Chapter 8
Use of Tablet Computers and Mobile Apps to Support 21st Century Learning Skills

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ABSTRACT

In this chapter, the authors provide examples that illustrate ways in which educators can use tablets and mobile apps to redesign school experience in order to support individualized instruction, development of 21st century skills, and anytime anyplace learning. These examples are generated from a two-year examination of a tablet initiative in a private all-boys school. Using insights from human-centered views of mobile learning, the authors highlight interactions among mobile apps, learners, and peers, while examining issues of pedagogy associated with the implementation of mobile learning. They conclude with implications for researchers, educators, and practitioners involved in the implementation of mobile initiatives.

INTRODUCTION

Andrew, a 13-year old 8th grader, walks into his social studies class. Upon entering, he unlocks his iPad, opens up *Edmodo* and begins his warm-up as he does each day the class meets. For today's warm-up, the teacher is asking students to consider the major reason U.S. President Kennedy did not get along with U.S.S.R. Premier Khrushchev, a lesson covered in the previous night's online lecture delivered by the teacher through *Voicethread,* consistent with a flipped classroom approach. To help form his response, Andrew is able to cue up a Cold War video the teacher linked from the *History Channel* app to the warm-up post. "Three minutes left on the warm-up," the teacher says as he walks around the room monitoring student work. Andrew takes the teacher's cue, as it is time to write his response in *Edmodo*. As students enter their posts in *Edmodo*, the teacher updates the responses and makes note of those students who are able to respond accurately and those who appear

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to struggle. The teacher uses this information as a form of formative assessments to better gauge which students need extra support and differentiate his instruction accordingly.

Andrew's story described above illustrates a way of embracing mobile learning and opening up new learning opportunities that prepare students for 21st century skills required to work and function in an increasingly mobile and information rich society. According to the latest issue of the New Media Consortium Horizon Report (Johnson, Becker, Cummins, Estrada, Freeman, & Ludgate, 2013), mobile learning is rapidly becoming a key component of K-12 education with the potential of near-term adoption. Mobile learning has been initially defined as learning where the dominant technologies used are handheld or palmtop devises (Trexler, 2005). In recent years, however, scholars have moved from *device-oriented* to *human-centered* definitions of mobile learning where the focus is primarily on learners and context (Koole, 2009; Laouris & Eteokleous, 2005; Sharples, Taylor & Vavoula, 2007). Koole (2009), in particular, proposed the Framework for the Rational Analysis of Mobile Education (FRAME), which includes a combination of the interactions between learners, their devices, and other people. In this framework, mobile learning provides increased access to information, enhanced collaboration among learners, and a deeper contextualization of learning (Koole, 2009). According to van't Hooft (2012), this model is valuable in K-12 education because it allows us to consider mobile learning devices, pedagogy, and curriculum in a holistic way.

The introduction and wide adoption of mainstream tablet computers in the last three years has re-energized and extended inquiry into the affordances of mobile learning in education (Brand & Kinash, 2010). More specifically, the introduction of the Apple iPad in 2010 as well as the dramatic growth of mobile educational applications (apps), software programs that run on mobile devices, have redefined what we mean by mobile computing and expanded the capabilities of mobile devices enormously (Johnson et al., 2013). In order to take advantage of the affordances and capabilities of mobile devices and mobile apps, however, educators need to redesign school experiences in order to support: (a) individualized instruction (Squire, 2012); (b) development of 21st century skills - the ability to access and evaluate information, create and innovate, communicate in new ways, and collaborate effectively (Partnership for 21st Century Skills, 2009); and (c) anytime anyplace learning through multiplicity of space (Squire, 2012).

In this chapter we provide examples that illustrate how educators can use iPads and mobile apps to support such learning experiences. The examples are generated from an examination of an iPad initiative in a private school in a Mid-Atlantic State launched in 2011. Specifically, the examples are generated from the first author's classroom (Michael), who has served as a social studies teacher at the school since the inception of the initiative. Using insights from *human-centered* views of mobile learning, we analyze these examples paying close attention to the interactions between learners, iPads and other people as suggested by Koole (2009). We also examine issues of pedagogy associated with the implementation of mobile learning and its potential to support the development of 21st century skills. Finally, we discuss implications of our work for researchers, educators, and practitioners involved in the implementation of iPad initiatives.

BACKGROUND

There is no doubt that the emergence of tablet devices such as the iPad has taken the educational community by storm. The Los Angeles school system, for instance, has recently approved the purchase of $30 million worth of iPads, while districts from Texas to Chicago and Florida are instituting iPad initiatives worth millions of dollars. Further, current estimates indicate 70 billion