

An Interview With Jeroen J. G. van Merriënboer

Michael Crudden

INTRODUCTION

Following a reading of *Ten Steps to Complex Learning*, I was presented with an opportunity to conduct an interview with one of the authors, Jeroen J. G. van Merriënboer. In the book, van Merriënboer describes how learning is constantly evolving to meet the needs of increasingly technical occupations. One fundamental issue cited in the book is the inability of education and learning to achieve transfer of learning (van Merriënboer & Kirschner, 2007). This interview

explores that thread, focusing on the front-line educator and the communication challenges of innovation. The exchange was conducted online via e-mail, in the form of a series of questions presented at one time. The response received addressed each question in a single message and shared some of his thoughts on the idea of developing a working language for teachers to engage in development.

We as a discipline are continuing to expand the capabilities and reach of educational technology. Some in the community are fortunate to be part of focused teams, with on-demand access to specialized resources like computer programmers to develop applications. Many of us are isolated in classrooms across the country, countless armies of one with limited resources but big ideas. Whether part of a group or individual, we are all talking along closely related threads, if not identical threads. Most of us in the field are neither computer programmers, nor graphic designers or network engineers. We are practitioners with a vision and a desire to see that vision come into being. So how exactly do we do that?

Once an idea is created we need to be able to transmit the idea. This transmission needs to capture both the technical detail and the essence of the concept, a difficult proposal. Engineers are able to communicate highly technical ideas to other engineers, through numbers. To understand



Michael Crudden,
22215 Bear Mountain View Circle,
Chugiak, AK 99567.
Telephone: (952) 807-4223.

those numbers, all one needs is an engineering degree. You or I (I am not an engineer) can look at a schematic and appreciate some basic elements, but for the most part lack the ability to interpret how each nuance is essential to the design.

Engineers do not communicate design plans in narrative form. They learned long ago that besides not being practical it is inadequate for their needs. A need was identified to communicate highly technical information in a standardized manner that could be understood by all in the field. They created a language, a method of communicating that effectively packaged all of the detailed information of their idea and allowed it to be read and understood by others.

In the development of educational technology, we are continuing to communicate ideas in narrative. We try to paint a picture using words, and we hope that those words will be received and interpreted in a way that creates an accurate reflection of our idea. The word “hope” used here represents chance, and the chances are that what we describe is not what is ultimately produced. We are reliant on surrogates, interpreters that take our descriptions and attempt to parse our expressed thoughts into a language that can be used by software engineers, or the like. Often what is lost in translation is the essence of the idea.

We can agree that the creation of applications for learning continues at a brisk pace, yet we as educators have not yet developed a language that we can use to communicate with each other and with those who have the specialized skills take the idea from its origin and produce it within the computer. Presented with a vast array of technological advances but currently without a means to speak directly to the technology, teachers have a language problem.

BACKGROUND

Since 1998, van Merriënboer has been a professor of educational technology at the

Open University of the Netherlands. Recently, he moved to Maastricht University, where he is heading the research program of the Department of Educational Development and Research. Van Merriënboer holds a master of science degree in experimental and cognitive psychology and a PhD in instructional technology. The areas of research he has conducted over the course of his career include instructional design for complex learning, intelligent performance support for instructional design, interactive computer-based learning environments for complex skills, cognition and instruction, and technical training. In 2000, van Merriënboer was named World Leader in Educational Technology by *Training Magazine*.

Q: In your book *Ten Steps to Complex Learning*, you talk about the development of a language to be used among instructional designers. If you were to create such a language, what would it look like?

A: I think we need more than one language, depending on the design level we are working on. Compare software engineers, who use “use cases” at a high level, flow charts and structure charts at lower levels, and programming languages at the implementation level, or architects, who start with sketches that are further developed into blueprints and detailed technical drawings. A very basic, high-level “visual language” I am using in my book *Ten Steps to Complex Learning* are the circles (learning tasks), L-shapes (supportive information), dotted boxes (task classes) etc. to visually describe training programs. I think such a visual design language could be further developed. Another lower-level language that has been developed by my former institute at the Open University is Educational Modeling Language (EML), which has been further developed to the IMS Learning Design Language. Of course, the main challenge is not to design languages but to motivate instructional designers to use such languages on a wide scale (i.e.,

make them into standardized tools for communication).

Q: With regard to the previous question, would the use of this language be limited to instructional designers or be used by all educators?

A: In my view, the main users are instructional designers. But depending on the level of the language, it can also be used to communicate with other stakeholders. For example, a high-level visual language used to communicate the main components of my 4C/ID model might be useful to discuss training programs with training managers and teachers; a lower-level language such as IMS Learning Design might be useful to discuss e-learning applications with programmers.

Q: In the world of aviation training, the first day of training for a new student pilot is aboard the aircraft in flight. What are your thoughts about this approach, from a cognitive load standpoint? How would you approach this learning issue?

A: Cognitive load theory (as well as 4C/ID) states that you should decrease cognitive load in the beginning of the learning process, without losing the nature of the “whole task.” For training pilots, you should thus first confront the learners with the simplest type of flight professional pilots encounter (probably a routine flight from A to B with good weather conditions, etc.), and, in addition, you should provide a learning task with maximum support/guidance (probably a worked example, meaning that the learners are required to observe all actions performed by an experienced pilot during this simplest kind of flight). Furthermore, cognitive load theory offers prescriptions to focus the learner's attention on important pilot actions, to prevent split attention, etc.

Q: As we move forward in the development of instructional content and learning systems, we adopt increasing levels of standardization. While standardization brings many benefits, those benefits are not without risk. Can we have an environ-

ment with standardization that also fosters innovation?

A: Yes, I see no fundamental conflicts between innovation and standardization—as long as standardization does not limit creativity (e.g., Does the Java programming language limit innovation, or does it favor it?) The design languages discussed above are a form of standardization, but as Java, they should have enough “expressive power” to allow for creativity and innovation. The problem is, however, that many recent standardization attempts in the field of education do not provide the necessary expressive power because they apply an inflexible template, building-blocks, or metadata-approach.

Q: On the issue of standardization, what role, if any, should government play in this development? If the Department of Education (or equivalent) were to mandate a system to be used for instructional design, do you think that would promote or hinder development?

A: I see no role for government. We need not one system but different systems (e.g., depending on the design level we are working on), and the best systems should be developed in competition. In my opinion, this is something that should be done by the educational/instructional design field and its stakeholders, not by the government.

COMMENTARY AND CONCLUSION

For educators to be able to speak directly to their technology and manipulate it in their image would require an extensive time investment. This is unlikely, but what is likely is the high level language van Merriënboer references in his response that can be used not by the technicians writing code, but by the practitioners putting ideas to work for them.

We have all had such ideas, notions that could change the world. When confronted with the prospect of engaging in the development process it feels an insurmountable

task. That feeling was not so much the work involved, but the lack of being able to communicate the concept to colleagues in a meaningful way. Removing development barriers for stakeholders can only result in a deeper pool of resources for educators throughout the field.

Some would argue that another abstract set of rules to learn and use to create technology is just another barrier to the creative process. Van Merriënboer speaks to this with his response to standardization, and the key lies in developing a language that allows for creative expressions.

Van Merriënboer's years of research and work in the area show that there are needs for communication tools. Educators are segmented into many fields, such as public education, professional training, and others. Our separate fields tend to be isolated, but through a shared language we can all share the same conversation.

REFERENCE

Van Merriënboer, J. J. G., & Kirschner, P. (2007). *Ten steps to complex learning: A systematic approach to four-component instructional design*. New York, NY: Erlbaum.

JEROEN J. G. VAN MERRIENBOER
MAASTRICHT UNIVERSITY