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Selection of apps for teaching difficult mathematics topics: an instrument to evaluate touch-screen tablet and smartphone mathematics apps.

Moyer-Packenham, Patricia S. (ed.), International perspectives on teaching and learning mathematics with virtual manipulatives. Cham: Springer (ISBN 978-3-319-32716-7/hbk; 978-3-319-32718-1/ebook). Mathematics Education in the Digital Era 7, 275-300 (2016).

Summary: Manipulatives – including the more recent touch-screen mobile device apps – belong to a broader network of learning tools. As teachers continue to search for learning materials that aid children to think mathematically, they are faced with a challenge of how to select materials that meet the needs of students. The profusion of virtual learning tools available via the Internet magnifies this challenge. What criteria could teachers use when choosing useful manipulatives? In this chapter, we share an evaluation instrument for teachers to use to evaluate apps. The dimensions of the instrument include: (a) the nature of the curriculum addressed in the app – emergent, adaptable or prescriptive, and relevance to current, high quality curricula – high, medium, low; (b) degree of actions and interactions afforded by the app as a learning tool – constructive, manipulable, or instructive interface; (c) the level of interactivity and range of options offered to the user – multiple or mono, or high, moderate or low; and, (d) the quality of the design features and graphics in the app – rich, high quality or impoverished, poor quality. Using these dimensions, researchers rated the apps on a three-level scale: Levels I, II, and III. Few apps were classified as Level III apps on selected dimensions. This evaluation instrument guides teachers when selecting apps. As well, the evaluation instrument guides developers in going beyond apps that are overly prescriptive, that focus on quizzes, that are text based, and include only surface aspects of using multi-modality in learning, to apps that are more aligned with emergent curricula, that focus also on conceptual understanding, and that utilize multiple, interactive representations of mathematics concepts.

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