Improving Teachers’ Understanding of Theoretical Foundations of Technology Use: Connecting Theories With Technology

Dazhi Yang, Boise State University, USA
Shannon Skelcher, Boise State University, USA

ABSTRACT
Situated in a theoretical foundations of educational technology course, this study explored how practicing teachers who had not previously taken any formal learning theories courses connected theories with the use of technology. It examined the mindset of teachers after their learning and exposure to learning theories and relevant school of thoughts for a sustained period of time. Results show that teachers showed an appreciation for theories and an awareness for the need of theories in guiding technology use. Teachers also connected theories with technology use. The learning of theories equipped teachers with theoretical guidance and justifications for the use of technology. The participating teachers were also able to evaluate pedagogical approaches toward the use of technology based on their learning. The study addressed the importance of theoretical understanding towards the use of technology and has implications for policies and practice regarding teacher education and professional development regarding the use of educational technology.

KEYWORDS
Professional Development, Teacher Preparation, Technology Integration, Theoretical Foundation of Technology Use, Theories and Practice

INTRODUCTION
Teachers’ understanding and perception of the role of theories in technology integration are critical for choosing and adopting technology in classrooms (Ennis-Cole, 2004). Despite many discussions and research efforts on the transformative use of technology in teaching during the last decade (Selwyn, 2016) the lack of theoretical understanding of the use of technology is prevalent for teachers. Teachers have access to technology (Purcell, Heaps, Buchanan, & Fredrich, 2013) and most teachers feel adequately trained to search the Internet for information and operate technology (National Education Association, 2008). However, having technology in the classroom
or being technologically-literate does not equate to an effective use of the technology (Barbour, 2012). Effective technology integration requires teachers’ understanding and knowledge of the theoretical foundations that justify and support the use of technology, and the appropriate mentality (pedagogical beliefs) to use technology (Ertmer, Ottenbreit-Leftwich, & Tondeur, 2014; Tondeur, van Braak, Ertmer, & Ottenbreit, 2017). Teachers’ pedagogical beliefs underlie and are instantiated via their pedagogical approaches towards the use of technology.

Meaningful technology use, a practice in which the focus switches from obtaining more technology to teachers’ ability to promote best practices and support effective pedagogy, is important (Ertmer et al., 2014; ISTE, 2017). In other words, a first step in meaningful technology use is understanding educational theories that support the use of technology in teaching and learning. The recently updated International Society for Technology in Education (ISTE) standards for educators (2017) indicate technology can empower learning, support and inspire teachers. Teachers can obtain knowledge through continuing education or professional development (PD) to support purposeful technology integration (Ertmer et al., 2014; Zoch, Myers, & Belcher, 2016). Through professional development or continuing education, teachers can also learn how to design technology-supported instruction so that it is conducive to learning (Brennan, 2015).

Teachers in the U.S. have been provided with many PD opportunities, however not all PD has been found to be effective (Wilson, 2013). Typically, PD occurs over a few hours or up to one or two days. Teachers may be unable to digest or practice the learned concept, knowledge and skills during this length of time. In fact, Garet, Porter, Desimone, Birman, and Yoon (2001) examined the structural features of teacher PD and found that the duration of PD had very influential effects on the PD outcomes of enhanced knowledge/skill and changes in teaching practice. Therefore, an ideal PD should provide a sustained period of time for teachers to not only learn new concepts, knowledge, and skills but also to reflect and practice what they learned during the PD.

This study explores the impact on teachers’ mindset, specifically pedagogical approaches and attitudes in regard to technology use, after they had been formally introduced to educational theories for the first time over a sustained period. The study addressed an essential topic of the lack of theoretical understanding towards the use of technology for teacher education and PD, stressing the importance of learning about educational theories. The results of the study have implications on what needs to be included (content wise) as well as how we should structure (time wise) teacher educational programs and professional development.

The Need for Theories

Learning theories are considered a must for the general practice of teachers (Skinner, 1950), providing valuable information on how people learn. The knowledge of theories helps guide instructors to effectively plan their instruction. Without knowledge of how people learn, much of teachers’ instruction will occur without being effectively guided and planned.

Theories are important for the practical use of technologies in classrooms. Principles and guidelines of behaviorism, cognitivism, and constructivism are essential in guiding the use of technology in education. For example, many of the drill and practice programs were based on the principles of behaviorism that advocate observations of behaviors within a student via stimulus and response (Skinner, 1938). Cognitivism’s approach of using technology focuses on students’ mental processes and the internal representations of their learning, and advocates breaking instructions into steps and a logical sequence of the instruction to avoid information overload (Driscoll, 1994). The constructivist approach focuses on using different technological tools and strategies to promote teamwork and collaboration between and among students (Jonassen & Land, 2012).

How teachers use technology in their classrooms is determined by many factors that relate to both teachers and their school environments (Hsu & Kuan, 2013). Among those factors, teachers’ beliefs of how learning should occur and how learning can be facilitated by technology are most critical (Judson, 2006; Ertmer, 2005). If there is a need for a change in technology use and integration,
Related Content

Encouraging Student Motivation in Distance Education
Judith Parker (2012). Pedagogical and Andragogical Teaching and Learning with Information Communication Technologies (pp. 178-190).
www.igi-global.com/chapter/encouraging-student-motivation-distance-education/55167?camid=4v1a

Do Open Educational Resources and Cloud Classroom Really Improve Students’ Learning?
Chia-Wen Tsai and Pei-Di Shen (2014). International Journal of Information and Communication Technology Education (pp. 89-96).
www.igi-global.com/article/do-open-educational-resources-and-cloud-classroom-really-improve-students-learning/103114?camid=4v1a
Mobile Technology as a Learning Tool: Use and Effects
[www.igi-global.com/article/mobile-technology-as-a-learning-tool/120612?camid=4v1a](www.igi-global.com/article/mobile-technology-as-a-learning-tool/120612?camid=4v1a)

Self-Directed Learning with Web-Based Resources
[www.igi-global.com/chapter/self-directed-learning-web-based/12000?camid=4v1a](www.igi-global.com/chapter/self-directed-learning-web-based/12000?camid=4v1a)