

## Chapter 58

# University Reading and Mathematics Clinics in the Digital Age: Opportunities and Challenges With iPad Integration

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### **ABSTRACT**

*This chapter discusses the findings of an exploration to integrate iPads in a university reading and mathematics clinic impacting three groups of learners: preservice teachers enrolled in reading and mathematics practicums, the K-8 community students served by the clinic, and the teacher educators. The TPACK model was used as a conceptual framework for teacher educators to engage and support preservice teachers in a technology rich learning environment designed to enhance their literacy and mathematics content knowledge, pedagogical knowledge, and technology knowledge, and the complex intersections between each. The teacher educators expected their mostly digital native preservice teachers to recognize technology affordances and technology integration opportunities when provided content knowledge and pedagogical support. Although the K-8 tutees were engaged at high-levels, faculty's assumption of the digital native preservice teacher was disrupted. Teacher educators discovered that digital natives still need support in developing technological knowledge in an educational setting.*

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## INTRODUCTION

Continuous updates and innovations of digital technology bring rapid and widespread change in our current culture both within and outside of school. This rapid change brings new challenges and expectations for teacher preparation. Mobile hand-held technologies move technology integration out of the computer lab to anytime, anyplace learning, causing educators to reconsider instruction, structures, tools, and pedagogies. Currently, teacher educators are faced with preparing preservice teachers for learning environments that neither have experienced as teachers or learners. At all levels of education from K-12 to universities, most digital native (Prensky, 2001a, 2001b) students have some degree of mobile technology knowledge that has the potential to change the expert/ novice dynamics of classroom settings.

This chapter documents the exploration of integrating iPads in a university reading and mathematics clinic that supports the development of preservice teachers and the K-8 students they tutor. With little research in this area, the findings of this technology integration exploration provide information on how teacher educators can design similar – and potentially more powerful – engagements with iPads. We explored the use of iPads by the teacher educators as they created 1:1 iPad learning environments for their practicum-based literacy and mathematics methods courses. Additionally, we observed the effects of iPads on the learning of the K-8 tutor and student dyads.

## BACKGROUND

Often, university students and K-12 students come to school from homes where touch technology is part of their everyday lives, through the use of smartphones, tablet computers, and hand-held gaming systems. However, schools often lag behind the outside culture in technology integration. Seymour Papert (1994, 1996), one of the world's foremost experts on technology and learning, posited that the full effect of technology on education will not be known until students no longer have to share devices.

Because the future work of the world is destined to be digital (Tsukayama, 2014), schools are beginning to explore these devices and 1:1 environments for learning in an effort to engage and prepare tech-savvy citizens for college and careers. Even schools with limited funds are changing their stance on mobile learning devices and are opting for “Bring Your Own Device” policy changes that result in new learning landscapes (Flanagan, 2013; ISED, 2013). These 1:1 environments are becoming more commonplace, and iPads are at the forefront of the movement (Jo, 2013; Kraft, 2013; Upadhyaya, 2013). In the most recent National Survey of Mobile Technology for K-12 Education (Interactive Systems Education Design, Inc. [ISED], 2013), iPads lead the national trend as the most common mobile devices adopted or planned to be adopted. These devices bring great hopes for changing the landscape of learning by differentiating instruction, increasing engagement, providing more collaborative opportunities, and supporting understanding of learning objectives. Thus, teacher educators find themselves charged with preparing preservice teachers for digital learning environments that neither they nor their students have experienced as teachers or learners.

### Technology: Tools, Processes, and Affordances

The Merriam-Webster definition of *technology* “includes the use of materials, tools, techniques, and sources of power to make life easier or more pleasant and work more productive” (n.d.), or simply put,

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