Chapter 33
Professional Development for Technology Integration Into Differentiated Math Instruction

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ABSTRACT

To make a connection between pedagogy and technology in teaching, this chapter will explore whether or not a professional development design and practice, whose aim is to help teachers use technology for personal purposes, readily translates into the ability to effectively teach and learn with technology. Adopting a conceptual framework known as self-efficacy beliefs and TPACK, or technological pedagogical content knowledge (Mishra & Koehler, 2006), this chapter discusses the design of a professional development model, the goal of which is increasing the critical attribute of the successful professional development: self-efficacy. In an effort to provide empirical knowledge to support this design, this chapter further showcases a faculty member's approaches to connecting technology and pedagogy using the TPACK approach, while implementing a model designed to improve teachers' self-efficacy. Implications and guidelines for developing teachers' self-efficacy, through activities during the professional development workshop, are discussed.

INTRODUCTION

Researchers have asserted that problems associated with technology integration may have much less to do with access and technical mastery of technology, and much more to do with effective use in practice (Al-Awidi & Alghazo, 2012; Jenkins et al., 2006; Niess, 2005). Understanding appropriate pedagogical

practices for using technology can be more important to effective instruction than technical mastery of technology, although both elements are essential. Extensive training in both pedagogy and technology are needed, through ongoing professional development opportunities. To make a connection between pedagogy and technology in teaching, this chapter will explore whether or not a professional development design and practice, whose aim is to help teachers use technology for personal purposes, readily translates into the ability to effectively teach and learn with technology. Therefore, this chapter adopts a conceptual framework known as self-efficacy beliefs and TPACK, or technological pedagogical content knowledge (Mishra & Koehler, 2006), in the professional development setting. Teachers' self-efficacy has been reported to play a critical role in their implementation of new teaching strategies presented through professional development. In his model of teacher change, Guskey (1986) hypothesized that the majority of instructional improvement programs fail because they do not take into account what motivates teachers to engage in professional development, and the process by which change in teachers typically takes place. Researchers examining teacher attitudes toward the implementation of new instructional practices have frequently found teachers' self-efficacy to be among the most powerful influences on receptivity to change (Guskey, 1989; Poole & Okeafor, 1989; Shahid & Thompson, 2001; Smylie, 1988).

The TPACK framework provides a coherent structure that allows educators to better understand sound technology integration. Sound technology integration affects how educators make effective decisions regarding: academic content (or *what* they will teach), teaching goals, pedagogical methods (or *how* they will teach), and finally how teachers will assess lesson outcomes. It has also been acknowledged that teacher-training programs should provide teachers with the opportunity to develop integrated knowledge of the subject matter, technology, and pedagogy (Niess, 2005; Polly et al., 2010). The research on which the arguments set forth in this chapter are based, was conducted while executing a Teacher Quality State Grant Professional Development Initiative in two of Georgia's high-need public schools.

We will first locate complex, current challenges in teaching teachers about technology integration into differentiated math instruction. These challenges inhibit the transformation of professional development from traditional, random acts happening *to* teachers, into a systematic and collaborative process happening *through* teachers. Secondly, we will move to discuss the design of the differentiated instruction professional development model, with technology integration geared towards increasing self-efficacy, the critical attribute of successful professional development. We will then proceed to showcase a faculty member's approaches to connecting technology and pedagogy during the professional development workshops. We will also present implications and guidelines for developing teachers' self-efficacy during the professional development workshop, which is designed to expand teachers' repertoire in technology integration into differentiated instruction. The chapter will conclude with considerations that should be examined while executing the technology-integration model in professional development.

BACKGROUND

Meeting Challenges in Teaching Teachers About Technology

This section will first locate complex, current challenges in teaching teachers about technology integration that inhibit the transformation of professional development from traditional, random acts happening *to* teachers, into a systematic and collaborative process happening *through* teachers (May & Zimmerman, 2003; Schmoker, 2005; Sparks, 2005). Researchers continuously analyzed why teachers are not willing

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