

Chapter 106

Preparing Next Generation Elementary Teachers for the Tools of Tomorrow

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ABSTRACT

This chapter examines the results from ongoing research of an authentic, problem-based learning (PBL) project. Embedded in an instructional technology course, the project was designed to help preservice teachers develop technological pedagogical content knowledge (TPACK) necessary to successfully incorporate digital tools and applications in elementary classrooms (Harris, Mishra, & Koelher, 2009). The project partnered the preservice teachers with local elementary school classrooms where they served as instructional designers to develop digital media in support of a flipped classroom initiative. Results indicate that the semester-long PBL-based assignment significantly impacted the preservice teachers' TPACK development in several critical areas and can serve as a model for advancing next generation teacher education. Overarching themes that emerged and recommendations for future research are offered as well.

INTRODUCTION

Because they have grown up with unprecedented access to technology, many of today's college students are frequently referred to as "digital natives" (Prensky, 2001). Since this generation of students has experienced a world where technology is infused in all facets of their lives, Prensky (2001) argues that this gives students a technological advantage over preceding generations and has changed how they

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access information and learn. Looking around any university campus, students can be seen carrying smartphones, laptops and tablet computers. Owning these tools, however, does not necessarily translate to knowing how to use technology for educational or pedagogical purposes. In fact, many researchers have challenged the concept of “digital natives” completely. Writing in the *Journal of Computer Assisted Learning*, Brown and Czerniewicz (2010) identify that opportunity and access are far better determinants of a person’s ability to use technology than age. While this research debunks a generational view of technological proficiency, it does provide some guidance for those individuals working to prepare next generation elementary teachers. For instance, Lei (2009) examined the beliefs, attitudes and technology expertise and experiences of preservice teachers. While the majority of the participants in Lei’s study reported using technology for social and communication purposes, only a small percentage had any expertise with digital tools for learning. To address this deficit, many teacher education programs incorporate training that focuses on the development of technical skills (Zhao, Pugh, Sheldon, & Byers, 2002). The challenge with technical training, however, is that it does not prepare preservice teachers for the changing technological landscape they are likely to face in schools. As new technologies for learning are introduced, a preservice teacher’s skillset quickly becomes outdated.

Examining this issue historically provides a critical lens for teacher educators. In 1996, Northrup and Little, writing in the *Journal of Teacher Education*, outlined a comprehensive list of “instructional technology benchmarks” that new teachers should possess. Their list included the following:

Ability to operate a microcomputer system to include powering up the computer, installing programs, accessing programs in other drives, saving files to diskette, and deleting files within the context of a Macintosh, Windows, and DOS-based system.

Ability to set up and operate peripherals such as scanners, laserdisc players, CD-ROM, modems, and printers.

Ability to use productivity software to include word processors, spreadsheets, databases, desktop publishing, and graphics to perform basic administrative tasks such as mail merge, grading, and creating basic newsletters. Ability to integrate productivity software including word processors, spreadsheets, databases, desktop publishing, and graphics into a classroom curriculum assignment.

Ability to use multimedia CD-ROM, laserdisc, and digital photography to access and store information.
(p. 218)

Building on this list, in 1998, the International Society for Technology in Education (ISTE) published its first list of Technology Foundation standards for all teachers. This early rendering of the ISTE standards was broken into four main categories, including “basic technology operations and concepts; application of technology and instruction; professional and personal use of technology; and societal, ethical, and human impact of technology;” however, the predominant focus remained on the acquisition of technical skills rather than on the development of an understanding of how to leverage technologies to support instruction and learning.

These original ISTE standards prompted teacher education programs to create courses that helped their teacher candidates develop proficiency to “use computer systems to run software; to access, generate and manipulate data; and to publish results. They also will evaluate performance of hardware and

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