

Pedagogical Perspectives on M-Learning

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INTRODUCTION

The advent of multimedia on desktop computers in the late 1980s and early 1990s heralded an era of educational technology that held the promise of revolutionising the business of teaching and learning by facilitating a shift from traditional teacher-centred methods to more effective student-centred approaches. During the mid-late 1990s the popularisation of the Internet, added to educational technology a new dimension of “connectedness” between people and between people and information resources. Online learning and e-learning became icons of the era. In late 1990s and early 2000s major players in the mobile phone industry worked on developing a wireless infrastructure to allow for wireless communication between devices, WAP (wireless application protocol) being one of the principle outcomes. This set the stage for the wireless Internet and for another new dimension to educational technology, mobility. Thus, the maturation of multimedia, the Internet and communication technologies together with development and availability of ubiquitous computing devices and wireless networking birthed the notion of mobile learning (m-learning) or “learning on the move.”

Like many other media technologies before, **m-learning** is considered to have the potential to reshape teaching and learning, in this instance, holding promise of unprecedented connectivity and learning interactions between learners, learners and educators, information and computing resources, anywhere, anytime. This article seeks to facilitate the realisation of the pedagogical potential of m-learning by proposing a model for the construction of m-learning spaces. The proposed model is founded upon a **pedagogical framework** directing attention to guiding philosophies, technology integration, and the capabilities of mobile devices.

BACKGROUND

The belief underlying the following discussion is that although technology use in educational contexts is not a requisite for positive change in teaching and learning practice, some degree of change in teaching practice is a requisite for effective technology use in educational contexts. The effective use of technology in educational contexts should precipitate significant and positive changes in teaching practice (Tearle, Dillon & Davis, 1999). History has shown that, the adoption of new technologies frequently occurs at a superficial level

consequently failing to make significant impact on teaching and learning environments (Cuban, 1986; Hammond, 1994; Nichol & Watson, 2003; Conlon & Simpson, 2003). New technologies used inappropriately or in ways replicating traditional teacher centred approaches contribute little to improving the quality of the learning environment. From this perspective, effective integration of technology in the curriculum results from teaching practice informed by an awareness of available technologies within the context of pedagogical frameworks.

The manner in which m-learning is defined fosters certain perceptions and beliefs about its implementation (Laouris & Eteokleous, 2005). Of fundamental importance to pedagogical discussions surrounding m-learning is the provision of a teaching “centric” rather than “techno-centric” definition for m-learning (Laouris & Eteokleous, 2005). Techno-centric definitions of m-learning accentuate the technology as the focus rather than teaching and learning. The motivation for implementation of mobile technologies should be not be driven by the technology but rather driven by two phases of activities: Firstly, reflection on current teaching practice and learning outcomes in order to identify deficiencies or new avenues for new effective strategies. Secondly, consider if and how any of the array of **mobile devices** can be exploited in order to achieve more effective strategies and more effective, meaningful learning outcomes (Torrisi-Steele, 2004).

Congruent with this approach, m-learning may be defined as:

the integrative use of mobile devices into the curriculum in order to facilitate active and meaningful learning through the creation of learning spaces extending outside the physical and temporal constraints of the traditional classroom. These learning spaces (m-learning spaces) are characteristically dynamic, collaborative and focused on individual learner needs in the current context. (adapted from Torrisi-Steele, 2006)

The term “mobile devices” refers to laptop computers, tablet PCs, PDAs, mobile phones, smart phones, MP3 players and any other small portable or handheld devices technically capable of connectivity (ideally wireless) to each other, other devices or Internet.

M-learning is considered here as an extension of e-learning (Brown, 2005). M-learning may include all the features of e-learning (multimedia, information access, Internet

capability, collaboration) but with the distinguishing feature of being ubiquitous and mobile.

PEDAGOGICAL FRAMEWORK

In alignment with the definition of m-learning proposed above, the pedagogical framework for the design of effective m-learning spaces incorporates three key aspects for discussion: guiding philosophies, technology integration, and capabilities of mobile devices. Following a discussion of each of these aspects, a model for the implementation of m-learning spaces is provided.

Guiding Philosophies

It is well established in literature that constructivist approaches that actively engage learners by presenting them with authentic learning activities, lead to more meaningful learning outcomes and are congruent with lifelong learning goals (Strommen, 1999, p. 2). Emerging from the work of theorists including Piaget (1952), Bruner (1985), and Vygotsky (1978), the constructivist perspective describes a “theory of development whereby learners build their own knowledge by constructing mental models, or schemas, based on their own experiences” (Tse-Kian, 2003, p.295). **Constructivist learning** supports a learner centred philosophy. Learner centred philosophy promotes and allows for a high degree of learner control and the individual construction of learning pathways.

Meaningful learning is being used to refer to learning resulting in a deep understanding of complex ideas, and it is relevant to learners. Jonassen, Peck, and Wilson (1999) define meaningful learning to have the following characteristics:

- **Active:** Created by interactions and manipulations with the environment
- **Constructive:** Knowledge created by reflection and interpretation
- **Intentional:** Activity directed toward trying to achieve a goal encourages thinking and learning
- **Authentic:** Contextual clues found in “real situations” assist understanding and learning
- **Cooperative:** Conversation and interaction with others promotes understanding and exposure to ideas of others; negotiation of knowledge.

M-learning spaces are well suited to supporting principles meaningful learning and constructivist philosophies (Table 1). Mobile devices support a variety of personalised experiences. The mobility attribute enables learners to explore knowledge and situations in their own way, in a variety of places and often outside the time constraints of traditional

classroom-based teaching. Mobile devices also increase motivation, provide for interactive leaning and facilitate control of the learning process and emphasise its relationship with the real world (Zurita & Nussbaum, 2004).

The ability of mobile devices to support ubiquitous communication brings the social aspects of learning into focus. M-learning is thus proving to be the catalyst for growing emphasis on **social constructivism**, and learning communities (Evans, 2005). M-learning allows for greater exploitation of collaboration and conversation as powerful learning strategies (Brown, 2005). Learning participants are able to communicate outside the bounds of physical locations and often from diverse learning contexts. Brown (2005) maintains that m-learning optimises the opportunities for interaction among learners, among educators, and among educators and learners. Consequently, communication and interaction should be exploited as critical factors for success of m-learning.

From this perspective, a valuable addition to the pedagogical toolbox for construction of m-learning spaces is the **conversational** framework proposed by **Diana Laurillard** (1993). The framework places emphasis on the role and importance of interactions in learning. The basic premise is that learner is more effective when learners converse with

Table 1. Congruency between aspects of constructivist learning principles and attributes of mobile devices

Constructivist principles supporting meaningful learning	Attributes of mobile devices
Learner-centred	Personal
Active	Includes tools for data gathering while on location e.g. image recording, sound recording, databases, spreadsheets. Impact of manipulations on environment can be recorded immediately often in multimodal manner
Constructive	Access to information through wireless to other information or mobile web allows interpretation of results in light of additional information resources (includes materials and human resources)
Intentional	Ubiquitous, goal directed activity specific to the context.
Authentic	Ubiquitous, explore information in the real world, in real contexts. Contextual clues assist understanding. Support for real-world case based learning rather than pre-determined sequence.
Co-operative	Connectivity May support multimodal interaction with others e.g. voice, video, text, images. Data can be shared and discussed spontaneously by learning participants in different locations. Allows for negotiation of knowledge through collaborative activity.

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