Chapter 23
Instructional Technical and Pedagogical Design:
Teaching Future Teachers Educational Technology

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ABSTRACT

This chapter described a case study of informed educational technology design. The chapter discussed how a conceptual guide for technology teacher experiences (Ottenbreit-Leftwich, Glazewski, & Newby, 2010) informed educational technology design in a course intended to prepare future teacher students to use technology. These students are introduced to various technologies and create materials for their future classrooms. They are also exposed to cases wherein they are required to make decisions on which technologies are most pedagogically appropriate. Therefore, the technology and pedagogy selected for this course are particularly important, as course instructors need to model appropriate decision-making.

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 teacher training with regards to technology (Kleiner, Thomas, & Lewis, 2007). To encourage teacher education students to transfer knowledge gained during technology experiences to their future classrooms, teacher education programs

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may need to improve on the instructional design of those technology experiences (Ottenbreit-Leftwich, Glazewski, & Newby, 2010).

Many teacher education programs have recognized the difficulties associated with developing teachers' abilities to use technology in the classroom and have proposed original, innovative approaches to use technology. "Extensive time and money has been spent developing strategies and programs to help preservice teachers use technology effectively… collaboratively crafted to address the technology needs of preservice teachers" (Kay, 2006, p. 392). The U.S. Department of Education funded a program (Preparing Tomorrow's Teachers to Use Technology) to support the development of teacher technology learning experiences, spending over $750 million on projects with new methods for preparing future teachers to effectively integrate technology into their teaching (Pellegrino, Goldman, Bertenthal, & Lawless, 2007). However, there is little empirical evidence regarding which methods are the most effective (Mims, Polly, Shepard, & Inan, 2006; Polly, Mims, Shepard, & Inan, 2010). In fact, after a meta-analysis of 68 studies discussing various strategies for incorporating technology into preservice teacher education programs, Kay (2006) concluded that "…only a handful of studies have carefully and rigorously pursued the evaluation process. The jury is still out on which strategies work best…" (p. 395).

Therefore, the *Conceptual Guide for Technology Teacher Experiences* (Ottenbreit-Leftwich et al., 2010) can help direct informed educational technology design for individual institutions. Depending on the institution, there may be different resources or expectations that influence how effective technology experiences are designed. This chapter will discuss how informed educational technology design, specifically utilizing the *Conceptual Guide,* assisted in selecting appropriate technology and pedagogy for technology experiences required in one teacher education program.

BACKGROUND

To become a teacher in the United States, preservice teachers (students who want to be teachers), must undergo a rigorous preparation and certification system that includes various assessments. These assessments include performance assessments from field experiences in classrooms, state-mandated tests, and completed accredited program from a higher education institution. While teacher certification requirements might slightly differ from state to state, most states require teachers to be proficient at using technology. To address this proficiency requirement, the higher education institution requires preservice teachers to complete a three-credit hour course related to technology use for teachers for three hours per week for one semester.

The only required educational technology experience in the teacher education program is a stand-alone, 3-credit hour course. This course is a pre-requisite requirement for being accepted into the teacher education program; admittance into the teacher education program depends on successfully completing the course. Approximately 400 students register for the course each semester, ranging in majors (early education, elementary education, secondary math education, secondary science education, secondary language arts education, secondary social studies education, foreign language education, physical/health education, music education, art education, and many other education-related fields).

The course is chronologically divided into three units. The first unit covers why teachers should use technology, hopefully conveying the rationale for using technology in their classrooms to these preservice teachers. Particular importance is placed on the pedagogical aspects of technology use based on the National Educational Technology Standards for Teachers published by the International Society for Technology in Education (ISTE 2008); meaning that technology should only be used when it is an effective,