

Chapter 44

Developing Technological Pedagogical Content Knowledge in Elementary Education Programs

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ABSTRACT

The digital age requires teacher education programs to constantly evaluate and revise their programs and courses, particularly with reference to guiding teacher candidates towards integrating current and emerging technologies. This designed-based research study demonstrates how state-wide mandates to revise teacher education programs were used in promoting subsequent revisions influencing the course components and teacher candidates' development of Technological Pedagogical Content Knowledge (TPACK). Cases of four undergraduate elementary education courses and the advanced licensure elementary education program are described. The cross case analysis reveals the subsequent influence on the program for improving the TPACK preparation of the teacher candidates. The chapter concludes with implications for teacher educators and leaders of teacher education programs.

INTRODUCTION

Technological advances are having a significant impact on multiple facets of people's lives, including ways they communicate, learn, and work (Allen & Seaman, 2013). Education is not immune to such influences and as a result, changes in delivery options now provide the means to address learners' demands for "more flexible access to content and instruction at any time, from any place" (Means, Toyama,

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Murphy, & Baki, 2013, p. 3). The amount of technology access in Pre-Kindergarten through Grade 12 (PK-12) schools is at an all-time high (New Media Consortium, 2014). Still, access does not always result in effective technology use or student learning (New Media Consortium, 2014; U.S. Department of Education [USDE], 2010; Vega, 2013).

The recommendations in the National Educational Technology Plan as well as the International Society for Technology in Education (ISTE) National Educational Technology Standards for students (ISTE, 2007) and teachers (ISTE, 2008) call for K-12 students to use technology to access and synthesize information, communicate with others around the world, create representations of knowledge and learning products, and facilitate their own learning of content and information. While these recommendations have potential to support teaching and learning processes, research indicates that teachers either do not integrate technology at all or choose not to integrate technology in meaningful ways in their classroom (Ertmer & Ottenbreit-Leftwich, 2010; Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, & Sendurur, 2012; Polly & Hannafin, 2011). These studies cite the need for teachers to receive high quality learning experiences (Lawless & Pellegrino, 2007; Polly & Hannafin, 2011) as well as experiences that will support teachers in ongoing ways to address negative beliefs related to teaching with technology (Ertmer & Ottenbreit-Leftwich, 2010; Ertmer et al., 2011). In light of the potential benefits of teaching with technology and the barriers that teachers demonstrate, teacher education programs must play a vital role in preparing future teachers (teacher candidates hereafter) with the knowledge and skills related to integrating technology into classrooms (Council for the Accreditation of Educator Preparation [CAEP], 2013; U. S. Department of Education [USDE], 2010).

In 2010, the North Carolina Board of Education charged all teacher education programs with revising the initial licensure and advanced degree programs to align with the North Carolina Professional Teaching Standards (NCPTS), which were adopted by the North Carolina State Board of Education [NCSBE] in 2007, and later revised in 2010 and 2013. The revision process was comprehensive and included input from multiple sources and stakeholders, including these new standards, data from our program completers and graduates, feedback from surveys and conversations with teachers and administrators in local schools, and feedback from our alumni themselves. One of the recommendations in numerous data sources during program revision was to deepen teacher candidates' knowledge and skills related to technology integration. Building off the construct of Technological Pedagogical Content Knowledge (TPACK) (Mishra & Koehler, 2006; Niess, 2005), there was a need to simultaneously address content, effective pedagogies, and how technology can support the teaching and learning processes of that content with effective pedagogies.

As a result of these challenges and the North Carolina context, faculty members began a design-based research process for the revision of the elementary education program. This research study is grounded in the TPACK framework to analyze data in ways that could inform the remodeling of the elementary education program, including courses and clinical experiences.

THEORETICAL FRAMEWORK: TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE (TPACK)

The Technological Pedagogical Content Knowledge construct (Figure 1) posits that in order for teachers to effectively integrate technology into their teaching, they need to have knowledge of technology, pedagogy, and the content that they teach as well as the intersections of each type of knowledge (Mishra

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