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Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media

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ABSTRACT

The purpose of this research was to explore teaching and learning when mobile computing devices, such as cellphones and smartphones, were implemented in higher education. This paper presents a portion of the findings on students' perceptions of learning with mobile computing devices and the roles social media played. This qualitative research study focused on students from three universities across the US. The students' teachers had been integrating mobile computing devices, such as cellphones and smartphones, into their courses for at least two semesters. Data were collected through student focus group interviews. Two specific themes emerged from the interview data: (a) advantages of mobile computing devices for student learning and (b) frustrations from learning with mobile computing devices. Mobile computing devices and the use of social media created opportunities for interaction, provided opportunities for collaboration, as well as allowed students to engage in content creation and communication using social media and Web 2.0 tools with the assistance of constant connectivity.

1. Introduction

The Educause Center for Applied Research [ECAR] (2012) survey on Mobile IT in higher education states that students are driving the adoption of mobile computing devices, such as cellphones, smartphones, and tablet computers, in higher education, and 67% of surveyed students believe mobile devices are important to their academic success and use their devices for academic activities. The increased ubiquity of mobile computing devices on college campuses has the potential to create new options for higher education students and the exploration of mobility and social media as an instructional strategy.

Mobile computing devices can provide educational opportunities for students to access course content, as well as interact with instructors and student colleagues wherever they are located (Cavus & Ibrahim, 2008, 2009; Kukulska-Hulme & Shield, 2008; Nihalani & Mayrath, 2010; Richardson & Lenarcic, 2008; Shih & Mills, 2007). These facile interactions are made even more accessible by using mobile devices in conjunction with social media, free web tools that allow for communication and enhance learning (Rodriguez, 2011).

Because mobile computing devices and social media are still rather new and evolving, research has tended to focus on evaluating the effectiveness of implementing mobile computing devices (Wu et al., 2012). Some of the most rigorous research used survey methods in order to depict students' intentions (cf., Cheon, Lee, Crooks, & Song, 2012; Liu, Li, & Carlsson, 2010). However, there is little applied research into how these tools are actually being used to support teaching and learning with few descriptions of how mobile computing devices and social media are used by university students.

The purpose of this research was to explore how higher education teaching and learning were affected by the integration of mobile computing devices. As mobile devices continue to grow as part of the higher education landscape, mobile computing devices present both opportunities and challenges to higher education institutions (Kim, Mims, & Holmes, 2006; Looi et al., 2010). The goal of our broader research was to present in-depth perspectives of instructors and students about their experiences of implementing mobile computing devices. However, this present paper will focus only on students' experiences and perceptions mobile computing devices brought to learning and the roles social media played. The primary research question for this study was, "What are students' experiences when mobile computing devices are integrated into higher education courses?"

2. Foundations of mobile learning

Technically still in its infancy in higher education, learning with mobile computing devices has been described and defined in a variety of ways. Mottiwalla (2007) stated that mobile learning "combines individualized learning with anytime and anywhere learning" (p. 2). Additional researchers have defined mobile learning as learning facilitated by

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mobile devices (Herrington & Herrington, 2007; Mobile Learning Network (MoLeNET), 2007, 2009; MoLeNET, 2007; Valk, Rashid, & Elder, 2010). Because our interest was focused on how mobile computing devices impacted learning with coursework, we felt a combination of definitions was most appropriate. So, in this study, mobile learning was defined as (a) more than just learning delivered and supported by handheld, mobile computing devices (Keegan, 2005; Mobile Learning Network (MoLeNET), 2007, 2009; Traxler, 2007) but (b) learning that is both formal and informal (Quinn, 2011; Sharples, Taylor, & Vavoula, 2007; Traxler, 2007, 2010), and (c) context aware and authentic for the learner (Sharples et al., 2007; Traxler, 2005, 2007, 2010; Winters, 2007). Each of these components is briefly discussed below.

2.1. Learning delivered and supported by mobile computing devices

Mobile computing devices have included technologies that are transportable, such as cellphones and smartphones, and these may include tablet computers, laptop computers, and netbooks (Valk et al., 2010). Keegan (2005), however, recognized that mobile learning should focus on the actual mobility of the device. That is, mobile learning should be "restricted to learning on devices which a lady can carry in her handbag or a gentleman can carry in his pocket" (Keegan, 2005, p. 33). This is the essence of mobile learning — accessing information and knowledge anywhere, anytime (Traxler, 2007) from devices that learners are used to "carrying everywhere with them" and that they "regard as friendly and personal" (p. 129).

2.2. Learning is formal and informal

Furthermore, Winters (2007), Sharples et al. (2007), Traxler (2007, 2010), Cook, Pachler, and Bradley (2008), and Pachler, Bachmeir, and Cook (2010) identified mobile learning as both formal and informal. Formal learning, by design, is where learners are engaging with materials developed by a teacher to be used during a program of instruction in an educational environment, highly structured, institutionally sponsored, and generally recognized in terms of a certificate or a credit upon completion (Colley, Hodkinson, & Malcom, 2003; Marsick & Watkins, 1990). Informal learning is often defined as learning that results "from daily work-related, family or leisure activities" (Halliday-Wynes & Beddie, 2009, p. 3). It is often intentional but unstructured and contextualized (Marsick & Watkins, 2001). This type of learning is sometimes "unanticipated, unorganized, and often unacknowledged, even by the learner" (Jubas, 2010, p. 229). Activities such as reading, using the Internet, visiting community resources, such as libraries, museums, and zoos, and on-the-job learning are usually considered informal learning activities, though there is no conclusive definition of informal learning. During any of these activities, learners can use and access their mobile computing devices to research, investigate, or collect information to be used in their formal learning environment (Abilene Christian University (ACU) Mobile Learning Report, 2010; Mobile Learning Network (MoLeNET), 2007, 2009).

Nevertheless, Billett (2002) argued that learning is ubiquitous and much of our learning takes place outside the formal educational setting. Therefore, informal learning should not be regarded as something that occurs after formal learning has been accomplished but in combination with formal learning. Mobile computing devices can be used as the bridge between formal and informal learning opportunities.

2.3. Learning is context aware and authentic

Traxler (2010) contended that with mobile learning, content can be more context aware, authentic, and situated in the surroundings where the learning is more meaningful to the learner. Learners can personalize the way they interact with the course content. They can also customize "the transfer and access of information in order to build on their skills and knowledge to meet their own educational goals" (Sharples et al., 2007, p. 223) based on their needs and abilities. Mobile computing devices also allow for learning to be situated and context aware in which learning takes place in meaningful surroundings — most likely outside the classroom and in the student's surroundings or environment at a time appropriate for the learner (Mottiwalla, 2007). However, Traxler (2010) and Tella (2003) warn that learning across contexts and at different times may produce fragmented knowledge and incomplete schemata.

3. Social media

Higher education students and faculty members typically use the term *social media* interchangeably with *Web 2.0*. Web 2.0 is typically defined by the characteristics, or technical design patterns, set forth by O'Reilly (2005). Social media, a term coined in 2005 after the term *Web 2.0*, is defined more specifically as "a group of Internet based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user generated content" (Kaplan & Haenlein, 2010, p. 61). The social aspect of the term "implies that it exists in a social space" (Rodriguez, 2011, para. 3), which may be used for individual, professional, and/or entertainment purposes, and leverages social networks cultivated by individuals. The *media* portion of the term suggests that the social interactions are mediated through social networks, digital networks, and digital devices.

Admittedly, the lines among social media and Web 2.0 tools, or "web apps," are blurred. Broadly, social media encompasses (a) social networking sites, such as Facebook, Twitter, and LinkedIn, (b) media sharing sites, such as YouTube and Flickr, (c) creation and publishing tools, such as wikis and blogs, (d) aggregation and republishing through RSS feeds, and (e) remixing of content and republishing tools (Greenhow, 2011, p. 140). Siemens's (2005) theory of connectivism, and Sharples' (Sharples, 2000; Sharples, Taylor, & Vavoula, 2010) notion of learning as conversation propose that learning events do not halt but may continue within other networks to which we are part. Organized, or structured, formal learning can purposively leverage these networks, such as through Facebook or Twitter. Likewise, informal learning can flow throughout a day or days, tolerating pauses and disruptions (Ng, Howard, Loke, & Torabi, 2010).

Greenhow (2011) summarizes that using social media tools in learning promotes a more student-centered course. These tools allow students to interact and collaborate with each other and instructors and "promotes personal choice, customization and student familiarity" (Hoffman, 2009, para. 23). Students are better able to create their own understanding of content when creating with these tools. Furthermore, Light (2011) identified elements that shape how Web 2.0 tools can be used meaningfully. Without structure, social media can negatively impact student learning.

4. Applications of mobile learning & social media

In this section, we describe applications of mobile computing devices and social media around three broad themes that reoccur in published studies and cases. These characteristics include (a) engaging learners with constant connectivity, (b) fostering collaborative learning and (c) enabling authentic learning on the move.

4.1. Engaging learners with constant connectivity

Mobile devices allow learners to access content and communicate with classmates and instructors, no matter where they are (Cavus, Bicen, & Akcil, 2008; Shuler, 2009). In addition, mobile technologies "enable learners to find, identify, manipulate and evaluate existing knowledge" (Brown, 2005, p. 300) and successfully integrate and communicate this new knowledge into their work. These activities