Chapter 10
The Infusion of Technology into Teacher Education Programs

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ABSTRACT

In this chapter, student achievement, the differentiation of instruction, and 21st Century Skills are examined along with their relationship to the use of technology in an educational setting. Characteristics of highly qualified teachers are also examined from multiple standpoints within the educational system. Standards from INTASC, NCATE, NCTAF, and NCLB point to the importance of the university faculty and quality teacher education programs to support the needs of preservice teachers. In addition, the joining of business and education across the nation and the world to infuse technology into education has shown positive results. This merger between business and education exemplifies the need for the acquisition of 21st century skills needed for all students to be a literate part of the 21st century workforce.

THE INFUSION OF TECHNOLOGY INTO TEACHER EDUCATION PROGRAMS

There is a sense of urgency in the United States to improve the quality of K-16 education. With the passing of one of the largest pieces of educational legislation in history, No Child Left Behind (NCLB), educational systems began working on closing the achievement gap and equipping students with needed 21st century knowledge and skills (Apte, Karmarkar & Nath, 2008; Ladson-Billings, 2006; Partnership for 21st Century Skills, 2009).

Our society has gone through many changes in economic transitions as a country. The economic and labor transitions are based on the type of workers that are found most commonly among the population. During the Agricultural Age, the common working person was some sort of farmer. According to the French economist, Jean Fourastie (1974), an economy consists of a "Primary sector" of commodity production, which would include farming, livestock breeding and mineral resources. Following this age would be the "Secondary sector" of manufacturing and industrialization. This Industrial Age in Western

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Europe and North America was the first transformation of an agrarian society to an industrial society in the world. In 1967 the production of material goods and delivery of material services accounted for nearly 54% of the United States' economic output (Apte et al., 2008; Karmarkar & Apte, 2007). This would mean the primary labor worker would be the factory worker. A "Tertiary sector" of service industries would soon follow after an Industrial Age. In 1997 the production of information products, such as computers, books, televisions and software, and the provision of information services, such as telecommunications, financial and broadcast services and education, accounted for 63% of the U.S. economic output (Apte et al., 2008; Karmarkar & Apte, 2007). This would be the evolution of the knowledge worker. Our educational system has kept up with the changes of the past, however we must question whether our educational system is poised to go into the 21st Century for the fourth sector, identified as the Conceptual Age (Pink, 2005). This age requires the economics of strong left brain skills (reading, writing, math and science/content area subject matter) as well as right brain skills (aesthetics, critical thinking, creativity, value and play).

Few would argue that teaching is one of the most important professions that exist, because it is directly linked to student learning (Hanushek & Rivkin, 2010). However, policy makers and educators are suggesting that the transformation of an outdated educational system is imperative in order to meet the needs of a global society and our 21st century students (Partnership for 21st Century Skills, 2004). Today's learner has changed dramatically from decades ago in their approaches to learning, and teachers need to act as facilitators in a classroom where students take an active part in the process of creating or constructing their own knowledge, yet questions continue to be raised regarding how well teachers are actually prepared for integrating technology in their classrooms (Polly, Mims, Shepherd, & Inan, 2010). The children of today are becoming very comfortable using the various forms of technology that surround them on a daily basis. With this transformation in our educational system, we need to meet the demands of the 21st century learner. This transition begins with acknowledging the ability students to learn in different ways than those of previous generations. Every child in America needs 21st century knowledge and skills to succeed as effective citizens, workers and leaders in the 21st century (Partnership for 21st Century Skills, 2004). There is, however, a large gap between the knowledge and skills most students learn in school and the knowledge and skills they need in the typical 21st century communities and workplaces (Partnership for 21st Century Skills, 2004).

The wave of change in student learning and professional educators is reflective of the global economics shift. With this global economic environment, education plays a crucial role in stimulating economic growth for a region, state, or nation (Stevens & Weale, 2003). This success is based upon the skills and knowledge of its general workforce and its capacity to innovate new markets (Spires, Lee, Turner, & Johnson, 2008).

Partnership for 21st Century Skills brings together business and education. Business leaders have viewed and kept pace with the changing world, however, the educational system has not kept up with what is needed to produce students who can actively engage in the 21st Century as part of a skilled workforce (Partnership for 21st Century Skills, 2004). In order to achieve success, students need to master traditional content subjects such as mathematics and science, while also gaining 21st Century skills, such as critical thinking, innovation, creativity and communication skills (Gaston, 2009; Marsh, Mitchell, & Adamczyk, 2010).

In one research study on the perceptions of middle school students on school, technologies, and academic engagement found students wanting the schools to become more like the world they live in through technology (Spires et al., 2008). Along with this desire of students for educational change