects)

Personalized learning (goals, projects, support, assessments, reflections)

Collaborative learning (team-based, peer coaching)

Instructor as guide on the side

Self-directed learner

Technology as tool mostly for the learner rather than the teacher

Nurturing culture

In the book, the action side of the coin is targeted to school districts, but some of the guidance is still relevant to the workplace. Personalized, competency-based learning, also called the learner-centered paradigm, requires a fundamentally different mindset about how to foster learning, along with a related set of values about fostering learning. The change process must promote this different mindset and set of values for it to succeed. Also, the traditional change process is autocratic – top-down and bureaucratic. That can work well for piecemeal change, but it does not work well for paradigm change. This means that the change process must be founded on a different set of values and principles.

Put learners first in all decisions related to workplace learning.

Build a shared vision of the system that promotes learning and empower all to help realize that vision.

Promote change in mental models.

Promote broad stakeholder involvement and ownership of the change process.

Use a consensus-building change process.

Use participatory (or developmental) leadership for the change process.

Ensure political support for the change process.

Build readiness and capacity for the change process.

Use ideal design and invention during the change process.

Use emergence and leverage to enhance the success of the change process.

Use the stages of prepare, envision, transform, and evolve for the change process.

Use many of the "continuous activities" described in the book throughout the change process.

Q: You developed the Formative Research method to improve the relevance of educational research to practice. Could you share some insights on how this methodology has influenced instructional design research and its practical applications?

A: I haven't heard much about how FR has influenced ID research, but I do know that downloads and reads for my publications on FR have spiked and are among my highest. So there seems to be a lot of interest in using FR. Whatever impact it is having should be primarily on improving the design guidance that is currently available to practitioners. Of course, it also means that more research should be done in real-world practical settings.

Q: What advice would you give to workplace learning practitioners who have developed a lot of multimedia development skills, but are light on understanding the instructional design theories and models background? Where should they start? What are the most important things to know?

A: The quality of instruction depends much more on knowledge of instructional methods than on knowledge of multimedia development. To start learning about sound instructional design, I recommend my latest book, Merging the Instructional Design Process with Learner-Centered Theory: The Holistic 4D Model. Chapter 5 gives important guidance for macro-level sequencing of instruction and designing PBL. Chapter 6 gives important guidance for mid-level sequencing. And Chapters 7 and 8 provide guidance for teaching individual skills and understandings, which usually has the greatest impact on learning. In Volume IV of Instructional-Design Theories and Models, Chapter 8 provides good guidance for designing multimedia games for learning. And Dave Merrill's book, First Principles of Instruction (2nd Ed.), is a great resource.

The most important things to know are micro-level methods, such as generality, example, and practice with immediate feedback for teaching a skill, various tactics for teaching causal understanding and others for teaching conceptual understanding, and presentation and practice with repetition, prompting, chunking, and mnemonics for teaching information. Perhaps next most important is methods for sequencing the instruction, such as the Simplifying Conditions Method on the macro level and easy-to-difficult

examples and practice on the micro level. Design of projects is also important. Selection and utilization of media are typically least important.

Q: Based on your research into technology in education, what are the key technological advancements you foresee being most impactful for the instructional design of adult learning and training in the workplace?

A: VR and AR are super important for providing immersive learning environments for PBL. AI is helpful for providing personalized, just-in-time tutorials and coaching for use during PBL. Another issue is what kind of technology platform can best support learning in the workplace. In my 2015 article about PIES (Personalized Integrated Educational System), my research team and I lay out a set of design specifications for such a system. It addresses four major functions: planning for learning, instruction for learning, assessment for learning, and recordkeeping for learning. It has detailed design specifications for each of those four functions and for some less important functions. When developed, such a technology platform will greatly enhance workplace learning.

Q: What are your thoughts about the application of AI technologies in learning and instructional design?

A: AI is a quantum advancement. We can only see the tip of the iceberg for what it will be able to do. It can create personal tutors, and it can be a tool to help design projects for PBL. And it can obviate the need to learn a lot of what previously needed to be learned for good job performance. So, it is a performance tool as well as a learning tool and ID tool.

Q: If you could travel back in time and give career advice to yourself – what would you say?

A: Devote a bit more time to networking. Don't be department chair. Do more research directly in school districts and workplaces.

Q: Anything else you would like to say?

A: Guidance for designing instruction for the workplace or anywhere else has typically taken the form of an ID process that breaks tasks down into little pieces and designs instruction for each of those pieces. This fragmented approach is mechanistic, reflecting Industrial-Age thinking.

In contrast, the learner-centered paradigm, with its focus on the learner experience, benefits from a holistic approach to

designing instruction (as well as a holistic sequence within that instruction, as reflected by the SCM). Furthermore, many current ID process models use a waterfall process – a linear sequence of steps. This is not the way designers find it most useful to design instruction. Consequently, with funding from the U.S. Air Force Air Education and Training Command, I have formulated, along with Yunjo An, an ID process that takes a holistic approach, starting with a fuzzy vision of the instructional system (top-level design) and proceeds to work out progressively more details for that vision (on the mid-level and lower-level of design). This results in a more creative and coherent design for the instruction.

Our process, called the Holistic 4D Model, also is highly iterative and flexible, with cycles of analysis, design, and evaluation taking place multiple times within each level of design. Another important innovation in our model is that guidance for which learner-centered instructional methods to use when is integrated into guidance for the ID process. I suggest you consider the Holistic 4D Model www.reigeluth.net/holistic-4d for designing learner-centered instruction in the workplace.