Chapter 36
Making and Modalities: Upending Traditional Teacher Education Course Delivery to Improve 21st Century Teaching and Learning

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ABSTRACT

The World Economic Forum's 2018 report indicated that students will need to be prepared for a rapidly changing, technology-filled world in which their future jobs likely do not yet exist. Recent education reform initiatives have focused on preparing the workforce for 21st century jobs by improving STEM literacy and acknowledging the importance of teacher preparation. Unfortunately, many teachers, designers, and technologists have not been trained in the same ways as they are expected to prepare students, and training opportunities are often delivered in traditional, business-as-usual formats. To better prepare individuals to prepare students, reimagining traditional educational delivery and modalities, while integrating STEM, making, and play to encourage the development and practice of 21st century skills may prepare those adult learners build toward the future. This chapter will discuss administrative and curricular changes we made geared toward meeting our adult audiences' needs in a teacher education program following their learning preferences.

INTRODUCTION

Recently, I asked one of my instructional design students to intern for me on an upcoming project, to which she replied, "I would love to try to put what I have learned into practice even though I am a walking insecurity." Her words resonated with me, as my colleagues and I have had to rapidly transition our courses and students to online learning environments in the wake of the COVID-19 pandemic. Many

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educators have been struggling with the rapid and immediate transition to the unfamiliar with insecurity, trepidation, uncertainty, and reluctance, but urgency necessitated change. My insightful student recognized the feelings that accompany changing the way we "have always done things" and her words illuminate one of the many reasons education may be slower to adapt to our ever-evolving world. The solution, however, to such insecurity is through proper preparation.

The World Economic Forum's (2018) recent report indicated that current students will need to be prepared for a rapidly changing, technology-filled world in which their future jobs likely do not yet exist. Students must be adaptable to the disruptions experienced in the workforce and the world, flexible in their capacity for skills development, reskilling, and upskilling, and become committed, agile lifelong learners able to innovate and forge their own future workforce pathways (World Economic Forum, 2018). Their instructors need to be just as prepared and flexible. Numerous researchers have noted that encouraging the development of 21st century skills in students will better prepare them for their future employment (see Bellanca & Brandt, 2010; Chan, 2016; Trilling & Fadel, 2009). Unfortunately, there is speculation as to whether or not the traditional structure of the U.S. educational system and business-as-usual curriculum delivery can meet those needs and requirements (Chan, 2016; McLeod & Shareski, 2018; Prensky, 2016). In response, recent education reform initiatives have focused on preparing the workforce for 21st century jobs by improving literacy in STEM fields and acknowledging the importance of appropriate teacher preparation.

According to Trilling and Fadel (2009, p. XXVI), 21st century skills include: learning and innovation skills (creativity, critical thinking, collaboration, and communication, often referred to as the 4Cs); digital literacy skills (media, information, and ICTs, or information and communication technologies literacies); and career and life skills (flexibility, adaptability, initiative, self-direction, multicultural interaction, productivity, accountability, leadership, and responsibility). Such skills can prepare individuals for the unpredictable, uncertain, and dynamic future they are likely to encounter by allowing them to be agile, creative thinkers that shift directions easily, while working effectively with diverse audiences. However, there is a great deal of concern that students are not and will not be adequately equipped for the future since their educations lack training of these skills necessary to solve problems and think analytically in order to be successful in high-quality, technology-driven jobs (Chan, 2016; Partnership for 21st Century Skills, n.d.). And, "Without high-quality, knowledge-intensive jobs and the innovative enterprises that lead to discovery and new technology, our economy will suffer and our people will face a lower standard of living" (National Research Council [NRC], 2007, p. 1). Preparing the workforce for 21st century jobs by improving literacy in STEM fields has become the crux of recent education reform initiatives.

The call for increased STEM literacy and improved learning outcomes in STEM subjects has been ongoing since the Space Race (NRC, 2007). Obama's *Race to the Top* initiative addressed U.S. deficiencies in 21st century skill areas and STEM education by encouraging "U.S. states to adopt internationally benchmarked standards and assessments as a framework within which it can prepare students for success in college and the workplace" (Organisation for Economic Cooperation and Development, 2013). In general, STEM standards encourage students to gain: 1) awareness of global interconnectedness, 2) conscientiousness of the future, 3) understandings of applications of the subject(s) in practice, and 4) the ability to create models, diagrams, and drawings within those subjects. Many initiatives have been undertaken to improve students' 21st century skills and STEM literacies; however, teachers, designers, and developers may have not been trained to implement them effectively. While students are not necessarily expected to become STEM majors, being literate in STEM subjects will help them gain those essential 21st century skills. Still, many fear that poor U.S. STEM teacher quality and preparation are