

Chapter 11

The Importance of Using Subject-Specific Technology Uses to Teach TPACK: A Case Study

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ABSTRACT

The objective of this chapter is to describe a case study of an educational technology course that uses subject-specific contexts to address preservice teachers' development of TPACK. Many have indicated that in order for technology knowledge to be transferred to the classroom, teachers need to find the knowledge being taught relevant to their future classrooms. This course uses various workouts and cases to develop preservice teachers' technology abilities within the context of their future classrooms. Through these activities, preservice teachers showed improvement in technology knowledge (TK), technological pedagogical knowledge (TPK), and technological pedagogical and content knowledge (TPACK). Recommendations are made to other teacher educators on how to apply such principles within their own educational technology courses.

INTRODUCTION

Experts and policymakers advocate technology integration as an essential tool in K-12 education. Research studies conducted in the United States have indicated that although schools are

currently equipped with adequate technological resources, teachers are still not utilizing those resources in their classrooms (CDW-G, 2010; Project Tomorrow, 2008). This could be due, in part, to a lack of relevant teacher training with regards to technology (Kleiner, Thomas, & Lewis, 2007). To encourage teacher education students to transfer knowledge gained during technology

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experiences to their future classrooms, teacher education programs may need to improve on the instructional design of those technology experiences (Ottenbreit-Leftwich, Glazewski, & Newby, 2010).

Many have indicated that in order for technology knowledge to be transferred to the classroom, teachers need to find the knowledge being taught relevant to their future classrooms (Ertmer, 2005; Ertmer & Ottenbreit-Leftwich, 2010). Teachers adopt technology based on their own value beliefs (Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010). Value beliefs with regards to technology are based on “whether or not teachers think technology can help them achieve the instructional goals they perceive to be most important. Whether a new pedagogical approach or tool is presented, teachers make value judgments about whether that approach or tool is relevant to their goals. The more valuable they judge an approach or tool to be, the more likely they are to use it” (Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010, p. 1322).

Logically, teachers consider valuable uses of technology to align with things they can use in their classroom. Research has shown that when teachers learn how to use technology within their specific content areas and/or grade levels, they report being able to more readily transfer that knowledge to their own classrooms (Hughes, 2005; Snoeyink & Ertmer, 2001/2002). Often times, technology uses are taught outside of the context of the subject area (Ottenbreit-Leftwich, Brush, et al., 2010). For example, one teacher education program has preservice teachers enroll in technology workshops (e.g., Endnote, Microsoft Word), but does not discuss how to use this technology in the classroom (Ottenbreit-Leftwich et al). When learning experiences are focused solely on the technology itself, with no specific connections to grade or content learning goals, teachers are unlikely to incorporate technology into their practices (Hughes, 2005; Niess, 2005). Successful professional development programs

that have facilitated teacher acquisition of technology integration knowledge, such as Learning By Design (Koehler, Mishra, & Yahya, 2007), have introduced technology integration within situated contexts. This could be due to that face that “the more content-specific the example, the more likely the teacher will see value and learn it” (Hughes, p. 295). Therefore, educational technology experiences in teacher education programs should place heavy emphasis on learning content-specific uses of technology that can be transferred to future classroom experiences.

Teachers are reluctant to adopt technology that does not align with their subject’s sub-culture (Hennessey, Ruthven, & Brindley, 2005; Ertmer & Ottenbreit-Leftwich, in press). In a review of literature on effective professional development for teachers, Hew and Brush (2007) found similar results that technology skills and experiences need to be introduced within an educational context, and should be consistent with specific and authentic needs and problems teachers faced in their professional contexts. In order to create effective teacher training where teachers will transfer technology knowledge to their future classrooms, teacher education programs need to help preservice teachers understand how to use technology in relevant ways for their different subject areas and grade levels (Zhao, 2003). The objective of this chapter is to describe a case study of an educational technology course that uses subject-specific contexts to address preservice teachers’ development of TPACK.

BACKGROUND: TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE

National organizations have begun to place more emphasis the integration of technology within the curriculum as opposed to a separate subject (Thomas & Knezek, 2008). The most recent National Educational Technology Standards advocate K-12 student technology use that will facilitate

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