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Investigating K-12 Pre-Service Teacher TPACK in Instructional Technology Learning

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ABSTRACT

This study investigated the change in pre-service teachers' Technological Pedagogical Content Knowledge (TPACK) self-efficacy beliefs in a technology integration course in a teacher education program. It assessed knowledge components that predicted TPACK self-efficacy beliefs. Pre- and post-surveys were administered using Schmidt et al. instrument at the beginning and end of the course. The study revealed statistically significant change in all dimensions of TPACK self-efficacy beliefs. Cohen's effect size revealed medium effect size on TPACK self-efficacy beliefs during the pre-service teacher education technology integration course. PCK and TPK were the significant predictors of TPACK in both pre- and post-survey report. Content knowledge (CK) was a significant predictor of TPACK in the post-survey. The result implies that instructional technology courses should pay attention to the factors affecting TPACK during curriculum design and course delivery. In the current research context, CK, PCK, and TPK predicted TPACK. TK and PK can be mediated by TPK and PCK respectively.

KEYWORDS

Beliefs, Content Knowledge, Pedagogical Content Knowledge, Pre-Service Teachers, Technological Pedagogical Content Knowledge, Technology Integration, Technology Pedagogical Knowledge

INTRODUCTION

Effective integration of technology in classrooms demands that teachers understand and apply technology, pedagogy and content knowledge simultaneously in a certain context (Koehler & Mishra, 2009). In order to maximize effective learning outcomes towards technology integration in K-12, educators in higher education not only teach how to integrate technology in the teaching learning

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process but also model technology integration in their own teaching during the teacher training program (Foulger et al., 2015; Foulger et al., 2017, Tondeur et al., 2017).

Many educators in teacher training programs endeavor to understand how pre-service teachers could be able to integrate technology effectively in their future classrooms (Abbitt, 2011; Archambault & Barnett, 2010; Koehler & Mishra, 2009; Scherer et al., 2017). Therefore a question remains about pre-service teachers readiness to effectively integrate technology in their future classrooms. Another question is how can educators determine when pre-service teachers are confident enough to effectively utilize technology in their future teaching.

A large amount of research assessed pre-teachers' self-efficacy beliefs and competencies in technology integration (Tokmak, 2015; Schmidt et al., 2009; Tokmak et al., 2013; Wu, 2013; Young, et al, 2013). To understand pre-service teachers' self-efficacy beliefs in technology integration in K-12 classrooms, it is very important to design training strategies, provide learning experiences and field activates in teacher preparation programs.

Albeit there is a good amount of research about TPACK self-efficacy beliefs for pre-service teachers, there is very limited research that explains the context in which the courses were facilitated and activities in the course. This study will explore technology enhanced activities in one undergraduate instructional technology course that aimed to enhance pre-service teachers' technology integration self-efficacy beliefs and competency. Therefore, the purpose of this study was twofold, first, to investigate the change in pre-service teachers' TPACK self-efficacy beliefs at the end of a semester based instructional tecnology course in one mid-western teacher education university and secondly, to investigate the impacts of TK, CK, PK, PCK TCK, and TPK on TPACK.

LITERATURE REVIEW

Technological Pedagogical Content Knowledge (TPACK)

Technological Pedagogical Content Knowledge (TPACK) is a framework that enables teachers to integrate technology for the content they teach using a sound pedagogical approach (Koehler and Mishra, 2006). TPACK was derived from Pedagogy Content Knowledge (PCK) which asserts that teachers should have both content and pedagogical knowledge to teach (Shulman, 1986, 1987). Shulman (1987) claimed PCK created identifiable body of knowledge as a blend of pedagogy and content. Shulman (1987, p. 9) further noted, "It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction".

Koehler and Mishra (2009) argue that teachers should have three components of knowledge domains, namely Content knowledge (CK), Pedagogical knowledge (PK) and Technological knowledge(TK) together with their four interrelations, namely Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK) and Technological Pedagogical Content Knowledge (TPCK) (see Figure 1). Koehler and Mishra (2009) also argued TPACK framework brings many opportunities for conducting research in pre-service and in-service teachers' technology use in classrooms.

Educators have been integrating technology without a clear understanding of an appropriate theoretical framework and very little attention has been given to the theoretical framework for research outputs in technology integration process (Robin, 2008). Robin (2008) discussed digital storytelling which can be a powerful learning experience for learners to develop skills and knowledge that is expected in the 21st century. However, when integrating digital storytelling in the learning environment, we need to use an appropriate theoretical model. Robin (2008) further noted Mishra's and Koehler's (2006, p. 22) ideas and explained, "no single framework can provide all the answers. The TPACK framework is no exception, however, we do believe that any framework, however impoverished, is better than no framework at all".