Chapter IV
Mobile and Pervasive Technology in Education and Training:
Potential and Possibilities, Problems and Pitfalls

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ABSTRACT

This chapter investigates the use of mobile digital technologies for learning, or mobile learning (m-learning), across a variety of education and training settings. In particular, it focuses on pervasive m-learning, defined as m-learning involving activities that are able to integrate into learners' lives, coinciding with other actions and tasks in an unobtrusive fashion. It also considers new and emerging pervasive computing, wearable, and ambient intelligence (AmI) technologies that enable implicit, unseen interactions between humans, objects, and their environment. The chapter is primarily concerned with the question of whether, and if so, how mobile and pervasive computing technologies can be used in pedagogically sound ways. Drawing on a number of illustrative examples, the chapter examines the degree to which pervasive m-learning has been achieved, or can be achieved, with current technologies, as well as the resulting benefits. It then raises a number of potential challenges and risk factors, before synthesizing the above into a number of realistic visions and future applications of pervasive m-learning. The chapter concludes with a discussion of the implications for education and training practitioners and researchers.

INTRODUCTION

Mobile devices are perceived by some as an interference with or even a hindrance to learning. Tales of such devices being used as implements for school bullying abound; mobile phones ringing in classes or lectures are viewed as a distraction; students with iPods and portable gaming consoles in classrooms and lecture halls paint an image of being disengaged from or disinterested in learning. These scenarios all demonstrate the *pervasive* nature of mobile technology. When mobile technology pervades a learning environment, it is seen as detracting from learning; conversely, however, this also implies that other facets of learners' lives can be pervaded with timely and flexible opportunities for learning. In fact, claims that the new generation of "digital native" (Prensky, 2001a; 2001b) students in today's schools, colleges, and universities, and now the workforce, has "… spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age" (ibid, p. 1, para. 3) have prompted some educators to consider the possibilities of "co-opting" (Buchanan, 2003) the technologies learners already use for communication and entertainment, to engage them and help them learn better.

We are also beginning to witness the birth of a new raft of pervasive and embedded computing technologies such as radio frequency identification (RFID) tags, contactless smart cards, ad hoc and sensor networks, and telepresence technologies that were originally envisioned by Weiser (1991) as those "that disappear ... [and] weave themselves into the fabric of everyday life until they are indistinguishable from it" (p. 166), which are sensitive to their environment and able to adapt automatically to the needs and preferences of people. As these technologies move slowly but surely towards reaching a critical mass, we are able to consider their potential applications in a education and training landscape that is experiencing the blending and merging of formal and informal learning, and the need to respond to the demands and challenges of providing authentic, relevant learning experiences to millennial learners in the context of and in preparation for life and work in the knowledge age.

This chapter explores the notion of pervasiveness as it applies to the use of mobile digital technologies for learning, or "m-learning" across a variety of education and training settings. It is primarily concerned with the question of whether, and if so, how, these technologies can be used in pedagogically sound ways. Drawing on a number of illustrative examples, it examines the degree to which pervasive m-learning has been achieved, or can be achieved, with current technologies and applications, and the resulting benefits afforded to learners and learning. It also explores a number of potential issues and risk factors facing the development and implementation of pervasive m-learning, before synthesizing into a number of realistic visions and possible applications of pervasive m-learning to harness its potential, given the known limitations and risks. It closes with a discussion of the practical and future research implications.

BACKGROUND

There is an increasing gap between the formalized interactions that occur in educational establishments and the informal modes of learning, socialization, and communication in the everyday world. Siemens (2007a) states: "… our institutions need to change because of the increasing complexity of society and globalization. Schools and universities play a dual role: accommodating learner's method and mode of learning *and* transforming learners and preparing them to function in the world that is unfolding" (para. 6, emphasis in original). This globally connected world is characterized by constant physical and social mobility and diversification of life trajectories, where

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