Creating a Working Model for Technology Integration Through a Lesson Planning WebQuest

Jana Willis
University of Houston – Clear Lake

Abstract
In preparing teacher candidates to effectively integrate technology into their future classrooms they need to work in classroom environments that support a variety of technologies that include best practice lesson planning and classroom experiences. They should be allowed an opportunity to work with model technology integration processes that best support the curriculum and enhance student learning. Teachers need training in environments that support technology integration in curriculum areas that can be replicated in their own classrooms not training that focuses on software applications and skill development. This study investigates the development and implementation of a reproducible training model that utilizes a Lesson Planning WebQuest to educate teacher candidates in effective technology integration. The findings of this study will help teacher educators better understand how to facilitate training in the integration of technology, while taking advantage of the affordances inherent WebQuests.

INTRODUCTION

Schools and educational agencies involved in elementary, secondary, and post-secondary education continue to place an emphasis on the use of technology as a teaching and learning tool because technology encourages teachers and students to work together as they explore ways to improve the teaching and learning process (Burns, 2006; Kontos & Mizell, 1997; Schrum, 2005; Skarr & Spagnolo, 1995). If schools commit to the attainment of high standards of knowledge, skills, and understanding for an increasingly diverse and needy population, then teachers will have to include new technologies in their instruction. Teachers should possess and draw on a rich knowledge base of content, pedagogy, and technology to provide relevant and meaningful learning experiences for all students. Teachers need to identify needs, plan, implement, and assess classroom instruction through the collaborative use of technology and other resources. If technology is to be used as a tool to support the future success of our students, it seems only logical that technology should also be an important part of the instruction provided to teacher candidates (Strickland, 2005).

Most teacher candidates seeking teacher certification have little experience integrating technology into the students' learning process and typically do not have experience using models on which to build their own visions of an integrated classroom (Beichner, 1993; Cifuentes, 1997; Kerr, 1996; Morehead & LaBeau, 2005, Schrum, 1999; Strudler & Wetzel, 1999). Many critics have argued that successful use of technology in schools may depend on how well schools of education model technology, provide opportunities for practice and reflection, and prepare teacher candidates to use technology in their own classrooms (Kent & McNergney, 1999; Pellegrino & Altman, 1997). Teacher candidates currently receive little technical, pedagogical, or

administrative support for these fundamental changes, and few teacher preparation programs prepare their graduates adequately to use technology to enhance student learning. As a result, most teacher candidates have very little insight into how to integrate technology into their curriculum (Recesso, Wiles, Venn, Campbell, & Padilla, 2002).

The instructional goal of a WebQuest asks learners to analyze a body of knowledge, transform information that supports their objective and demonstrate an understanding of the new information by creating information or a product that others can respond to. (Dodge, 1995). The WebQuest model was created by Dodge (1995) and his colleague Tom March (1998) as a framework for structuring learner-centered instruction using resources from the World Wide Web. The model is only a subset of a larger class of guided inquiry activities in use today (Young & Wilson, 2002). Tom March (1998) suggests that WebQuests increase student motivation by providing an open-ended essential question and real-life resources. This encourages more advanced performance by the learner and motivates them to want to explore the topic. (March, 2003; Strickland, 2005). WebQuest are inquiry-oriented activities that utilize information from the World Wide Web. They are designed to use learners' time well, to focus on using information rather than looking for it, and to support learners' thinking at the levels of analysis, synthesis and evaluation (Dodge, 2001). They are characterized by deep learning that involves constructing new knowledge through a critical thinking process (Dodge, 2001).

Scheffler and Logan (1999) conducted a study to identify technology related competencies that were important for teachers. The results of the study showed that making technology an integral part of curriculum and instruction was of the greatest importance for teachers. This suggests that teachers are moving beyond administrative uses of technology to instructional uses that enhance teaching and student learning. Teachers identified the most important competencies as the knowledge and skills to make technology a seamless part of the curriculum. The teachers indicated they had less need to teach about technology and more of a need to use technology as a teaching and learning tool that could be integrated into classroom instruction. This study showed an increasing need for teachers to obtain more skills and knowledge about the use of technology-enhanced instruction.

An earlier longitudinal study investigated the outcomes of a staff development program designed to improve technology use in the classroom, Parr (1999) found that increased experience and competence in using technology did not ensure success in the integration of technology into the curriculum. After the participants in the study were given laptop computers, their knowledge, skills and use were monitored over the next several years. The data collected indicated that there was an increase in the participants' technological skills as related to their personal use of the computer but the skill increase did not transfer to an equal increase in their ability to use the computer as a teaching and learning tool. This finding suggested a need to relate technological skills and knowledge to pedagogical knowledge to facilitate technology integration into the curriculum. Recent studies on educational technology confirm the necessity of preparing teacher candidates to integrate technology into the classroom curriculum and the inadequacy of

existing education programs efforts to teach and model the integration process effectively (CEO Forum on Education and Technology, 1999; National Council for Accreditation of Teacher Education (NCATE) 2001). Frequent modeling of technology-enhanced lesson plans directly related to the classroom environment would support the transfer of technology skills and use from the training environment to the teachers' own classroom (NCATE 2001).

THE STUDY

In response to the growing need for effective models the University of Houston – Clear Lake (UHCL) Preparing Tomorrow's Teachers to use Technology (PT3) Collaborative developed a reproducible training model to prepare teacher candidates to be proficient in developing and delivering classroom lessons (guided by state content and technology standards) that effectively incorporate technology in the learning process so that all students (Pre -kindergarten to 12th grade) use technology in obtaining and demonstrating mastery of lesson plan objectives (Driskell, 2002, Mayo, Kajs, & Tanguma, 2005). The goal of the three-day, interactive professional development technology practicum developed by the UHCL/PT3 Collaborative was to better prepare teacher candidates to develop and deliver technology-rich lesson plans (Driskell, Kajs, & Coppenhaver, 2002).

The model provided teachers candidates and their field-based mentors, with three days of hands-on technology training, focusing on the use of appropriate technology for enhancing student learning and the integration of that technology into the classroom curriculum (Driskell, 2005). The teacher candidates and their field-based mentors were provided with an opportunity to work collaboratively in student-centered technology rich learning environments. The model used a variety of instructional delivery methods to provide the teacher candidates and mentors with hands-on experience using the emerging technologies that are available for the classroom. The technology-rich lesson plans produced during training were to provide the teacher candidates and their mentors with working models that they could transfer to their classrooms.

When initially implemented, the model provided teacher candidates and their field-based mentors with technology training in software applications, Internet resources and technology-rich activities that could easily transfer to their campus classrooms. The training was in addition to the required technology skills course taken by teacher candidates during their educational programs. The teacher candidates and field-based mentors worked collaboratively to develop classroom lessons or activities that incorporated the new technology skills. Since the teacher candidates received training specific to the technology needs of the project they served as the technology experts and the field-based mentors brought to the partnership content expertise and classroom experience.

To document areas where change and growth were expected participants in the training completed three locally developed instruments. The instruments used were a Technology Comfort Scale, a Frequency of Involvement in Technology Scale, and an Attitude Toward Technology Scale. "The scales were determined to have a Cronbach's alpha reliability coefficient of .91, .95, and .98, respectively. The magnitude of these coefficients indicates good scale reliability for each of the three scales" (Kajs, Underwood, Coppenhaver, Driskell, & Crawford 2001, p. 1988). The results from the administration of the instruments indicated an increase in the understanding of technology integration and a higher comfort level about creating lesson plans that they felt to be appropriate for their future classrooms (Mayo et al., 2005; Kajs, et al., 2001).

While gains were reported and attitudes were positive the training was not without complications and obstacles. The field-based mentors were often unable to attend the training sessions due to the needs of their campuses and classrooms. This left the teacher candidates without content and classroom experts to help guide them in the development of technology-rich lessons plans that would be appropriate for the candidates' assigned grade level and content area. The measure of a teacher's ability to effectively incorporate technology into the classroom curriculum can best be determined by a teacher's development and delivery of lesson plans that integrate technology into the content and pedagogy to enhance student learning processes and to demonstrate mastery of lesson objectives (Driskell et al., 2002).

The following semester the training model was modified to better address the limited time commitments of the field-based mentors while still addressing the lesson planning process and effective technology integration. During the new training sessions teacher candidates were again provided instruction in the use and application of appropriate software applications, Internet resources, and technology-rich activities. In addition to the technology skills training, they were presented with best practice model lesson plans that were lacking in integrated technologies. The teacher candidates were guided through the lesson plan process with the aid of a WebQuest. The lesson plan WebQuest (Dodge, 2001) was developed by the UHCL/PT3 Collaborative to enable the teacher candidate to explore and analyze resources that aided in the understanding of each lesson plan component. The candidates were to identify and integrate a technology component they believed would enhance the learning process for their students. The WebQuest activity provided the teacher candidates with links to state content and technology standards. In addition to the standards the candidates were directed to resources related to assistive technologies that would support the needs of diverse learners in their classrooms.

The quantitative results from the fall semester 2001 indicated positive gains on all three scales. However, statistically significant results were only reported for the Technology Comfort Scale (n = 115; / = 2.065; $p < .04$). The results from the spring semester 2002 showed statistically significant gains on the Frequency of Involvement in Technology Scale (n = $ll;$ $t = 2.201;$ $p < .025$) and the Technology Comfort Scale (n = 79; / = 4.49; $p < .0001$) (Mayo, et al. 2005). The increase in gain scores indicated that the WebQuest activity had provided the teacher candidate with resources and instruction

in appropriate lesson planning processes and integrated technology (Mayo et al., 2005). Table one, below, demonstrates these results.

Table 1. Measurement Results

Measure	Semester	Results
Technology Comfort Scale	Fall (n=80)	t=2.065;p<.04
	Spring (n=79)	t=4.49;p<.0001
Frequency of Involvement in Technology Scale	Fall (n=115)	No significant results pre-test mean = 55.82 post-test mean = 58.18
	Spring (n=77)	t=2.291; p<.025
Teaching Efficacy Scale	Fall (n=63)	pre-test mean = 115.73 post-test mean = 117.27
	Spring (n=88)	pre-test mean = 99.19 post-test mean = 101.83

In the UHCL/PT3 WebQuest training model the teacher candidates were faced with the question of what skills and knowledge they wanted their student to acquire as a result of the lesson and how technology would be used to assist in mastery and demonstration of the lesson objective. Using a WebQuests for inquiry-based learning as they progressed through the lesson plan cycle required the candidates to exercise information seeking, analyzing, and synthesizing strategies that represented higher levels of cognition than simple knowledge acquisition. (MacGregor & Lou, 2004). By breaking the lesson planning process into meaningful components and asking candidates to undertake specific sub-tasks within each of the components, the WebQuest supported the thinking process that more experienced teachers would use (March, 1998). Candidates were required to be creative and use high-level problem-solving skills to discover information that would help them accomplish their learning goal (Billings & Kowalksi, 2004). Actively involving the teacher candidates in knowledge building strengthened their understanding and promoted higher-level thinking. The motivation and authenticity of inquiry learning encourages the development of thinking skills (March, 1998; Strickland, 2005). Throughout the WebQuests process the learners are engaged in inquiry learning supported by resources and guidance (Strickland, 2005).

CONCLUSIONS

WebQuests should not be used as isolated instructional activities but as tools to use within the larger context of course objectives and curriculum. Achieving connections between the learning activities and the principle and ideas of the curriculum is a challenge for education. WebQuests may provide powerful tools to help meet that challenge (Young & Wilson, 2002). Research on the educational benefits of WebQuests is lacking but recent studies have indicated gains in self-efficacy and outcome expectancy (MacGregor & Lou, 2004; Strickland, 2005; King, 2003) The UHCL/PT3 study placed technology training in the context of lesson planning and classroom instruction through the use of a WebQuest. The training taught future teachers to effectively integrate technology into lesson plans to support the use of technology to enhance student learning and mastery of lesson plan objectives.

The encouraging results of the WebQuest enhanced training model prompted the integration of the model into the technology integration course required by all teacher candidates enrolled at UHCL. The undergraduate technology course, *INST 3133: Computer Use in Classrooms* offered by the School of Education at UHCL, introduces teacher candidates to the tools and skills necessary to understand and operate computers, navigate the Internet and World Wide Web, and create hypermedia products.

The new component of the course presents teacher candidates with the WebQuest, created by the UHCL/PT3 Collaborative to enable the exploration of resources that address lesson plan development, standards alignment and technology integration throughout the lesson planning process. The teacher candidates are asked to create a lesson plan appropriate for their selected grade level and content area that integrates a software application, Internet resource or technology-rich activity they believe will enhance student learning during the lesson cycle. The WebQuest activity acquaints the teacher candidates with lesson plan components, the lesson plan process, the use of web-based resources, effective technology integration, and assistive/adaptive technologies through the use of an interactive activity (WebQuest) for developing technology rich lesson plans that addresses state standards and meet the needs of all learners. Candidates are provided with links to resources that support the lesson plan development. Teacher candidates need more than training in software applications and technology skills if they are expected to understand how to use technologies in their lessons to enhance student learning. The findings of the study suggest that teacher educators need to place instructional technology education within the context of lesson planning (Mayo et al., 2005). Effective training models should include best practice lesson planning and technology-rich classroom experiences to allow teacher candidates an opportunity to model technology integration processes that best support the curriculum and enhance student learning.

Contributor

Jana M. Willis, Ph.D. is an Assistant Professor of Instructional Technology and Teacher Education at University of Houston – Clear Lake (UHCL). She specializes in technology integration in the curriculum. Her current research is foundational curriculum to support integration training.

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