M-learning as a trend

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This article summarizes the current development in the field of mobile learning and contextualizes it in relation to technology proliferation and user capabilities and expectations. The first part focuses on the term itself while the second section gives numbers on mobile technology proliferation in relation to particular age-groups. Part three deals with users' abilities and expectations in relation to their unprecedented exposition to technologies terms of "network" and "tactile" generations reintroduced here. Authors conclude that widely accessible technologies and connectivity enable feasible modes of instruction delivery. The final part looks at some promising trends and technologies and suggests questions for further research.

Keywords: M-learning, net generation, tactile generation

Introduction

An academic buzz-word and a matter of high expectations, mobile learning (m-learning) deserves thorough scrutiny. For about a decade it has been referred to as the next big thing in the way people would teach and learn in the near future and the notion of m-learning keeps re-appearing in the academic discourse with rising frequency. M-learning is in a pilot stage, where projects are being developed in an effort to move this approach from experimental to mainstream status (Rajasingham 2011) and coming to theoretical conclusions that would prove to be practically applicable is becoming as urgent as the gap between the number and quality of commercial uses of the available technologies and their educational applications is getting all the more observable and startling. It is the purpose of our presentation to attempt answering the question following question: „Why should m-leaning become an important element in our teaching and learning practices?" In doing so we focus on the key factors relating to (and enabling) the trend. We develop our thesis primarily around the effects of rapid development and proliferation of mobile technologies and the relevant behaviors of their users - namely the habits and expectations of different generations involved in education processes of all kinds.

What is m-learning?

However clear the connection between technical possibilities and their educational utilization may appear, defining the term itself before we discuss any related phenomena is critical as M-learning (or mobile learning) has different meanings and connotations for different communities of practice. Though it is apparently related to the notions of computer assisted learning, e-learning, Edtech, and distance education, it is specific in its wide applicability across different learning

Applied Innovations and Technologies

contexts. Discussing m-learning also requires dealing with circumstances brought about by number of different technological platforms and mobile devices that enable M-learning application in one way or another. One of the wider definitions of mobile learning (and thus a more successfully applicable one) describes it as: "Any sort of learning that happens when the learner is not at a fixed, predetermined location and that happens when the learner takes advantage of the learning opportunities offered by on-line technologies." (O'Malley et al., 2003, p.6). Following such a definition the key factor of m-learning lies in the affordance it gives us to learn anytime and anywhere. Some advocates of m-learning attempt to define and conceptualize it in terms of devices and technologies, others in terms of the mobility of learners and the mobility of learning, and others in terms of learners' experience of learning with mobile devices (Metcalfe, 2011; Rajasingham 2011).

Most of the arguments have already been used to "sell" the idea of ubiquitous computing so why is m-learning expected to grow in its importance? And why is m-learning considered by many to be the future of learning? Thanks to continuously developing wireless internet connection and portable devices, vastly overreaching capabilities of desktop computers of the yesteryear, learning content has been widely accessible for a relatively short period of time. Media-rich content can now be transferred and consumed by a growing audience. Provided you have the right device (with internet connection) and the content available (application, text, interactive exercise etc.) you can access it on a 24/7 basis, wherever you find yourself - on a train while commuting to work, in airport lounge as you wait for your flight, in your car, your office, at home, in a hospital room or in a prison cell. This way mobile communications allow networks to embed themselves not only in social and political organizations but also in the delivery of just-in-time, just-for-me access to personalized education that is different from previous actualizations of PC-based platforms. (Rajasingham, 2011).

Therefore the critical matters to be discussed are shifting towards the methodology and didactics of mobile learning. Omnipresent technology sets a completely new agenda in themes of research of its psychological, social and economic implications.
Geser 2002 (mentioned in Enriquez, 2011) notes that bodies coordinate multiple tasks and conversations, oscillating between highly private and semi-private modes of communication - remaining in one place whilst connected to the internet. The directions for further research would therefore have the uneasy task to understand what is being done - the reconfigurations of bodies, spaces and technologies in a mobile society that is increasingly characterized by media convergence and ubiquitous connections and communication. (Enriquez, 2011).

Cell phones current situation

To understand the actual state of things we need to have a look at the current landscape of mobile computing and its acceptance by the public. There are two factors making a case for serious approach to m-learning - technology proliferation and the consequent formation of prominent user groups (which tend to include primarily of the youngest generations of people we categorize as net- and tactile-generations).

The first factor - the growing number of mobile devices is much easier to pin down with the assistance of relevant numbers. The statistics covering the sales figures for relevant technologies tells us that at the end of Q3, 2012 the number of smartphones in use worldwide reached 1.038 billion units. (Strategy Analytics,

2012). By the third quarter of 2011 there were 708 million smartphones in use worldwide. (Strategy Analytics, 2012). That's 46.6 percent growth rate in a year.

To make the overview complete we need to acknowledge that the category of mobile devices does not include only smartphones. The array of gadgets available to end users include Mp3players, e-books readers, tablets and other (hybrid) gadgets which and can also be used for mobile learning. One of the basic and most proven instances would be the use of Mp3 players for podcasting that has already proven to be rather helpful in language acquisition.

This year's NMC Horizon Report (Johnson, Adams, and Cummins, 2012) identifies mobile apps and tablet computing as technologies expected to enter mainstream use in the first horizon of one year or less. Game-based learning and learning analytics are seen to be a part of the wave expected to arrive in the "second horizon" of two to three years; gesture-based computing and the Internet of Things are seen emerging in the third horizon of four to five years.

"On the near-term horizon - that is, within the next 12 months - there are mobile apps and tablets. These have become pervasively present in everyday life, at least in the developed world, and students at universities and colleges have ever-increasing expectations of being able to learn on these devices whenever and wherever they may be." (Johnson, Adams, and Cummins, 2012, p.6)

Mobile Applications have been described by the Horizon Report as "the fastest growing dimension of the mobile space in higher education right now, with impacts on virtually every aspect of informal life, and increasingly, every discipline in the university". (Johnson, Adams, and Cummins, 2012, p.6) 3 G and LTE cellular networks and rapidly coming innovation in the mobile technologies are background for the rise mobile applications importance.

Tablet computing "higher education institutions see tablets not just as an affordable solution for one-to-one learning, but also as a feature-rich tool for field and lab work, many times replacing far more expensive and cumbersome devices and equipment. " (Johnson, Adams, and Cummins, 2012, p.7) Mobile applications are light software tools compared to heavy Learning Management Systems. Convenient management of mobile applications is also a reason, which will most probably play a role in their proliferation in formal education.

Imbedded sensors, cameras, and GPS bring new possibilities of educational process. "Apps that take advantage of recent developments in these tools, along with advances in electronic publishing and the convergence of search technology and location awareness, made this category of software enormously interesting in a higher education context." (Johnson, Adams, and Cummins 2012, p.7).

The second factor, much more difficult to among those who are 18 to 24 years old, the smart phone penetration rate is hovering near 54% to the date. Around 40% of 12-17 year-olds have smart phones as opposed to a more basic feature phone (Nielsen, 2011). According to the United States ComScore (2009), studies have shown that average smart phone user is much younger than the traditional mobile phone user. There were only 38,8 percent of 13-34 young people in all of the U.S. who use mobile phones. However, more than 51% of them have smart phones. Most of these smart phone users have a touch screen phone. That seems to be quite telling in how the different generations tend to approach technology in terms of innovation acceptance and learning the kind of motorics necessary to work with the device smoothly and in an error-free way.

Net and tactile generation

What are the results of the increasing adoption of mobile computing? The extremely fast proliferation and popularity of mobile devices naturally bring consequences to the ways people learn, to their perception of learning experiences and their preferences. To grasp the most common effects of the shift we have to acknowledge the formation of the last two generations which clearly have different learning habits and characteristics than the previous generations in the 20th century. We could call these young people - a net generation and tactile generation.

People called the net generation were born between 1977-97. They are not only consumers but they are the generation of prosumers (Tofler, 1980). They consume and produce at the same time. "Eight characteristics, or norms, describe the typical NetGeneration and differentiate them from their boomer parents. They prize freedom and freedom of choice. They want to customize things, make them their own. They're natural collaborators, who enjoy a conversation, not a lecture. They'll scrutinize you and your organization. They insist on integrity. They want to have fun, even at work and at school. Speed is normal. Innovation is part of life." (Tapscott, 2009, p.6-7)¨

People born after 1998 comprise a proportion of users we have come to call "the tactile generation". Its members are similar to net generation, but they are more interconnected with modern technologies. They are used to playing with gadgets from very early age - they have basically had access to modern technologies since they were toddlers. (Beseda and Machat 2012)

> *"I use my handheld devices for "stolen moments of learning" so that I can eke out a little more productivity in my day by learning while standing in line for the bank or waiting for an appointment . . .." In his presentation Metcalf suggests that, because the way we live, work, play, and learn is being affected by the increasing mobility of our society, it is the responsibility of educators and learning innovators to design for the needs of education's changing audience. It is suggested that learning is akin to constructing a narrative or a conversation, and the question remains as to whether "stolen moments of learning" can lead to constructivist scaffolded deep learning that would constitute a new university paradigm in mobile learning environments. Rajasingham (2011)*

According to Hwang (2012, p.2) younger users of the smart phones put more emphasis on the "merit" of smart phones. Users younger than 18 tend to stress the "shortcoming" of smart phones. They prefer smart phones without functions; they are affected by emotions and habits. Overall, Hwang's research found out that smart phones users are looking forward to launching new features and they don't have any problems with changing their habits. Another connecting element of net and tactile generations is the fact that they are connected through social media. They live their lives on-line. They also socialize this way and share their experiences through on-line social networks. They are always connected to the Internet. Not only on their laptops or desktops, but also on their tablets and smartphones. The highest smart phone penetration rate (62%) is in the age group of 25-34 years old. 50% of Android smart phone users and 43% of iPhone users are below 34 years old (Go-Gulf, 2012).

According to the 2012 Pew Internet Report, current students are more self-directed, better arrayed to capture new information inputs, more reliant on feedback and response, more inclined to collaboration, more open to cross discipline insights and creating their own "tagged" taxonomies and more oriented

towards people being their own individual nodes of production. (Camacho, 2012, p. 216) Students already spend much of their free time on the Internet, learning and exchanging new information. They often use for finding new facts and information social network sites. These young people expect to be able to work, learn, and study whenever and wherever they want to.

Near future trends

We can observe these trends in electronic learning: transition from system solutions to applications, personifications of applications and learning tools; using social network sites for learning (e.g. Twitter for microblogging), and the Internet of things - things will be connected through the Internet and thus it will be possible to use them for learning (e.g. smart refrigerator). As we explained, there are generations that are looking forward to use m-learning as a tool for learning.

In the mid-them horizon (two to three years into the future), NMC experts predict namely a rapid growth in the areas of game-based learning and learning analytics (Johnson, Adams, and Cummins, 2012, p.7). Let's look at the trend of games first. People love entertainment, especially the members of net generation want to have fun, even at work and at school. The trend of last years is using game elements in a variety of areas of our lives (e.g. shopping rewarding systems -collecting points, animal cards, etc.). The use game-thinking and game mechanics in non-game contexts in order to engage users and solve problems is called gamification. According to Huotari and Hamari „gamification refers to: a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation. "(Hu Huotari and Hamari, 2012, p. 3) "Educational gaming brings an increasingly credible promise to make learning experience more engaging for students, while at the same time improving important skills, such as collaboration, creativity, and critical thinking. " (Johnson, Adams, and Cummins 2012, p.7). M-learning and game-based learning go hand in hand as much of today's gadgets are descendants of early gaming consoles and to date games represent an important proportion of applications sales figures.

To understand the behaviors of our students analyzing relevant data is crucial. In the last decades the ICT tools have been made a part of education and the related processes. Higher education institutions established student information systems (SIS) and learning management systems to cover these agendas. The aforementioned systems provide different kinds of data. The analysis of SIS could help us "address student success and accountability while better fulfilling their academic missions". (Campbell and Oblinger 2007, abstract). "Learning analytics takes this same approach but with the specific goal of improving learning outcomes, which could be measured by grades, retention, or completion. LA collects and analyzes the "digital breadcrumbs" that students leave as they interact with various computer systems to look for correlations between those activities and learning outcomes." (Eli, 2011, p.1)

Over the past years, learning analytics (LA) has garnered a lot of attention (e. g. Campbell and Oblinger 2007; Eli, 2011; Ferguson, 2012). "Learning analytics is one of the fastest growing areas of technology enhanced learning (TEL) research." (Ferguson, 2012, p.1)

The capacity to synthesize data in real-time is exciting because it changes the structure of the learning dynamic - educators can use the data to make adjustments to their teaching style that better caters to student needs. In coming years we will be witnesses of the growth of new learning applications which will be connected with learning analytics tools. These tools and m-learning bring new dynamics and flexibility to the learning process.

Applied Innovations and Technologies

Gesture-based technology has enabled students to learn by doing. Interfaces that react to touch, movement, voice, and facial expression allow more freedom in how we interact with our devices. The Internet of Things, a notion first outlined by Vint Cerf as one of the many reasons to move to IPv6 to expand the address space of the Internet, is converging with smart objects, and fueling considerable innovation in how these devices communicate with each other and with us. Smart cars can serve as a good example. BMW, Mercedes and other car producers have developed cars which are connected to the Internet.

Conclusion

To answer the questions posed by the processes described above and to cover the resulting agendas Rajasingham (2011) suggests that education policymakers and planners must first be clear about the educational outcomes being targeted. Provided that such prerequisites are met, M-learning will cease to look like a fad and bring tangible results on a large scale and serve humanity the way one's intuition expects it to deliver.

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Applied Innovations and Technologies