

Chapter 56

Technologizing Teaching: Using the WebQuest to Enhance Pre-Service Education

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ABSTRACT

With the continuing shift of instructional media to digital sources occurring in classrooms around the world, the role of technology instruction in the pre-service curriculum of K-12 teachers is acquiring increasing salience. However, barriers to its inclusion continue to exist. In this chapter we focus on a model of hybridity designed to embed technology instruction into pre-service education. This model is known as the WebQuest and involves the development of a technology-driven learning activity that scaffolds the building of skills in content, pedagogy, and technology integration in pre-service teachers. We discuss data from an exploratory project conducted within a class of graduate pre-service teachers experiencing instruction in creating a WebQuest, and offer some preliminary findings. We place these results within a larger perspective of the CFTK and TPACK frameworks and their application to issues germane to pre-service teacher education.

INTRODUCTION AND BACKGROUND TO TECHNOLOGY INTEGRATION IN THE CLASSROOM

Technology is dramatically changing the way today's K-12 students are educated. This rising cyber generation has unprecedented choices in how to generate, manipulate, obtain, display, and share information. Not only has technology

changed the role of students, it has also altered that of their teachers. Instead of acting only as a dispenser of information, today's teacher must be a change agent and visionary, able to perceive and harness the potential of rapidly developing technology tools and web advances, deciding how to manage these to effectively meet their own needs and that of their students (Angeli & Valanides, 2009; Goktas, Yildirim, & Yildirim, 2009; Wang & Hannafin, 2008).

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This role-change for teachers has critical, wide-ranging implications for teacher education because, increasingly, many within and outside the education sector view teacher preparation as the linchpin in maintaining a well-informed, capable, and effective teacher force trained with necessary knowledge, skills, and dispositions. Prominent among the areas that pre-service teacher preparation programs across the United States have been encouraged to improve is technology (NCATE, 2010). Among the many questions these programs must address, one stands out: Can teacher education programs prepare the emerging teacher force to assume an instructional leadership role to accommodate the needs, capabilities, and imaginations of today's technocentric students?

To begin to answer this, a database grounded by empirical investigations with pre-service teacher education has been accruing and presented some noteworthy findings (Maddux, 2009). For example, studies with undergraduate pre-service teachers have shown that absent specific training in the educational uses of computers, undergraduates (sophomores and juniors) who were described as computer-competent were not any more skillful in designing better technology-infused lessons than freshmen who possessed competent technical skills with no specific training in the educational uses of computers. Following computer training, these sophomores and juniors outperformed freshmen in designing learning activities with computers (Angeli, 2005; Angeli & Valanides, 2005; Valanides & Angeli, 2006, 2008). Speaking to this outcome Angeli and Valanides (2009) asserted that "teacher educators need to explicitly teach how the unique features or affordances of a tool can be used to transform a specific content domain for specific learners, and that teachers need to be explicitly taught about the interactions among technology, content, pedagogy, and learners" (p. 158). Kariuki and Duran (2004) used the innovative concept of an

"anchored instructional approach" to restructure technology course learning. Pairing a curriculum development class with an educational computing class, they found that when the curriculum course was used to "anchor" activities in the computing course, the result was more effective and successful when learning about teaching with technology. For even digitally native pre-service teachers, incorporating technology into effective instruction is not a natural extension of technological fluency.

School infrastructures also reflect the continuing inroads made by technology. A report entitled "Teachers' Use of Technology in U.S. Public Schools, 2009" revealed that 97% percent of teachers had one or more computers located in their classroom, daily, while 54% could bring computers into the classroom. Internet access was available for 93% of computers located in the classroom every day and for 96% of those computers that could be brought into the classroom. The ratio of students to computers in the classroom every day was 5.3 to 1 (Gray, Thomas, & Lewis, 2010).

To further demonstrate the impact of technology, a 2010 National Education Technology Plan (U.S. Department of Education, NETP, 2010a) from the U.S. Department of Education, Office of Education Technology, presented the following goal: "Provide pre-service and in-service educators with preparation and professional learning experiences powered by technology that close the gap between students' and educators' fluencies with technology and promote and enable technology use in ways that improve learning, assessment, and instructional practices" (U.S. Department of Education, NETP, 2010a, p. 11). This goal further aligns with the broader agenda advanced by the federal *Race to the Top* initiative, a part of the 2009 American Recovery and Reinvestment Act, which enumerates as one of its four assurances a priority to "increase teacher effectiveness" especially in the area of STEM (Science, Technology,

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