

Integrating Digital Learning Technologies the Content Area

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November, 2008

Abstract

As the use of digital technologies in teaching and learning becomes more institutionalized in pre-service teacher preparation, it becomes increasingly necessary to incorporate content specific technology experiences to enable career and technical teachers to seamlessly integrate the diversity of digital tools available to today's learners. Using the universally recognized International Standards for Technology in Education (ISTE) National Educational Technology Standards (NETS) for learners and teachers, a course specifically developed to incorporate these standards in planning learning activities in a content area in one of the Career and Technical Education (CTE) programs demonstrates that technological applications can enhance pre-service teacher's abilities to conceptualize and create learning activities and assessments that strengthen the constructivist learning perspective. This paper provides a rationale for teaching of content specific technology courses in addition to the general technology courses in pre-service preparation of Family and Consumer Sciences (FCS) teachers.

Background

How can we integrate technology skills in the curriculum to enable pre-service teachers to achieve universally recognized technology standards and create valuable teaching resources that aligns **technology standards** and **content area** outcomes? This continues to be an overarching question as family and consumer sciences educators attempt to integrate emerging digital tools in planning learning activities that support constructivist learning environments in teaching family and consumer sciences.

Although it is recognized that a number of teacher education programs are proactive in preparing teachers to integrate digital tools to support pedagogy and learning (Bush et. al., 2003; Duhaney, 2001; Grabe & Grabe, 2007; Jang, 2008), most experiences with technology are focused on a single course of learning to "use" technology rather than learning how to "facilitate" learning with technology (Grabe & Grabe, 2007, Jonassen et.al, 2003). Wachira, Keengwe and Onchawi (2008) in a study of technology integration in the content area of mathematics concluded that it was imperative to critically examine how technology was being integrated in teacher preparation programs. Bush et al (2003) also report on a shift in teaching technology to a field based approach from one that required pre-service teachers to participate in a campus-based educational technology during their junior or senior year with no real coordination between what students were learning in the class and what they were doing in their methods experiences (p. 59). A review of literature reveals that other content areas have rationalized for this model of technology integration.

In a position paper for technology integration in teacher education programs, Thompson, Bull, and Willis (2002) note that restricting technology experiences to a single course or to a single area in teacher education such as a general methods course will not prepare students to be technology-using teachers (p. 1). They propose three basic principles for integration of technology in teacher education programs that:

- technology should be infused into the entire teacher education program where student teachers have opportunities throughout their program to learn about, learn with, and learn to incorporate technology into teaching
- technology should be introduced in context so student teachers learn many uses of technology from integration in their coursework and field experiences; and
- student teachers should experience innovative technology-supported learning environments by observing educators using technology to support traditional, new, innovative, and creative forms of teaching and learning. (pg 1-2)

This shift from learning technology in isolation to focusing on technology as a tool that supports learning is becoming increasingly necessary as more teacher educators advocate for technology integration in the content areas and field experiences (Bush et. al, 2003; Hargrave & Hsu, 2000; & Jacobsen & Friesen, 2002). By observing best practices in their courses, pre-service teachers will in turn critically reflect on how technology can be used to promote creativity and higher order thinking skills that allow learners to critically analyze, question, interpret, and solve problems of everyday life (Jonassen, Howland, Moore, & Marra, 2003; ISTE, 2007). Providing opportunities within the content area to engage in this reflective process can support the constructivist approach to curriculum conceptualization, development and delivery which assumes that learners can be empowered to construct meaning of new knowledge based on their own lived experiences. Using digital tools to help learners create new knowledge and provide additional avenues for introducing these lived yet sometimes silenced experiences into the learning environment. This in turn creates a curriculum that is relevant to the needs of an increasingly diverse student population and in tandem with the current realities of learners living daily lives in a highly digital world (ISTE, 2008).

Incorporating Technology Standards (NETS)

A technology course in the content area allows teachers to maximize available technological tools to create meaningful learning activities for their students through the linking of universally recognized International Society for Technology Education (ISTE) National Education Technology Standards (NETS) for learners to the content standards in FCS, for example. Because technology integration can be quite broad, and the technology tools available vary from school to school, the use of ISTE NETS (2008) for learners provides a basic framework for working towards a systematic, developmentally appropriate, and meaningful integration of technology in learning environments. These internationally recognized technology standards include the ability of the learner to:

1. demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology;
2. use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others;
3. apply digital tools to gather, evaluate, and use information;
4. use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources;
5. understand human, cultural, and societal issues related to technology and practice legal and ethical behavior; and

6. demonstrate a sound understanding of technology concepts, systems, and operations. (ISTE, 2008)

For educators to integrate these standards in instruction, they too have to become familiar and achieve technology standards for teachers (NETS for Teachers). These include the ability of the educator to:

1. facilitate and inspire student learning and creativity;
2. design and develop digital-age learning experiences and assessments;
3. model digital age work and learning;
4. promote and model digital citizenship and responsibility; and
5. engage in professional growth and leadership. (ISTE NETS, 2008)

In planning to integrate these technology standards within the content area, teachers have to recognize that pre-service teachers are going to be working in diverse contexts, and need to develop learning activities cognizant of the realities of their classrooms and personal access to technological tools. By understanding the context in which pre-service teachers will work (for some, their experiences are limited to their practicum experiences and context), they will be able to develop useful, realistic, learner appropriate, and technology-enhanced learning activities. It is meaningless to develop learning activities that require the use of digital tools that are not readily available in the learning environment (Bush et al. 2003).

Unlike technology skills based courses taught in isolation of content, students in our courses focus on developing learning activities for secondary FCS programs (foods, housing, health, fashion, personal finance, textiles, and human development). All projects culminate in the development of an interactive inquiry based learning activity (webquest) that allows learners to maximize on the potential of a variety of applications available in most learning environments. Webquests, although over a decade old, have been widely used by teachers to integrate technology in learning environments and more recently, Wang and Hannafin (2008) point out that teacher educators have applied the web quest model with pre-service teachers in order to develop technology integration skills similar to those used in everyday schools. Well conceptualized and developed, web quests can provide a platform for engaging learners with authentic, rich and relevant content (Dodge, 1995; March, 2006). Web quests' popularity is in its richness and versatility to seamlessly incorporate multi-media including digital video, images, internet hyperlinks, audio, text and other forms of new media that are familiar to today's learners.

Developing Interactive Web quests

In developing web quests in the content area, the tasks assigned to pre-service teachers should require minimal experience with technology as learning tools. A brief demonstration and discussion is given on how each basic tool can be used to enhance learning after which students are asked to construct a creative activity using various digital tools. A good resource for such a course is *Learning to Solve Problems with Technology, A Constructivist Perspective*¹ which provides the theory to support integration of technology in constructivist learning environments. Pre-service teachers should also be provided an opportunity to reflect on how each tool selected to complete the web quest engages learners, promotes creativity, critical thinking,

¹ Jonassen, D., Howland, J., Moore, J., & Marra, R. (2003). *Learning to solve problems with technology: A constructivist perspective*. Columbus, OH: Prentice Hall.

problem solving and collaboration and enhances learner's ability to conduct research (ISTE, 2008). By completing a reflection, pre-service teachers are provided additional opportunities to explore current literature on pedagogical implications and the role of technology as a learning tools rather than a medium for delivering content.

The underlying philosophy of the FCS profession is to empower learners to take action on perennial issues in everyday life. They are encouraged to ask "*What should we do about...*" questions of everyday life for example...managing family resources? ..poverty in our community?...affordable and quality child care? caring for the elderly? affordable housing? consumption of healthy foods? consumption of non-renewable resources? Content in family and consumer sciences is so intertwined with everyday lives of students and most topics have the potential to be re-phased to allow learners to ask critical questions, explore solutions to those questions and take or make morally defensible choices or actions respectively. Below are some examples of completed pre-service teacher's webquests:

- *What should be done about sustainable lifestyles in rural agricultural communities?* This web quest allows learners to research and find ways to nurture environmentally conscious practices to reduce the need to import items that can be obtained locally;
- *It Isn't Easy Being Green* allows learners to evaluate the local and federal impact on the environment and determine their personal ecological footprint
- *What should be done about consumption of healthy fast foods – Fast?* Learners research the ingredients and nutritional value of fast foods from Burger King, McDonalds and Subway and use the data to make informed decisions in choosing healthy foods *fast!*
- *What should we do about child labor in Sweat Shops?* Students use digital resources to investigate practices and develop a morally defensible response for making informed choices in purchasing clothing.
- *What should be done about managing available family finances?* In this interactive activity, learners use spreadsheets to record data on individual and family expenses and make informed projections on future expenditures.

The advantage of offering a technology course specific to the content area is that it allows pre-service teachers the opportunity to explore and practice creating learning activities for practicum experiences while they still have ample access to the various tools available in university settings. In working with pre-service teachers, we have found that students begin to integrate learner centered and technology enhanced learning activities in their projects, allowing them to implicitly meet the ISTE Standards for Teachers. Pedagogy and content courses have incorporated digital stories, electronic portfolios, digital videos, interactive spreadsheets, on-line tools such as calculators, and interactive blogs. If these experiences are encouraged and educators model best practices during pre-service teacher preparation (Thompson et al., 2002) pre-service teachers will seamlessly transfer them into their own classrooms once they assume full time teaching responsibilities. In setting expectations for technology enhanced learning activities, teachers have to be cognizant of the reality that some students may not still have access to technology at home.

Conclusion

Imperative to successful integration of technology in teaching and learning is the ability of the teachers to link curriculum in content area with teaching that uses available technological tools to create constructivist learning environments. It is recognized that for educators to facilitate learning with technology in a content area, they must first learn how to use technology. In the process of learning “how to” with technology, it is critical to utilize content specific examples and consideration of the learners context, i.e. access to digital learning tools in the classroom and at home; connectivity to the Internet, and students’ technology abilities. It will also require collaboration between educators offering stand alone technology courses and those teaching special methods in the content area. This helps pre-service teachers to plan realistic lessons incorporating the ISTE NETS for learners as a framework to guide their integration efforts. In order for teacher educators to model best practices, they too need to continually build their own capacity and be pro-active in adopting emerging technologies. A course on technology integration within the content area not only enriches the teaching of the specific content, but also supports local, state, national and global efforts to prepare today’s learners.

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