

Chapter 50

Visiting Technological Pedagogical and Content Knowledge (TPACK): Issues and Challenges for Teachers' Professional Development

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ABSTRACT

The TPACK framework has been widely discussed for effective technology integration, and the literature has also indicated TPACK has significant implications for teacher education and professional development. The purpose of this chapter is to examine interconnectedness of TPACK and teacher professional development. This chapter reviews the research on TPACK and the extensive literature on quality professional development for teachers. In addition, the chapter highlights how various content areas have addressed pedagogical content knowledge and implications for practice in technology and teacher development. The chapter seeks to contribute knowledge about the structure of professional development initiatives that involve instructional technology and integration into various content knowledge disciplines.

INTRODUCTION

Teaching is a complicated practice that needs an interweaving of many kinds of specialized knowledge (Koehler et al., 2013) and therefore requires teachers to apply complex knowledge structures across different cases and contexts (Mishra et al., 1996). Teachers practice their craft in highly complex, dynamic classroom contexts (Leinhardt & Greeno, 1986) that require them to constantly shift and evolve their understanding. Thus, effective teaching depends on flexible access to rich, well-organized, and integrated

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knowledge from different domains (Putnam & Borko, 2000), including knowledge of student thinking and learning; knowledge of subject matter; and increasingly, knowledge of technology.

Technology plays an important role in enhancing educational quality and therefore, current reforms in education have placed significant emphasis on the integration of technology into the curriculum and the use of it to improve teaching and learning. However, teaching with technology is not an easy task and hard to do well. With the dramatic advances in technologies, the need increasingly arose for teachers to understand the impact of technology and respond to technological changes. Faced with these challenges, how can our teachers integrate technology into their teaching?

As instructional technology and teacher development continue to emerge and evolve, teachers often have inadequate or inappropriate experience with using technologies for teaching. The technology integration barriers include not only the lack of specific technology knowledge and skills but also the lack of technology-supported pedagogical and technology-related-classroom management knowledge and skills (Hew & Brush, 2007). Many approaches to teachers' professional development offer a one-size-fits-all approach to technology integration when, in fact, teachers operate in diverse contexts of teaching and learning. According to Koehler et al. (2013), there is no "one best way" to integrate technology into curriculum, but the idea of good teaching with technology requires three core components: content, pedagogy, and technology. These three knowledge bases form the core of the Technology, Pedagogy, and Content Knowledge (TPACK) framework (Koehler et al., 2013). Currently, the notion of TPACK has been widely used for effective technology integration, and the TPACK framework has had a significant impact on research and practice around instructional technology as well (Koehler et al., 2011). Many researchers and teacher educators have adopted TPACK as a tool for understanding and advancing preservice and in-service teachers' abilities to integrate technology into their instruction (Graham et al., 2009). As a result, TPACK has significant implications for teacher education and teachers' professional development also (Koehler & Mishra, 2005).

The purpose of this chapter is to examine interconnectedness of TPACK and teacher professional development. This chapter reviews the research on TPACK and the extensive literature on quality professional development for teachers. In addition, the chapter highlights how various content areas have addressed pedagogical content knowledge and implications for practice in technology and teacher development. The chapter seeks to contribute knowledge about the structure of professional development initiatives that involve instructional technology and integration into various content knowledge disciplines.

WHAT IS TPACK?

As shown in Figure 1, TPACK contains three main components of teachers' knowledge: content, pedagogy, and technology. The TPACK framework builds on Shulman's (1986, 1987) descriptions of PCK (pedagogical content knowledge). Shulman developed the idea of pedagogical content knowledge (PCK) to describe the relationship between the amount and organization of knowledge of a particular subject-matter (content) and knowledge related to how to teach various content (pedagogy). The interactions of these three forms of knowledge are interacted and developed to be other secondary forms of knowledge that include pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), and technological content knowledge (TCK). Ultimately, emerging from interactions among different combination of the six forms of knowledge, the integrated form of knowledge, TPACK (technology, pedagogy, and content knowledge), is formed (Cox & Graham, 2009).

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