Chapter 10
Mobile Technology Integration and Student Learning Outcomes

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ABSTRACT
Several schools leverage federal, state, local, and private funding to improve technology. Most have implemented their technology plans which range from providing each student with a digital device to equipping each classroom with an interactive white board or desktop computers. To fully realize the benefits of these technologies requires teachers to redesign their instructional strategies including participating in technology focused professional development and administrative support. This chapter examines the impact of technology integration on student learning outcomes and reviews a framework for the integration technology in the curriculum.

INTRODUCTION
Portable computing devices such as smartphones and tablets that have access to the Internet through a cellular or Wi-Fi network (Grant, Tammin, Brown, Sweeney, Ferguson, & Jones, 2015; Reeves, Gunter, & Lacey, 2017) are becoming increasingly ubiquitous in society particularly with the current generation of students (Grant et al., 2015; Sharples, Kloos, Dimitriadis, Garlatti, & Specht, 2015; Wright & Parchoma, 2011). Personal ownership of mobile devices continues to increase with the percentages of youth ages 2-17 owning smartphones increasing from 23% in 2011 to 37% in 2012 (Levene & Seabury, 2015). This generation often called digital natives have grown up with the Internet, computers, cellphones, and other digital media integrated into almost every sphere of their lives (An & Reigeluth, 2012).

Digital natives are accustomed to receiving information rapidly; can parallel process and multi-task; prefer viewing graphics before text; and function best when networked. These learners require the integration of technology to be actively engaged in their learning. According to the National Center for Education Statistics (NCES), in 2013 about 71% of the U.S. population age 3 and older used the Internet. DOI: 10.4018/978-1-5225-3949-0.ch010
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(United States Department of Education, National Center for Education Statistics (NCES), 2016), while the United Nations Educational Scientific and Cultural Organization (UNESCO) gives the number of people having access to a connected mobile device at over 6 billion people worldwide (UNESCO, n.d.). These and other developments have led to an increased emphasis on the integration of technology into the k-12 classroom in an effort to encourage learner engagement (An & Reigeluth, 2012). Technology integration in the classroom has the potential to support important educational goals and enhance the acquisition of higher order thinking and problem solving skills (U.S. DOE, 2016). O’Dwyer, Russell, Bebell, and Tucker-Seeley (2005) found a connection between technology, achievement, and motivation; students and teachers tend to be more engaged and interested when technology is an integral part of teaching and learning.

This chapter aims to provide a useful reference point of published research on mobile learning and the influence of mobile technologies on student learning outcomes. Although there have been many promising learning opportunities, there continues to be a need for empirical evidence supporting the effectiveness of mobile technologies in specific areas of student achievement. This is especially critical as schools begin to consider “bring your own device or bring your own technology” as a feasible alternative to providing school-owned mobile computing devices for every student (Grant et al., 2015), and seek ways to comply with new state mandates and access to digitized learning resources. As modern day classrooms become more technologically enhanced, and schools struggle to keep up with the latest gadgets, technology remains a tool to be used to deliver the content and not the content. Good teaching with technology remains informed by the relation and interaction among and between content, pedagogy, and technology (Koehler & Mishra, 2009). See Figure 1 - a concentric depiction of the interaction of the three core areas of knowledge and the resulting Technological Pedagogical Content Knowledge (TPACK). The TPACK framework (Koehler & Mishra, 2009) provides a structural basis that can be used to plan for technology integration.

Theoretical Perspectives

The variety of ways through which people interact with and use technology and media cannot be explained by a single theory or theoretical perspective as the concept of technology exists on a continuum ranging from simple and mundane to complex (e.g. striking a match to light to nuclear power plants) (OpenStax, 2017). In addition, several contextual factors make the way in which a teacher integrates technology in the classroom unique, and no single combination of content, technology, and pedagogy will apply for every teacher, every course, or every view of teaching (Koehler, 2012). However, without reference to theoretical and pedagogical issues, including the design of m-learning, studies of m-learning will not necessarily further our understanding of how m-learning can contribute to successful learning outcomes globally (Zahrani & Laxman, 2016, p. 75).

As technology continues to evolve and become increasingly ubiquitous the world over, understanding the role of technology in the context of development needs to be conceptualized theoretically (Qureshi, 2015). As in other sectors of society, the field of education has been influenced by the development of technology particularly information and communication technologies and the affordances they allow (Yumurtaci, 2017). Mobile technologies are also being used to address education inequality by giving students with limited social and economic resources access to mobile devices for use at school and home (Reeves et al., 2017). However, if classrooms, schools, and society are inequitable, the introduction of mobile technologies into classroom spaces will not fundamentally alter these inequities (Philip, 2017).
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