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E-textbooks for mathematical guided inquiry: design of tasks and task sequences.

Watson, Anne (ed.) et al., Task design in mathematics education. An ICMI study 22. Based on the conference, Oxford, UK, July 2013. Cham: Springer (ISBN 978-3-319-09628-5/hbk; 978-3-319-09629-2/ebook). New ICMI Study Series, 229-247 (2015).

Summary: In most educational systems, the textbook remains the core external authority. However, as textbooks rapidly change from print to digital formats, it is assumed that the ways in which they will be used will also change. In this situation, the main challenge is to rethink the sets of concepts and images used to guide us in thinking about the structure of traditional printed textbooks and to consider the consequences of interactivity, multimodality, and personalization on the design and structure of use – primarily the teacher. By briefly addressing the traditional roles and images of textbooks, this paper analyzes the challenge of teaching with textbooks while attempting to guide mathematical inquiry. It then describes common notions concerning the interactivity of digital textbooks. It continues to discuss in three parts the affordances of interactive digital textbooks and to demonstrate examples of central design decisions reflected in the VisualMath algebra textbook: (a) constructing tasks around interactive diagrams that provide students with ways to explore, (b) suggesting a visual semiotic framework for typifying interactions within technology-based textbooks, and (c) offering multiplicity of ways to sequence units that respond to the principal objects and operations of the mathematics to be learned.

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