Efficient Mobile Learning in Classroom Settings through MLE

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Nitzan Elyakim
School of Education, Bar-Ilan University, Israel

Iris Reychav
Ariel University, Israel

INTRODUCTION

Preadolescents at the formative age of 11 to 13 born after 1995 have been shaped by the emergence of mobile technology. The amount of time they spend online daily has tripled over the last decade, and in many cases they multitask to handle mobile and connectivity devices (Erickson, 2012). The growing use of mobile devices in educational institutions in recent years has led to a shift from content centered learning to a diverse mixture of approaches to learning in many different settings (Woodill, 2011). This article begins by summarizing recent trends in mobile learning (m-learning), and then presents a new complementary theoretical and practical model for synergetic and efficient integration of m-learning technologies into classroom practice. It models a comprehensive interaction between mobile devices, their affordances and mobile practices in classroom settings, designed to enhance collaborative Mediated Learning Experience (MLE) in small groups based on Vygotsky's and Feuerstein's theories.

BACKGROUND

The emergence of ICT (Information and Communication Technology) and its pervasiveness in educational systems are not new. However, when innovative features or new technologies emerge, the balance between technology, pedagogy and learning content (Koehler & Mishra, 2009) is disrupted and reconsideration is required. Since its introduction into different education systems in the last decade, research has explored whether the integration of mobile technology should be seen as a different kind of learning; namely, mobile learning. The definition of m-learning covers attitudes toward mobile device use and relates to people's mental models of technology.

Technology Mental Models

This debate is complex, because it reflects attitudes linked to previous perspectives on technology. As McLuhan and Fiore noted (1967, p. 75), "We look at the present through a rear-view mirror. We march backwards into the future." As we encounter a new and unknown artifact, we try to evaluate it and understand its functionality by implementing mental models. When interacting with the environment, people form internal representations of themselves and the artifact with which they are interacting. These subjective models are not necessarily technically accurate, but must be functional. A mental model consists of (1) people's belief systems (reflecting their beliefs and expectations from the artifact), (2) the correspondence between parameters and the observable state of the artifact, and (3) predictive power and functionality of the artifact (Norman, 1983). Mental models of mobile devices may thus affect the definition of m-learning.

The Evolution Trends of Mobile Learning

Kukulska-Hulme et al (2009) divided the evolution of mobile learning into three phases: (1) focus on devices, (2) focus on learning outside the classroom, and (3) focus on learners' mobility while connected to both the Internet and other ambient information.

Mobile learning refers to the use of handheld, portable and wireless devices for the purposes of learning

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activities while on the move (Park, 2011) or while learners are mobilized across contexts (Walker,2006). Winter (2006) re-conceptualized the essence of mobile learning, and emphasized learning: "(*intention*) mediated learning through (*means*) mobile technology."

Although most research on mobile learning has dealt with outside activities, this study examined learning in a classroom setting by taking advantage of the unique affordances of mobile devices.

Affordances

The term "affordance" refers to the relationship between an object's physical properties and the characteristics of a user that enable specific interactions between user and object (Gibson 1977). All learning environments are a unique combination of technological, social and educational contexts. These possible combinations produce three types of affordance.

Technological affordances: According to Norman (1988) affordances are the perceived and actual properties of things, primarily those fundamental properties that determine how an artifact may be used. Norman related affordances to the design aspects of an object, which suggest how it should be used. An affordance is a *desirable* property of a user interface that naturally stimulates users to take the correct steps to accomplish their goals.

Educational affordances: Kirschner (2002) defined educational affordances as those characteristics of an artifact that determine if and how a particular learning behavior could be enacted within a given context. Educational affordances can be defined as the relationships between the properties of an educational intervention and the characteristics of the learner or learning group that enable a particular kind of learning by him/her and the other members of the group.

Social affordances: Kreijns, Kirschner, and Jochems (2002) defined social affordances as the "properties of a CSCL (Computer Supported Collaborative Learning) environment that act as social-contextual facilitators relevant to the learner's social interaction" (p. 13).

Koole (2009) developed a 'Framework for the Rational Analysis of Mobile Education' (FRAME) model which presents three aspects of mobile learning: usability, interactive learning, and the social technology environment.

Mobile Technology Affordances

Technological affordances serve as the infrastructure for educational and social affordances. Often, it takes the introduction of a new technology to spark new thinking about innovative uses of an existing technology (Woodill, 2011). The opposite can also be inferred: a new technology characteristic can be defined in contradistinction to its predecessor. The relationship between the similarities and differences of both new and preceding technology is shown in Figure 1.

The unique characteristics of mobile technology include its small, lightweight surface that allows the user to carry it conveniently. The growing number of PDA applications (personal digital assistant) exploits their embedded sensors (haptic, context awareness, accelerators, ambient light sensors, etc.) which are likely to increase in the future.

All these characteristics afford ubiquitous, portable, blended, private, interactive, collaborative, and instant information learning (Ozdamli & Cavus, 2011). Of all these affordances, mobility is nevertheless the key feature as regards learning in a classroom setting.

Figure 1. characteristics of new and previous technology
A: *Unique characteristics of similar previous technology (e.g. Laptops).*
C: *Unique characteristics of new technology (e.g. Tablets).*
B: *Shared characteristics of both technologies.*