

Chapter LI

TPACK Development in a Teacher Education Program

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ABSTRACT

The teacher education program at Brigham Young University (BYU) includes three stages of development in technological pedagogical content knowledge (TPACK) (Thompson & Mishra, 2007). The first stage consists of experience in a technology course with sections specific to early childhood education, elementary education, and secondary content areas. The next stage includes a series of methods courses in which instructors expand on the work of the introductory technology course. The third stage of technology development occurs during the final field experience. The candidates complete a Teacher Work Sample (TWS) (Renaissance Partnership for Improving Teacher Quality, 2001) that must have a technology component. At each stage our candidates have consistent criteria for how technology should be appropriately used in active learning. These criteria are key to the lessons candidates develop that incorporate technology. This chapter describes each stage and how our program has worked to improve technology understanding of our candidates.

INTRODUCTION

The teacher education program at Brigham Young University (BYU) includes three stages of de-

velopment in technological pedagogical content knowledge (TPACK) (Thompson & Mishra, 2007). The first stage consists of experiences with technology in an introductory course with

sections specific to early childhood education, elementary education, and secondary content areas. The next stage includes a series of methods courses in which instructors expand on the work of the introductory technology course. The third stage of technology development occurs during the final field experience. The candidates complete a Teacher Work Sample (TWS) that must have a technology component. At each stage our candidates have consistent criteria for how technology should be appropriately used in active learning. These criteria are key to the lessons candidates develop that incorporate technology. This chapter describes each stage and how our program has worked to improve technology understanding of our candidates.

THEORETICAL FRAMEWORK

Two areas of research have informed our integration of technology in our teacher education program: teacher development and beliefs (Song, Hannafin, and Hill, 2007) and Technological Pedagogical Content Knowledge (TPACK) (Mishra & Koehler, 2006). TPACK was formally referred to as TPCK but in the current literature has been changed to TPACK because it is easier to use when communicating (Thompson & Mishra, 2007). TPACK refers to the complex interrelationship between a teacher's technology use, instructional methods, and understanding of the subject matter (Mishra & Koehler, 2006). TPACK involves understanding and negotiating the relationships among technological knowledge, pedagogical knowledge, and content knowledge (Niess, 2008). Teachers who possess TPACK think about and use technology as an enhancement of their pedagogical methods in teaching content and are aware of ways that technology can support high quality teaching in curriculum areas (Loveless, DeVoogd, & Bohlin, 2001). TPACK is the added dimensions of knowledge required by teachers to effectively teach with technology. The process of

developing TPACK can have a disruptive effect (Hedberg, 2006) when it requires teachers to consider teaching and learning in new ways that are quite different from traditional methods of teaching. Our teacher education program uses both the introductory technology course and the methods courses to develop technology knowledge and technology pedagogical knowledge. Technology Pedagogical Content Knowledge is developed as the candidates continue their development in their content methods courses. Our faculty members strive to use active, inquiry-based learning to encourage the development of TPACK in our students (Song, Hannafin, and Hill, 2007).

Pedagogical beliefs of teachers are a vital first step of change as teachers begin to integrate technology into their instruction (Ertmer, 2005). Active, inquiry-based activities can invigorate teaching and motivate students to take charge of their own learning, understand multiple perspectives, and develop high level reasoning skills; such activities also improve student understanding and retention of knowledge (Kur & Heitzmann, 2008; So & Kong, 2007; Yoder, 2004). Some teacher candidates have had few experiences infusing inquiry and technology into instruction. They expect technology to be used to improve only their administrative efficiency and presentation skills (Wentworth & Waddoups, 2003). The methods course is perhaps our best and only opportunity to turn the tide of teacher misconceptions about inquiry learning and technology use (Molebash & Julius, 2004).

Teachers who ascribe to inquiry methodology use technology to support inquiry learning (Juliana, 2002). Experiences with active and inquiry teaching using technology at the preservice level have been found to impact the teaching practices of these future teachers (Nail, 2003). The inquiry experiences teacher candidates have can involve multiple types of technology because different inquiry tools reinforce different inquiry skills (Churchill, 2008; Everett & Spear, 2008). Use of handheld-based science activities were found to

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