



Drawing on technology: An investigation of preservice teacher beliefs in the context of an introductory educational technology course

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ABSTRACT

This study investigated entering preservice teachers' initial beliefs and ideas with regard to the role of technology in teaching and learning. It also examined specific technology-integrated pedagogical strategies and their potential to help preservice teachers begin to shift from traditional teacher-centered beliefs to a more student-centered mindset. The work was conducted in the context of an introductory educational technology course for preservice teachers in a Mid-Atlantic University in the United States. Data sources included pre- and post-course drawings where participants depicted themselves as technology-using teachers, drawing reflections, and weekly reflective entries submitted in response to a blogging assignment. Findings indicated that preservice teachers enter their training programs with traditional, teacher-centered beliefs about the use of technology and the roles of technology-using teachers and students. Analysis of post-course drawings, however, indicated that participants' beliefs began to shift from largely teacher-centered to more mixed teacher- and student-centered. Analysis of reflective blog entries also demonstrated that participants reflected predominantly on how technology can provide opportunities for students, teachers and parents to collaborate. To a lesser extent, participants reflected on how technology can enhance teaching and learning. Based on these findings, implications specifically related to stand alone technology courses and teacher education programs are discussed.

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1. Introduction

In order to improve student learning, the *U.S. National Education Technology Plan (2010)* advocates for the need to apply technologies used in personal and professional lives to our entire education system. This generation of teacher education students, often referred to as *digital natives*, is expected to know and use current technologies to support student learning. In fact, many school leaders and veteran teachers often look upon new teachers to fill the gap between the technology available in schools and its effective integration across the curriculum (Jacobsen, Clifford, & Friesen, 2002). Yet, existing research indicates that although beginning teachers are comfortable with computers they are not well-prepared to effectively integrate them into the curriculum or to apply what they learned during their teacher education program in real classrooms (e.g., Dawson, 2008; Lei, 2009; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010; Russell, Bebell, O'Dwyer, & O'Connor, 2003).

In a systematic analysis of barriers to effective technology integration, Hew and Brush (2007) revealed that the three most frequently cited barriers included resources (40%), teachers' knowledge and skills (23%), and teachers' attitudes and beliefs (13%). Two of those barriers – knowledge and skills and attitudes and beliefs – can be directly addressed by teacher education programs. In fact, studies indicate that nearly all preservice teachers take an educational technology course aimed at improving their basic technology skills and knowledge (Polly, Mims, Shepherd, & Inan, 2010). Knowledge and skills alone, however, are not sufficient conditions for effective technology use. Research indicates that even if teachers develop the knowledge and skills to use technology, they are not likely to do so if they cannot envision uses that align with their own pedagogical beliefs (Angeli & Valanides, 2009; Ertmer, 2005; Koehler & Mishra, 2009). According to Ertmer (2005), one of the essential factors for successful technology integration rests with the pedagogical and personal beliefs of teachers. Therefore,

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teacher educators must help identify and develop preservice teachers' beliefs during their teacher education programs as well as create a context that enables preservice teachers to examine their beliefs in relation to the application of technology in teaching (Anderson & Maninger, 2007; Lim & Chan, 2007; Smarkola, 2008; Teo, 2009).

1.1. Purpose of the study

Research suggests that teachers with more traditional pedagogical beliefs use technology in more didactic approaches such as disseminating information to students or reinforcing traditional skills (Ertmer, Ross, & Gopalakrishnan, 2000). In contrast, teachers with more constructivist, student-centered beliefs use technology in more frequent and meaningful methods (Ertmer, 2005; Wang, 2002). Such methods are more likely to positively influence academic performance by engaging students in authentic experiences, active learning, and creation of new products (Hickey, Moore, & Pellegrino, 2001). Many preservice teachers, however, enter their teacher education programs with teacher-centered pedagogical beliefs established during their twelve years as students in largely traditional classrooms (Calderhead & Robson, 1991; Lortie, 1975; Niederhauser, Salem, & Fields, 1999). To address this issue, teacher education programs often adopt strategies aimed at helping preservice teachers shift away from traditional beliefs toward the adoption of more student-centered instructional beliefs and practices (e.g., Lim & Chan, 2007). This study contributes to this body of literature by examining how participation in an introductory educational technology course can initiate such shift.

In particular, the purpose of this study is twofold. First, it investigates entering preservice teachers' initial beliefs and ideas with regard to the role of technology in teaching and learning. Second, it examines specific technology-integrated pedagogical strategies and their potential to help preservice teachers begin to shift from a traditional instructional mindset to a more student-centered one throughout their participation in an introductory educational technology course. Although there is a growing body of literature focusing on the interaction between teachers' beliefs and classroom practices, research focusing on the relation between teacher beliefs and use of technology is still scarce (Tondeur, Hermans, van Braak, & Valcke, 2008).

Data sources included pre- and post-course drawings where participants depicted themselves as technology-using teachers, written reflections on these drawings, and weekly reflective entries submitted in response to a blogging assignment. Three key questions guided this work:

1. What kinds of beliefs about technology use and the roles of technology-using teachers and students do preservice teachers bring to their teacher education programs?
2. In what ways, if any, does an introductory educational technology course begin to influence preservice teachers' beliefs about technology use and the roles of technology-using teachers and students?
3. How do preservice teachers reflect on their learning as they complete an introductory educational technology course?

2. Background literature

2.1. Teacher beliefs and use of technology

Preservice teachers enter their teacher education programs with established, deeply held beliefs about teacher roles, students, and the academic material to be taught (Kagan, 1992; Niederhauser et al., 1999; Wang, 2002). These beliefs, largely developed during their twelve-year "apprenticeship of observation" (Lortie, 1975) as students, often center on traditional, teacher-centered classrooms (Calderhead & Robson, 1991). Pajares (1992) suggested that beliefs are the best indicator of how teachers will behave and make decisions in the classroom. As a result, helping preservice teachers shift to student-centered beliefs consistent with current theories of how students learn is important.

Teacher beliefs are often described as images from the past that create "intuitive screens" (Goodman, 1988), influencing the interpretation of learning and the creation of knowledge (Calderhead & Robson, 1991). In other words, teachers are more likely to accept new instructional practices that are in accordance with their personal conceptions of teaching and learning (Pajares, 1992). In fact, Kagan (1992) and Pajares (1992) have indicated that teacher beliefs exert more influence on teacher practice than teacher knowledge. This is particularly true for beliefs attributed to value (Tondeur et al., 2008). According to Anderson and Maninger (2007), teachers' value beliefs are related to the perceived importance of particular goals and choices and whether they can help them achieve the instructional goals they perceive to be most important (Ottenbreit-Leftwich et al., 2010). The highly personal nature of beliefs makes them resistant to change, but when teachers assign value to a specific pedagogical strategy they are more likely to incorporate it into their teaching practice (Zhao & Cziko, 2001). In turn, adoption of new instructional practices can lead to the creation of new, reconstructed or reaffirmed beliefs (Haney, Lumpe, Czerniak, & Egan, 2002).

Just as preservice teachers come to their training programs with deeply-held beliefs about teaching, they also come with beliefs, established as K-12 students, about the role of educational technology (Ertmer, 2005). Most preservice teachers did not experience a technology-integrated K-12 curriculum (Niess, 2005). As a result, they do not value the role of technology in addressing important teaching and learning needs (Zhao & Frank, 2003). These early experiences with technology, "can shape teacher subsequent encounters for years to come, despite great efforts to persuade them differently" (Ertmer, 2005, p. 30).

In order to persuade preservice teachers on the value of technology, we first need to investigate the images of teaching and learning that they bring to their teacher education program and design opportunities for them to recognize and reflect on those images (Kearney & Hyle, 2004). If preservice teachers themselves do not recognize and reflect on their beliefs about teaching with technology, they may perpetuate the teacher-centered methods they experienced as students (Ertmer, 2005).

Research suggests that teachers who do perpetuate traditional, teacher-centered methods integrate educational technology less effectively (Hermans, Tondeur, van Braak, & Valcke, 2008; Tondeur et al., 2008). Hermans et al. (2008), for example, found that teachers' "traditional beliefs had a negative impact on integrated use of computers" (p. 1499). In contrast, student-centered or constructivist beliefs were strongly correlated with educational technology integration. Similarly, Overbay, Patterson, Vasu, and Grable (2010) found that "constructivist practices and beliefs were significant predictors of technology use" (p. 103). Overall, existing research consistently indicates that teachers with

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