1. Chapter: State of mobile learning around the world

Avgoustos Tsinakos

Abstract
The current Chapter summarizes the status of mobile learning and of the related initiatives, policies and barriers across the world and it is dived in two sections according to the geographical location of the corresponded regions. Therefore the first section will concern the Northern Hemisphere and the regions of Canada, USA, Europe, Russia and Ukraine, while the other section will concern the Southern Hemisphere and the regions of Latin America, Africa- Middle East, Asia and Pacific.

The current Chapter aims to provide an overview of the growth of mobile learning with emphasis on the educational sector and to report current trends, implications and the barriers related to mobile learning. The chapter concludes by comparing and categorizing the most important barriers towards the adoption of mobile learning, and poses some required recommendations and reformations on policies, on perspectives and on educational programs in order the widespread of mobile learning to be facilitated.

Introduction
Although the concept of mobile learning is gaining popularity around the world as the widespread use of mobile devices and of smart phones facilitates this trend, large scale projects of mobile learning are rare. Most of the projects are University or School based initiatives, while some others are supported by the local authorities, provinces, the private sector and the industry.

A closer view of the projects that were reviewed reveals that they fall in one of the categories below:

a. Organization provided devices (OPD) projects, where a University or a province or a company takes the complete responsibility of the project's cost.

b. Shared cost provided devices (SCPD) projects, where the cost of the device or the communication cost is shared among the organization and the learners.

c. Free of cost projects, also known as Bring Your Own Device (BYOD), where the cost is shifted to the learners who can participate using their own mobile device.

Restrictive educational policies, economical barriers and personal fears act as roadblocks against the adoption of mobile technologies for educational purposes. Since mobile technologies are increasing in prevalence, quality and affordability there

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will be increasing pressure for education to adopt mobile technologies in the learning process.

The current chapter will review the status of mobile learning in regions located in the Northern and the Southern Hemisphere such as Canada, USA, Europe, Russia and Ukraine, and Africa- Middle East, Asia and Pacific correspondently .

Section 1: Mobile learning around the Northern Hemisphere, a closer look…
In the current section a comprehensive analysis on the use of mobile learning will be attempted, surveying similarities or discrepancies that appear in the regions located in the Northern Hemisphere. It aims to provide an overview of the growth of mobile learning with emphasis on the educational sector, in order to identify common initiatives, new emerging policies and perspectives for education, similar barriers and potential solutions which might facilitate the use of mobile learning globally

Canada

Proliferation and penetration of mobile devices
The penetration of mobile devices has been remarkably increased over the last two years (Hardy, 2012). According to the Canadian Wireless Telecommunications Association Canada's wireless carriers offer coverage to more than 99 percent of Canadians, while the combined subscriber numbers surpassed 26 million with the prediction that 30 million Canadians will have a wireless device by 2014. According to Bernard Lord, President and CEO, of the CWTA "wireless penetration in Canada is set to exceed 100 per cent in just the next few years" (Hardy, 2012). As of December 2011, 45% of Mobile subscribers in Canada have Smartphones (Iab.canada, 2012) and their adoption is expected to cover the 50% of the Canadian market for 2012 (Duong, 2012, p 49).

Review of Mobile learning initiatives in Canada
A number of mobile learning projects are conducted in Canada promoted by educational institutions, companies or even by the provinces. As typical examples, the province of Ontario has legislated the use of assistive technology for students with identified special needs and the province of Alberta is developing a guide on the meaningful use of mobile technologies in schools. In addition, in Manitoba the Manitoba's Literacy with ICT Across the Curriculum initiative mandates that teachers develop their students' ability to think critically, creatively and ethically with information and communications technology (ICT), including mobile devices (Fritschi and Wolf , 2012, p 14-15).

Apart from these initiatives driven by the provinces in Canada, some Universities also conduct mobile learning projects. Most of them are included in the recent report of Ally and Palalas (Ally and Palalas, in press) which tries to identify, among other issues, how is Canada positioned globally in terms of mobile learning.

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According to this report, Athabasca University has conducted a number of mobile learning projects such as a project with the Athabasca University Library which has developed mobile accessible websites to enable the students to access material and research resources from their mobile devices. Another project called "the English project" was designed to explore the effectiveness of mobile devices towards the development of English language skills employing innovative approaches to mobile-assisted workplace language training. The University also offered access via mobile devices to other coursed such as Mobile French and a Nursing and Health Studies web (AU Mobile Strategy Report, 2010). Finally a mobile-friendly Digital Reading Room was created to enable students to access their course readings, and mobile language websites via their mobile devices (Ally and Palalas, in press). These projects have followed the BYOD approach and resulted in quite encouraging conclusions for the use of mobile learning (Kenny et al, in press, p 26-30).

Similar to Athabasca University, George Brown College employed the use of mobile devices following the BYOD model in order to enrich interactions for the English as a Second Language (ESL) and Communications classes. The project aimed in the provision of language practice outside the college and resulted to positive concluding findings (Palalas, 2010; 2011).

At University of British Columbia, as stated by Macdonald and Chiu, the mobile delivery of course content was found to offer increased convenience and flexibility of the participants, concluding that the most effective format of presenting mobile content is video, followed by audio and text (Macdonald, Chiu, 2011)

The Algonquin College has also adopted the BYOD approach as 80% of Algonquin College students bring their own mobile devices to the college such as laptops, iPads, smartphones, or notebooks and this trend continues following and increasing rate. In order to meet the increasing need for mobile access of the course content the college has opened the Algonquin Mobile Learning Centre, providing a dedicated space to use mobile computing devices facilitating also the collaboration among the students. Additionally the college has also started a pilot project called "myDesktop" service that remotely delivers computer applications (such as Microsoft Office, AutoCAD, etc.) to a student's mobile device (Algonquin College, 2011). Similar initiative has been adopted by Durham College and the University of Ontario Institute of Technology (UOIT) in Oshawa (Durham College, 2011).

In the Wilfrid Laurier University the success of another BYOD pilot project conducted for the MBA program has led the university to incorporate the mobile technology into its current full-time MBA program. During the pilot students and faculty participating in the program interchanged course material, assignments, presentations etc, using their mobile devices (Johnson, 2011).

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Close to the mobile initiatives in Ontario, a research project conducted by Rhonda McEwen at University of Toronto which examined whether devices like iPads could facilitate communication and interaction for autistic children (Hewitt, 2011).

As reported by Ally and Palalas, "a number of projects have also been housed at Ryerson University, OCAD University, University of Waterloo, Conestoga College, Seneca College, McGill and many other Canadian schools" (Ally and Palalas, in press).

Even though mobile learning projects are gaining popularity in Canada, a number of roadblocks are slowing down their adoption.

Policies, implications and barriers to mobile learning in Canada

The increasing spread of mobile devices and of smart phones does not necessary imply to their adoption in education. Ally and Palalas claim that the Standards Council of Canada is working with an international technical committee (ISO and IEC) to develop a technical report on Learner Information Model for Mobile Learning. (Ally and Palalas, in press). Though as Volante and Jaafar indicate, Canada does not have a national ministry of education. Therefore the federal government does not play a significant role in determining education policies towards all the thirteen provinces and territories which belong to the Council of Ministers of Education of Canada. The latter is an intergovernmental body that provides education leadership at the national level. (Volante and Jaafar, 2008). Therefore most of the mobile initiatives are conducted following local control of education polices (i.e of the provinces and territories). Such local policies –District Acceptable Use Polices – could have a profound positive or negative impact on mobile learning (Fritschi and Wolf, 2012, p 16).

Due to the lack of specific educational policy a number of barriers to mobile learning implementation and practice arise as Ally and Palalas report in their research in the area of Canada. The high start up cost of a mobile learning initiatives –especially when they do not follow the BYOD approach in relation with the cost of bandwidth and or the absence of appropriate network infrastructure were among the top roadblocks emerged.

Many hesitations also arise in the School or even in the University environment related to security and students related privacy issues, and to the fear of employing a destructive –for the students-technology, are some the commonly reported arguments.

Resistance from the teachers (due to lack of expertise or lack of resources for development and support) in addition to fears arisen from the students' parents resulted in many cases to policies and regulations which prohibit or exclude mobile devices in schools. (Ally and Palalas, in press). Limited access to the technology by disabled students is also an issue to be considered.

On the other hand, Canadian managers and other stakeholders are still sceptical on the use of such technology for educational or training reasons as mobile learning is in infancy stage.

Although Ally and Palalas findings indicate that Canada is considered to be an "Early majority" according to Rodgers definition (Rogers, 1962) as regards to the adoption of mobile learning, the above mentioned issues still hampers the widespread adoption of this educational method.

USA

Proliferation and penetration of mobile devices

Mobile phones and smartphones are very popular in USA. This trend is verified by the statistical numbers of the proliferation of mobile technologies. In the USA, mobile phone subscribers totalled 331.6 million in early 2012, indicating an amazing penetration rate which equals to 104.6% . (Ctia.org 2012). It is estimated that more than 110 million people in the US owned smartphones during the three months ending in June 2012, up 4% versus March 2012, according to Internet analytics of comScore. Furthermore, 234 million Americans age 13 and older used mobile devices for the three-month average period ending in April 2012, according to comScore, Inc. with the estimation that 107 million people owned smartphones during the same period, up 6% versus January 2012 (New Media Trend Watch, 2012). This high rate of proliferation of mobiles provides a great opportunity for the development and implementation of a variety of mobile projects. Although the USA government has initiated several national programmes of mobile learning projects, many programs tend to be school based while a number of state and provincial programmes also exist.

Review of Mobile learning initiatives

Mobile learning programmes in USA tend to either provide mobile devices to students directly (OPD) or to allow students to bring their own technology (BYOD) given that 75% of teenagers have mobile phones (Wallace, 2011; Madden, 2011). As the national educational policy emphasizes increasing the equity and reducing the gaps between students of different demographic and economical backgrounds, some initiatives are following a hybrid approach of Shared Cost projects (SCPD).

Fritschi and Wolf in their paper, on behalf of UNESCO, report some of these initiatives. In the list of the OPD mobile projects conducted in USA, the Qualcomm's Wireless Reach initiative (started in 2006) is one of the longest-running mobile learning initiatives which, in addition with the FCC's Learning On-the-Go pilot programme (started in 2010), provide external funding to encourage and support district mobile learning initiatives. "The initiative's education projects aim to increase student access to educationally relevant content and enable communication with teachers and peers through online tools and resources for 24/7 learning" (Fritschi and Wolf, 2012, p17).

As a part of the Qualcomm's Wireless Reach initiative North Carolina's Project KNect (started on 2007) provided smartphones to students with low end of grade math test scores as a way of increasing their engagement and math achievement. After the encouraging project's results - end of grade test scores were increased at a rate of 30% comparing to the scores of other students with no access to mobile devices- the program was extended under the FCC funding (since 2011) to also include other states such as Virginia and Ohio.

At this time, the FCC's Learning On the Go programme supports twenty districts in fourteen states providing the necessary funds for purchasing a range of devices such as tablets, smartphones, netbooks etc. As a typical example the Katy Independent School District in Texas received funding to develop a programme in which students and teachers will have smartphones to interact while the teachers will use a learning management system to create and manage assignments. In addition, the Greater Southern Tier Board of Cooperative Educational Services which supports twenty one districts in New York received a grant through the FCC project for the utilization of the virtual classroom software program by providing smartphones and netbooks to middle and high school students (FCC, 2011).

Forsyth County School District in Georgia has adopted the BYOD approach with a pilot program which has started with a small number of schools and expanded afterwards to twenty schools. According to the project, students were allowed to bring their own mobile devices in school as part of the everyday teaching /learning process. On the other end, the programme provided teachers with "job-embedded professional development and instructional support from media specialists in each school. Project's findings indicate that "in order to achieve positive results districts and schools must employ a systemic approach that appreciably changes teaching and learning as a whole". (Fritschi and Wolf, 2012, p 22)

Projects of shared cost provided devices (SCPD) are mainly adopted by primary schools as younger children are less likely to have their own mobile devices. On the other hand some districts schools and universities may use a combined approach to mobile learning in which they fund part of the cost of the device and the required access plan, while students or their parents are responsible to cover the remaining expenses. As a typical example, Saddleback Valley Unified School District in California has conducted a SCPD project where mobile devices have been purchased from the institute on behalf of students in elementary school. Furthermore some other SCPD projects are targeting students belonging to low income families or in other cases some companies are beginning to offer reduced rates or shared plans, in which parents and districts split the costs of the mobile project.

In the private sector initiatives like the Text4Baby projects have followed the SCPD approach. Text4Baby brought together several partners such as the U.S. Department of Health and Human Services the National Healthy Mothers/Healthy Babies Coalition, Johnson & Johnson, mHealth provider Voxiva, and the foundation arm of

CTIA in order to share the cost of texting over 20 million SMS messages to parents (Gahran and Perlstein, 2012, p 10).

Policies, implications and barriers to mobile learning

The National Broadband Plan, developed by the FCC in 2009 and the plan of Transforming American Education: "Learning Powered by Technology" by the National Educational Technology Plan released in 2010 is the main plan in USA which contributes to the adoption of mobile learning in education. Both plans emphasize on the role of technology as a facilitator to students education and on the provision of educational opportunities and content available on the internet (FCC, 2009). Furthermore, the Association of Secondary School Principals issued a policy which encourages administrators to use mobile technologies for teaching and learning in schools, and to focus on teaching students how to use internet resources (NASSP, 2011a) and Mobile and Social Technologies effectively and safely (NASSP, 2011b).

It is worth mentioning that a set of Common Core State Standards (CCSS Initiative, 2010) agreed to be adopted for the development of digital content, courses and resources by the District of Columbia and forty six other states. Such policies remedy the problem of content and resource development due to the multiplicity of operating platforms available in the field of mobile learning.

State , provincial and local policies also exist in USA affecting critically the facilitation or the prohibition of mobile learning in their areas (Fritschi and Wolf, 2012, p 15). The adoption of directions such as the Legal Appropriate Responsible and Kind framework so called LARK in the everyday educational plans, or of the Cell Phones in the Classroom: A Practical Guide for Educators (Kolb, 2011), can inflect potential hesitations raised by some districts or by some school principles or teachers as regards to the use of mobile devices in the school environment (Livingston, 2006). Such hesitations are grounded to the existing barriers which affect negatively the adoption of mobile learning. Such barriers concern:

There is high start up cost of OPD programs. Students could become frustration as they may have to shift form their own mobile device to a new one due to the project's requirements. The misuse or the loss of mobile devices is also a cumbersome for OPD projects. Equity issues among students' ability to access smartphones due to low income or due to social-demographic origins, might arise as part of a BYOD project. Lack of specific educational plans or guidance both for teachers and students on how to use their personal devices for educational purposes in combination with lack of appropriate broadband resources within the schools or the districts may also prohibit mobile learning activities.

Additional findings from the mobile learning projects in USA indicate hardware limitations, such as small screens of the mobile devices, or their use by students with disabilities as a potential drawback. As reported by Wallace students' distraction in the class might be a critical concern that has led many districts to exclude mobile

devices from the school environment (Wallace 2011). Exposure of students to risk environments containing inappropriate material, or to hostile behaviours such as cyber bullying, sexual offenses, or potential cheating during school's examination are some additional roadblocks towards the adoption of mobile learning in USA.

Europe

Proliferation and penetration of mobile devices

Mobile phones are widely used in Europe. By the end of 2011 a total of 741 millions mobile cellular subscriptions have been estimated in the European region indication a penetration rate of 119.5% (ITU, 2011a). Though, as reported by Dylan Bosomworth D "The latest data (collected May 2011) suggests that mobiles are not used as widely as might be expected, given the hype, for different web applications across Europe" (Bosomworth, 2012). Smartphone penetration rates are also controversial in EU from the high rates of 75% in Sweden to the low rates of 9% in Romania and Bulgaria (export.gov, 2012) while the average penetration number among the EU countries is estimated at the level of 34% which is increasing yearly.

Considering the demand of European Commission for the countries' economies to remain competitive and innovative, according to the EU's Europe 2020 growth strategy, the high rate of proliferation of mobiles provides a great opportunity for European countries to work towards their above targets. The integration of ICT into European education systems is seen as crucial to enhance European economy (EACEA/Eurydice, 2011).

Review of Mobile learning initiatives

Mobile learning initiatives in Europe are primarily funded by European Commission through Framework program for Research and Development (FPs) (CORDIS, 2011). European mobile learning initiatives apart from being EU-funded are also nationally, locally, or privately-funded. Jan Hylén (2012) in his paper, on behalf of UNESCO, reports some of the most important initiatives in EU. The projects described below have been supported by EU-funds.

. The HandLER was an SCDP project launched in 1998, which aimed to develop mobile devices and methodologies to facilitate lifelong learning in varying contexts. However, the technology available had severe limitations and the project succeeded on establishing requirements for mobile technologies.

Similarly the MOBIlearn was a BYOD project which ran from 2002 to 2005 to enhance blended learning in MBA programs, to improve learning opportunities in museums and galleries, through mobile devices and to deliver medical knowledge via mobile phones in emergency situations. The project succeeded on establishing the viability of hand-held technology to enable learning in informal settings (MOBIlearn 2005).

The eMapps programme followed the BYOD approach and ran from 2005 to 2008 aiming to build communities where children would create digital content about their culture, communicate with peers and help integrate ICT into education (eMapps, 2008).

The M-learning was an EU-funded ODP project, coordinated by LSN, a now-defunct non-profit organization dedicated to improve education in public and private sector in UK. The project facilitated disaffected learners, by engaging them in learning outside formal school settings. In this project, mobile learning functioned best as part of a 'blend' of learning activities, rather than a single solution.

The list of EU-funded projects can be further completed by other two initiatives. Maseltov (Maseltov, 2012) is a collaborative multi-partner SCDP project, which runs from 2012 to 2014 and focuses on developing computing services on smartphones for immigrants. The second is the pan-European xDelia project, which ran from 2009 to 2012 and focuses on delivering new approaches to decision-making research based on wearable sensors and serious gaming technology (xDelia, 2012).

The United Kingdom implemented nationally funded projects for mobile learning. MoLeNET which followed the SCDP approach was the largest and most diverse mobile learning initiative in Europe. It ran from 2007 to 2010 and was coordinated by LSN. It defined mobile learning technologies to support teaching and learning and it facilitated student retention and lower drop-out rates. MELaS, adopted the BYOD approach and ran from 2007 to 2008 and was funded by JISC, a government agency which funded a number of other similar projects in UK. The MELaS developed an SMS network in which students and faculty of the University of Wolverhampton would engage in text conferences (MELaS, 2012)

Nationally funded mobile learning projects adopting the SCDP approach were also implemented by the Netherlands. The SURF foundation funded two mobile learning projects in the environmental sciences. First, the GIPSY programme, which ran from 2002 to 2003, was a good example of integrating practical field work through mobile devices with classroom activities and Manolo project which ran from 2004 to 2005, focused on the integration of electronic, wireless and mobile learning (Alterra, 2011). The SURF supported the ARena project which was focused on Augmented Reality (AR) targeting to students who were asked to use their smartphones' camera to investigate their surrounding environment. Unfortunately as user interaction was not yet perfected, the educational use of ARena was not as successful as expected (Ternier, et al, 2010). Though, the first encouraging signs for the use of AR in education were indicated in the Spring School on Mobile Learning in Higher Education, which was organized by SURFacademy in cooperation with the Centre for Learning Sciences & Technologies in Heerlen during May of 2009 (CELSTEC, 2009).

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Denmark has invested almost one million Euros as governmental funding to support a variety of mobile learning pilot projects between 2005 and 2006;however, there are few published evaluations of these projects (Hylén, 2012, pg19).

The other European countries report scattered activity on mobile learning, through the local and privately funded projects. The LET'S GO was an OPD programme which ran from 2008 to 2011 and was funded by private resources in Sweden and USA. Schools in Sweden and USA collaborated in an interactive learning platform to share research questions and data. The PI program in the UK has adopted the SCDP approach. It took place from 2007 to 2010 and facilitated inquiry-based learning and supported learning across formal and informal settings (Sharples and Scanlon, 2011). The Learning2go program which started in 2003 in the UK is also inquiry-based and claims to be the largest collaborative mobile learning project for students. However, an overall project evaluation is not yet available. The Nintendogs was an SCDP project, which ran in 2008 in Scotland, was small-scale, game-based and designed by teachers in two Primary 2 classes. Students developed writing, technological and social skills by composing stories about their dogs and calculating to make budgets.

Other initiatives include: (1) an OPD project which was implemented in 2009-2011, in Switzerland, was school based and students were given an Apple iPhone 3G as part of their personal learning environments PLE. (2) In Norway, Bergen, tablet devices and e-readers have been used to motivate boys (bt.no, 2011) adopting the OPD approach. (3) In Denmark, private educational publishing companies requested school subscriptions for accessing digital learning materials via mobile devices adopting the SCDP approach.

National funded initiatives also took place in Greece adopting the SCDP approach. During the period of 2009-2010 Kavala Institute of Technology (KIT) provided SIM cards to more than 150 staff members in order to use them in their mobile devices to access internet and institutional services via VPN. Since October 2012, "The University Mobile Internet" is a national SCDP project which provides wireless connectivity via 3G networks up to 4GB of data exclusively for students, faculty and staff of the Greek universities and colleges. The target population who will be eligible to participate in the project is estimated to be 295,000 students, 29,000 MSc and PhD students and 20,000 University professors. (GRNET, 2012; Giannikopoulou, 2012)

McQuire in his report (2012), summarizes some of the most important private funded MOBILE projects. Brent Council is a local authority representing an area of London in the U.K. The council has approximately 3,000 employees and approximately 1,000 laptops, 800 BlackBerrys in addition to a small number of tablets. The Council deployed a BYOD program in order to provide mobile applications to the employees who requested to go paperless and to use mobile devices in their work environment.

Similarly, Leeds City Council, the second largest local authority in the U.K., employing around 33,000 individuals, provided a number of mobile applications to its

employees, following the BYOD approach which has been also adopted by Honda in France who decided to deploy iPads and focus its strategy on mobile applications.

Finally, AWD a Germany-based financial advisory firm operating in eight countries also adopted the BYOD approach in order to roll out an enterprise mobility management solution for over 1,000 users enabling them to easily self enroll to apply for security credentials and distribute company applications.

Policies, implications and barriers to mobile learning

Mobile learning is not mentioned among the priorities of the Ministries of Education in Europe (Lewin, C., Savage, J., Haldane, M. and Whitton, N., 2011). However, in UK, Denmark and the Netherlands policy-makers have addressed some strategies. UK was the most active country in Europe in the field of mobile learning from 2000 to 2009. The government initiated mobile learning programs in primary and secondary education and universities and cooperated with telecommunication companies to provide mobile technology to students. Considering these previous projects and the fact that smartphones and tablet devices are becoming cheaper, UK proves fertile ground for bottom-up initiatives.

On the other hand, the Netherlands has no national strategy; however, there are promising efforts in primary, secondary and tertiary education. Kennisnet, a semi-governmental organization supports government to promote mobile learning, through issuing guidelines concerning ICT, working with the SURF foundation to stimulate the use of mobile technology and organizing the "Make it mobile" contest to motivate students and scholars to develop mobile educational devices. However, the use of mobile technologies is described as low and the government does not plan to make mobile learning a policy priority in the near future.

Denmark includes mobile learning directions in its national policy documents. In 2009, guidelines on mobile learning had been published by the government's national e-learning centre and the Danish web portal for teachers and students contains pedagogical advice on mobile learning. In 2011, the Digital Path to Future Welfare ICT strategy calls for an investment provided by the state and the Danish municipalities, on developing digital materials and mobile platforms, pushing to establish a market similar to 'app stores' for smartphones and tablet devices.

As it seems, mobile learning in European education requires still a long way. The existing barriers are the lack of policy support and governmental investment and the negative social attitudes of people towards mobile phones in the school environment (i.e. in Italy, Greece, UK) because of cheating, cyber-bullying, etc. However, the low cost of devices, their growing functionalities and the proliferation of powerful hand-held devices may be drivers to increase the implementation of mobile learning. Acquiring a BYOD approach will promote mobile learning as the current economic crisis reduced investments in ICT for education. The challenge for policy-makers will be to create guidelines that will not be restrictive as technologies

and pedagogy are constantly transforming in response to development. Successful projects should also balance infrastructure, competence development, digital learning materials and pedagogical vision (ten Brummelhuis, A. and van Amerongen, M., 2010)

Russia -Ukraine

Proliferation and penetration of mobile devices

Russia has always been a great market for cell phone producers and telecom companies. Like in many other emerging markets, mobile usage has exploded in the last 10 years. The number of mobile phones in Russia doubled in the last 6 years. Today 90% of the Russian population owns a mobile phone. According to TNS, in January 2012, a variety of mobile devices to access the network is used by more than 22% of all people in large Russian cities. At a rate of 51% Russians use regular cell phones to access Internet via mobile networks, 43% use smartphones and the remaining 6% use tablets. Though there is a variation in Moscow, as smartphones are more often used to access the Internet at a rate of 56% while 31% of Moscow uses regular mobile phones for this purpose and 10% uses tablets (Yandex and TNS, 2012).

According to forecasts of the researchers, by 2013, the volume of selling of tablet computers will reach 1.23 million per year and smartphones will reach 15 million compared to 2010 where 3.9 million and 400,000 were sold respectively. Thus, in 2013 a 36% of all phones sold in Russia will be smartphones and their average cost will decrease from the current $350 to $285 (Russian Search Tips, 2012; Zapuskalov A., 2012) .

In Ukraine, the number of cellular subscribers for the second quarter of 2012 increased compared to the first quarter of 2012 by 1.6% - up to 54,867,731 (number of SIM-cards), according to the analytical report consulting company Advanced Communications & Media (AC & M). The level of mobile penetration in Ukraine as of June 30, 2012 was 120.4% compared to 118.5% at March 31, 2012 (RBK nd, 2012).

As of June 30, 2012 the number of mobile subscribers accessing the Internet in Ukraine was 14.1 million people, of which 11.6 million - 2G-users (GPRS / EDGE) and 2.5 million - 3G-users (CDMA EV-DO ; UMTS).

Review of Mobile learning initiatives

At present, mobile learning in Russia and Ukraine is not widely developed as only few initiatives can be identified in the private and academic sectors (Golitsyna, 2011; Bugaychuk , 2012; Slavic-Greek-Latin Academy, 2012)

One of the first efforts for mobile learning in Russia with positive outputs was an ODP project which was held during the period October to December 2007 by Medium company and Beeline mobile operator. In this project a mobile training

course called “credit sale tariff plans for individuals” was designed and delivered to 30 employees who used a PDA HP IPAQ hx 2790 device (Websoft-elearning, 2008).

An interesting effort, not in the form of a mobile learning project but rather as an effort to familiarize with mobile learning, took place in the schools of Ukraine during December 2009 to February 2010. A mobile operator Mobile Tele Systems (MTS) in cooperation with the Ministry of Education, the Ministry of Finance, and the Ministry of Youth and Sports created a series of "mobile" lessons focusing on the modern means of communication, wireless phones and safety issues. The lessons have reached more than 4,000 students of the middle classes in 146 Ukrainian schools. According to Dr. Volobuyev Dean of Donetsk Oblast Institute, this mode of training would be used in the future to cover the training needs of teachers and professors in Ukraine either in the form of mobile or distance education or utilizing self training opportunities (NAU nd., 2011).

Similar initiatives have been held by the company named “Young Digital Planet” who developed a number of e-learning courses compatible with a variety of mobile devices, on the topics of mathematics, physics, chemistry, biology and science for pupils aged 10 to 19 years. A learning platform was also offered in order to facilitate the use of the courses and meet the learning preferences of individual users (Young Digital Planet nd., 2012).

The Moscow Institute of Technology and Slavic-Greek-Latin Academy follows the SCDP approach as its students during their admission to the Institute are granted with an android tablet in order to further enable their access to all training materials and tests available in the Academy’s LMS. Furthermore the tablets can also be used by the students for communication purposes such as chatting with peers and Academic staff or for participating in webinars held by the Institute (Slavic-Greek-Latin Academy, 2012; MTI nd, 2012)

In the private sector, the nonprofit organization Community e-learning PRO provides a series of educational activities on mobile learning. For example, in August 24, 2012 a webinar on the use of QR codes for teaching, learning, and other professional activities was held , covering both areas of Russia and Ukraine (Litvinova M, nd. 2012b)**.**

Policies, implications and barriers to mobile learning

Mobile learning has created a positive impact in Russia and Ukraine according with the general views of the regional scientific population (Golitsyna I., 2011; Litvinova M, nd. 2012a). The ongoing growth of use of mobile devices such as phones, laptops, PDAs, tablets, e-readers, etc. for educational and training purposes is an encouraging indicator.

Mobile learning is currently considered as an alternative method of e-learning and embodies the principles of open education: flexibility, modularity, time and place independency, and the use of modern communication technologies. Despite the

positive perceptions towards mobile learning in Russia and Ukraine, a series of roadblocks have to be removed.

On the infrastructure level, Internet coverage has to be improved mainly in the rural areas. It is worth to mention that in Ukraine only one operator is licensed for 3G, as other mobile networks operate in the standard CDMA 2000, covering only small areas such as big cities or trading centers. Furthermore, educational institutions are hardly supported by wireless networks.

Limited resources of fully functional and of high quality educational content for mobile devices are an additional barrier to mobile learning, which is further expanded considering the lack of specific technical programs to train educators and trainers in the field of mobile content development. Furthermore, large number of standards, variety of screen sizes and operating systems and limited means of content development blurs further the landscape of mobile learning.

As reported by Konstanine Bugaychuk, another critical barrier in the establishment of mobile learning is the lack of research data at a national level from the evaluation of mobile learning initiatives as such evaluation techniques are in early stage in the region.

The parameter of cost should not be overseen, as for the independent user is related both to the cost of the device as well as to that of mobile Internet. Even in the school environment, low level of funding prohibits the development of high quality wireless networks to support mobile learning initiatives. Therefore, the most popular approach to implement mobile learning is a centralized purchase of mobile devices from a manufacturer, but the low level of funding forces the students to use their own devices in the educational process and the BYOD the most popular approach followed by the SCPD . (Bugaychuk nd, 2012b).

Additional findings indicate hardware limitations such as small screens' sizes of the mobile devices, and limited battery life, although at present the proliferation of tablets, smartphones and netbooks in the Russian and Ukrainian population tends to remedy this deficiency.

Section 2: Mobile learning around the Southern Hemisphere, a closer look…
Similarly to Section 1, the current section attempts a closer look on the growth of mobile learning in the Southern Hemisphere, indicating the most important initiatives, policies and similar barriers that appear in the corresponded regions.

The section concludes by crosschecking the findings around the world and by providing recommendations and solutions which might help the widespread of mobile learning.

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Latin America

Proliferation and penetration of mobile devices

The use of mobile phones is growing rapidly in Latin America. Mobile phone subscribers representing 106% of the population and surpassing 120% in several countries (GSMA, 2012). According to Vinicius Caetano, Senior Analyst for Pyramid Research, the mobile penetration will reach the 130% of the population by the end of 2015 (PS Newswire,2012). Although the penetration of smartphones in Latin America is still low, it is increasing rapidly and is forecast to triple from 9% in 2010 to 33% in 2014 (GSMA, 2012).

The size of the population that does not have a fixed and mobile broadband connection is one of the most critical challenges for the countries of Latin America, as the percentages of unconnected population varies from 77% in areas like Venezuela to 98% in areas like Bolivia and Nicaragua (GSMA, 2011b). However by 2015, Latin America is expected to have almost a third of a billion Mobile Broadband connections (PR Newswire, 2012).

Review of Mobile learning initiatives

Several countries in Latin America have recently launched mobile learning initiatives and small-scale mobile learning programs. Most of the mobile learning programs in Latin America provide devices to either students, teachers or school supervisors adopting the OPD approach while only a few allow students to bring their own mobile devices (BYOD).

Lugo and Schurmann (2012) reported on some of these initiatives that involved only mobile phones and others that involve other mobile devices such as tablets and laptops.

Most of the mobile learning initiatives are OPD programs. Colombia implements a program against illiteracy called “Programa Nacional de Alfabetizacion” (National Literacy Programme). The aim of the program is to provide access to interactive educational content to illiterate people living in rural areas of the country. As part of the project, more than 250,000 mobile devices with appropriate SIM cards are going to be distributed at no cost to the target population.

Another OPD mobile learning initiative that aims to indirectly improve educational process is the “Mobiles for Supervisors” in Argentina. This program aims to help school supervisors report and track data on students’ academic performance and schools’ needs in terms of both human resources and infrastructures. A number of 350 3G mobile phones with unlimited internet access were provided to schools supervisors. The phones could also open Word, Excel, PowerPoint and PDF files. This allows supervisors to connect from schools in rural areas to the internet and to specific online system for reporting students’ performance and schools needs.

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Two similar programs called Puentes Educativos (Educational Bridges) and "Raíces de Aprendizaje Móvil" (Roots of Mobile Learning) in corporation with BridgeIT implemented in Chile and Colombia respectively. The first one runs for three years (2010-2012) and expected to reach 660 teachers and about 22,000 students in rural schools throughout the country (Plaza and Carreras, 2010). The program aims to improve primary-school students' knowledge on mathematics, science and English language. This program is training teachers on smartphones use and using multimedia resources through the Nokia Education Delivery application. In particular teachers learn how to promote student-centered learning activities by incorporating mobile learning and digital resources into the curriculum. Afterwards teachers use the resources to develop and update curriculum plans for a variety of domains (Lugo and Schurmann, 2012). In addition each participating school receives a smartphone along with a planning kit. Similarly, the program Roots of Mobile Learning will provide support to seventy-five school teachers in order to incorporate mobile technologies into their curriculum.

The "Seeds of Empowerment" was also an OPD project which was launched by Stanford University in the United States. Although it was originally implemented as a research project, "Seeds of Empowerment" reached schools in more than five Latin America countries (Argentina, Mexico, El Salvador, Bolivia, Brazil and Uruguay). The aim of this program was to increase access to basic education for children living in rural areas. According to this program, a specific mobile device called TeacherMate along with appropriate platforms were distributed to both students and schools in order to access specific educational content through the Internet. However, over the last two years, a new interactive mobile application called "Stanford Mobile Inquiry-based Learning Environment (SMILE)" was developed which supported both iOS and Android. As a consequence, students and teachers could access educational content even from their smartphones. Therefore this project was shifted to an SCPD project since both devices were provided to education stakeholders and students and allows the use of students' smartphones for accessing the provided educational content.

Apart from the OPD projects, projects adopting the BYOD approach was also conducted in Latin America, for example, the PSU Movil in Chile. The Chile Ministry of Education had lunched Educarchile, a national educational internet portal. The aim of this portal was to help low-income students improve their performance on PSU (Prueba de Sleccion Universitaria) exams. In order to make it easier for students to access the portal educational content a mobile application called PSU Movil (PSU Mobile) was developed. This application was available for use by smartphones providing educational content to students and incorporating exercises and online tests for practice.

Another BYOD initiative was implemented in Paraguay entitled "Evaluación de Aprendizajes a través de Celulares (Learning Assessment through Mobile Phones)" which focused on mathematics and Spanish language. According to this project

students were able to perform tests through their mobile phones while their responses could be uploaded directly to the Paraguay's Ministry of Education. The project was implemented in 300 public schools and more than 10,000 students have completed the assessment while the targeted population of Secondary Education Level is 18.000 students (Escolar, 2011).

Policies, implications and barriers to mobile learning

The high rates of illiteracy of people that live in urban and rural places of Latin America countries have motivated many governments to invest in mobile learning. However, in most cases the mobile learning initiatives operate as small scale projects. One exception is the "Programa Nacional de Alfabetization" in Colombia. Lugo and Schurmann (2012) in their research highlight that only in Colombia the government actively supports mobile learning. It was also the only country that representatives were aware of current mobile learning programs in their schools, although they were not aware of any program at the secondary level and above.

Most of Latin America countries do not have immediate plans to support mobile learning due to the fact that more than seventeen countries of Latin America have invested a lot of money into national 1:1 training programs, providing one laptop/netbook for every student. Consequently such efforts demand many resources for their implementation leaving limited resources for the evolvement of mobile learning and polices in the near future. However, these programs indicate the commitment of the respective governments to integrate ICT into education and therefore a promising future for mobile learning.

Restricted educational regulations raise another barrier for the integration of mobile learning in Latin America. Such regulations restrict the use of mobile phones in the classroom by the students and sometimes by the teachers banning the mobile devices from the school environment. It is really encouraging that in the last years such restrictions begin to loosen up. Another roadblock towards mobile learning is the low percentage of 3G or 4G network coverage. While for the developed countries the average coverage is about 90% in Latin America coverage is less than 55%. However, as Katz indicates, the penetration of mobile broadband services in the area is going to be highly increased (Katz, 2011).

Africa and Middle East

Proliferation and Penetration of mobile devices

There has been a rapid and widespread uptake of mobile phone devices across Africa and Middle East (AME) over the last few years. Reports have shown that the number of mobile subscribers in Africa exceeded 620 millions in September 2011, making it the second largest mobile phone market in the world after Asia (GSMA and Kearney, 2011). The number of mobile users has been increasing rapidly the past ten years, growing at an average rate of 30% per year, and is estimated to reach 735 million by the end of 2012. That is a surprising large number when taking into consideration that

it is a continent of approximately 1 billion people that suffered several difficulties in the last decades.

In the Middle East, mobile penetration rates were expected to reach 93.9% during 2011 and 125.5% in 2015 (Cherrayil, 2010), with Iran and Afghanistan driving the growth in this region. According to Gallup, 87% of Arabs aged between 15 and 29 years old had access to mobile phones in 2010, showing 79% increase since 2009. In wealthy countries such as United Arab Emirates and Qatar the penetration rate can be more than 100%, while in poorer countries like Palestine and Yemen is expected to reach high levels due to growing youth market and new mobile network operators (Muttoo, 2011). All this growth in the mobile phone market, along with the price drop of devices and the low network usage cost, make mobile learning an attractive field for future educational solutions.

Review of Mobile learning initiatives

The limited number of mobile learning projects in the AME region shows that the penetration of mobile technology in the educational field is still in the early stage.

Shafika Isaacs outlines recent mobile learning projects and initiatives in the AME region (Isaacs, 2012). Nevertheless, the six EFA goals placed by UNESCO indicate that mobile access will be expanded to education and will improve the quality of learning. Some typical examples of mobile learning initiatives in AME which try to meet the EFA goals are reported below.

Pesinet was a SCDP project in Mali which intended to improve health care of children by early detection of illnesses and better record keeping. Mobile devices are used to upload information to an online database where doctors review them and are alerted for any illnesses. Families pay a small monthly fee to enroll their children to the program and can benefit from medical examinations and half the cost of medication needed to treat a sick child. From early 2012 until October 2012 Judith de Benoist is mapping Pesinet's data to improve preventative action of the potential 2000 beneficiaries of the program (Pesinet, 2012a) and Pesinet organization is already growing and planning to expand to other SSA countries (Pesinet, 2012b).This project is in line with the first EFA goal which calls for the improvement of the early childhood care and education for the world's most vulnerable and disadvantaged children

Jokko –an SCDP initiative launched in Senegal by UNICEF and Tostan (RapidSMS, n.d.) is SMS-based and learners use a free-based platform to communicate with a network of people by sending SMS to a single number. The project also introduces mobile phones as pedagogical tools to teach and reinforce literacy as well as the organization and management skills taught in Tostan's Community Empowerment Program. According to Beltramo and Levinethe, the project provides to its beneficiaries the opportunity to develop literacy and communication skills (Beltramo and Levine, 2010), enhancing the decision making among youth and adults. Jokko is

in line with the third EFA goal which calls for lifelong learning where children and adults can satisfy their learning needs by having access to suitable learning and life-skills programs.

Project Alphabetisation de Base par Cellulaire (ABC) in Niger was a collaborative initiative which adopted the ODP approach between Catholic Relief Services/Niger, Tufts University and the University of Oxford (Project ABC, 2010). This project uses multimedia phones pre-loaded with a digital curriculum in the local languages of Hausa and Zarma. This curriculum was taught to adults by local trained facilitators and learners use basic SMS messages to study functional literacy and numeracy for a few hours per day. Preliminary results showed that the average math test results in villages that use ABC were higher than in villages that did not use it, even several months after the end of classes. This project is in line with the fourth EFA goal which calls for adult literacy improvement and access to basic and continuing education for adults

M4Girls was a pilot project which also adopted the ODP approach and took place in South Africa. The project was intended to address learning performance differences in mathematics between boys and girls from underserved communities. Two schools were selected as pilot schools for the project by the North West Department of Education in South Africa. The project involved issuing 20 girl learners in the two schools with Nokia 6300 mobile phones that contained curriculum-aligned Mathematics content -in the form of mobile games and videos- which was developed locally by Mindset Network (Mobileactive.org, 2011). Even though phones were used mainly to listen to music, access the Internet and communicate with others, female users felt more technologically confident (Mindset Network and Neil Butcher & Associates, 2009). This project is in line with the fifth EFA goal which calls for gender parity and equality and focuses on ensuring full and equal access to high quality basic education for girls.

Dr Life Orientation and Life Skills (LOLS) was a BYOD project in South Africa that utilizes mobile phones to supply advice and subject support to learners and teachers of LOLS. The program intended for grades 8 and 9 as a sequel of other program for grades 1 to 7 in order to provide efficient education for HIV/AIDS prevention (IBE, 2003). Users of the program stated that they developed technological and digital skills while using the mobile phones and improved their life skills (CSIR, 2010). This project is in line with the sixth EFA goal which calls for improving the quality of all aspects of education and ensuring that positive outcomes are achieved by all in literacy, numeracy, and essential life skills.

It is worth to mention that according to Isaacs's report no specific project could be identified in the region which is in line with the second EFA goal which calls for universal primary education (Isaacs, 2012, pg 21). A theoretical case was made in Nigeria to offer primary education to nomadic children with the use of mobile phones (Aderinoye et al., 2007). Similarly, efforts to provide open school led by

Commonwealth of Learning and its partners offer new ideas for incorporating mobile phones in primary and secondary education as well (Mishra, 2011).

Policies, implications and barriers to mobile learning

Forty-eight out of fifty-three countries in Africa had some form of ICT in their education policy and development in 2007 (Farrell and Isaacs, 2007). Nowadays, most of these countries have further advanced their strategies and policies on ICT. Rwanda developed an ICT in Education Policy and a draft Implementation Plan in 2009 (Isaacs, 2011), while South Africa reinforced its White Paper on e-Education that was adopted in 2004. Additionally, global guidelines on policies were established to ensure similar future development.

Shafika Isaacs highlights some recommendations for national policies which can help mobile learning to play a significant role in the educational field of every country in the region of AME (Isaacs, 2012). A value proposition for mobile learning must be built to attract attention and investment from government funding. This proposition should focus on four major attributes. The first is the fact that mobile phones provide easier access to education and information to children and adults who were previously unable to enjoy that. Secondly, how the use of mobile phones can improve the experience and quality of learning. Thirdly, how mobile phones improve the decision making skills of individuals. Finally, how the use of mobile phones can improve the administration, management and governance of local, national and regional education systems.

Another recommendation that arises is the need to encourage supportive policies in other government sectors. Studies have shown that national, regional and global policies on trade, telecommunications and ICT highly influence the penetration of mobile phones in the market (Adam et al., 2011). Cooperation between education and finance departments is necessary so that cost effective mobile phone access is established at countries that have low average income. Furthermore, policies on internet governance, safety, security and intellectual property rights are highly important and directly related to the growth of mobile learning.

Additionally, policies on mobile learning need to take into consideration the effects of rapid advances in mobile technology and how these can influence and alter the educational landscape.

Finally, while in the policy development stage, groups and communities that were previously marginalized from the decision making process, need to be taken into consideration. Parents, guardians, media and youth are such examples that must have the opportunity to take part in the policies development and contribute to their improvement.

Although mobile penetration in the AME region is growing fast, the expansion of mobile learning initiatives is relatively weak due to various roadblocks. This is mainly due to the fact that government decision-makers are relatively unaware of the

potential of mobile phones and the role they can play in improving the quality of education. This awareness is enhanced by the lack of effective initiatives and research projects that would provide evidence on the efficacy of mobile learning.

Another barrier is the lack of modern mobile phones in many poor areas. Learners usually own or have access to mobile phones when they are older missing the opportunity to benefit from them in younger age. Furthermore, absence of industry standards also serves as a drawback, when issues like screen size, resolution, support for programming languages, audio and video formats, internet browsers and memory sizes are not standardized.

Lastly, anti-mobile sentiments in AME form a significant barrier to mobile learning. Worries about the disruptive nature of mobile phones and safety around them expressed by teachers, parents and the media have in many cases led to complete banishment from school premises.

Asia-Pacific

Proliferation and penetration of mobile devices
Asia and Pacific is a place of contradictions as regards to the exploitation of mobile devices varying from the impressive percentages of Japan, China and New Zealand to the low percentages of Mayanmar (NetMedia Asia, 2012, So, 2011, p 9-11)

Asia and Pacific holds 2.15 billion mobile phone users in the year of 2012 which is equivalent to the 55% of the global sum. According to recent estimations "…by 2016, Asia Pacific will account for 57.7% of all mobile phone users—nearly ten times the North American share. China and India contribute most to this teeming mobile population, with 880 million and 470 million users, respectively, in 2012. In China alone, the mobile consumer base will top 1 billion in 2014" (eMarketer, 2012). In case these estimations will be verified, the use of mobile infrastructures will become a primary platform not only for educators but also advertisers, bankers, and marketers of Asia Pacific region. Not surprisingly citizens of the region are experiencing a smartphones revolution as most of the internet users are leapfrogging the era of PCs or of Tablets and they are moving forward to smartphones (NetMedia Asia 2012). As tracked by the GfK group in Asia, in countries such as Singapore, Malaysia, Thailand, Vietnam, Indonesia, Philippines, and Cambodia the demand for smartphones has been catapulted in the range of 40 to 400% more over the same period last year (GfK, 2012).

Review of Mobile learning initiatives
In such challenging environment a variety of mobile learning projects take place, despite the existing contradictions where citizens in Australia and New Zealand make an extensive use of mobile devices and smartphones to access internet repositories up to 40% or in Indonesia which has one of the most challenging smartphone penetration rates of 62% versus to the low rates of Nepal.

In areas where minor ICT and mobile infrastructure exist, most of the mobile learning initiatives are targeting to enhance the current level of education (so called literacy education). India, Nepal and Pakistan are typical examples, where gender disparity becomes an additional roadblock in adult education as females have significant lower access to educational materials (So, 2011, p 12). In Pakistan an OPD project was conducted, where 250 girls living in rural areas of Punjab where provided with a mobile device in order to improve their English language skills by receiving daily SMS. The effort was supported by UNESCO, a local nongovernmental organization, and a local mobile provider Mobilink. Project's results were so promising that the initiative was evolved to a SCPD project (project of share cost) in order to include more than 1,250 girl participants from Punjab.

Similar positive findings are also indicated by Matthew Kam during an OPD pilot study held in North India (Kam et al. 2009). The study took the form of an after-school program, during the afternoons at a private village school affiliated with a nongovernmental organization in North India. The main goal was to investigate learning impacts that English Language Learning (ESL) games on cellphones have on lower-income rural children. A number of cellphones preloaded with ESL learning games were to be loaned to the participants from late December 2007 to early April 2008.

On the other hand, in areas which have sufficient ICT and mobile infrastructures mobile learning projects are targeting to the provision of distance education and informal learning services. The Open University of Philippines conducted a BYOD project as part of a mega-project called Pan Asia Networking Distance and Open Resource Access (PAN-DORA). As Rammos et al describe in their study, the project called "Viability of Mobile SMS Technologies for Non-Formal Distance Learning in Asia" seeks to determine the utility of SMS technology as a basic tool in non-formal education. A similar effort was made by the Health Sciences University of Mongolia in cooperation with MDFI agency and the English for Special Purposes Foundation who developed learning material that could be delivered via SMS (Rammos et all, 2006). Furthermore a typical example of successful large scale project was the Text2Teach initiative which was a combination of BYOD and of SCPD model –as it was also sponsored by Nokia. The project enables students to access and download – or even request via sms- multimedia educational material in sciences and mathematics. According to Ayala Foundation the project has expanded to include 550 schools and thousands of students in the Philippines (Ayala Foundation, 2011)

Japan, Bangladesh and South Korea have also launched large scale mobile learning projects –at a national scale in some cases- as their national policy facilitates the use of mobile devices in education. In the areas of Japan and Bangladesh, Eijiro and English in Actions respectively, are two BYOD projects aiming to improve citizens' English language skills in each area. Both projects are successful with very good results so far (So, 2012, p 16). Furthermore in South Korea the SK Telecom has partnered with the largest U.S. education company, Houghton Mifflin Harcourt

(HMH) to provide mobile content to enhance the English proficiency and academic outcomes of students throughout Korea (Houghton Mifflin Harcourt, 2012). Due to the program's success SK Telecom and HMH announced that they will also offer smart learning in other countries with high demand for education, including China and India (TelecomTiger, 2012).

Finally countries in areas which have strong ICT infrastructure and mature mobile market with high penetration of mobile phones mobile learning, projects intent to promote future learning environments. The Australian and New Zealand Mobile Learning Group (anzMLearn) outline the most important initiatives in the region for the last two years. Charles Stuart University has established the mLearn -a large scale BYOD project- that is working on a range of initiatives that focus on the learning aspects of mobile technology for the period of 2012 to 2013. The mStories is a participatory project that was aimed to explore mobile technology creatively launched in Sydney in October 2011 exploring how we can tell stories with text, image, sound, video and anything else available on the mobile device. University of Technology in Sydney in 2011, lunched the "Student-Generated Pod and Vodcasts to Improve IT Career Understandings" project which focuses on understanding the learning processes that first-year university students engage in when undertaking a team student-generated mLearning project (anzMLearn, 2012,).

Other innovative mobile learning initiatives include projects like the Smart School governmental project in Malaysia, the FutureSchools@Singapore project in Singapore also held by the government and the Promotion Strategy for Smart Education in South Korea are exploring the integration of mobile devices into everyday school environment (APIIT, 2012; IDA Singapore, 2012; OECD 2011), preparing the students for the learning environments of the future.

Policies, implications and barriers to mobile learning

In the challenging Asia –Pacific region, policies related to mobile learning are in line with the controversial widespread and use of mobile devices in different areas. In areas where mobile penetration rate is high, such as Australia, China, New Zealand, Japan, South Korea, Singapore, Thailand, Malaysia etc, mobile learning is strongly supported by the governments who promote new Educational Laws and ICT policies. (SAMEO, 2012; So, 2012, pg 19).

In areas where ICT infrastructures are under development, such as India, Nepal, Pakistan etc, although there are no governmental policies specific for the development of mobile learning, some references are included in the general Educational policy plans about ICT.

Not surprisingly in the Asia –Pacific region it is generally accepted that governments and universities play a critical role in encouraging mobile learning and in cases where additional stakeholders are involved such as NGOs, Mobile network providers, ICT companies etc, success and sustainability of mobile learning initiatives are granted.

Such successful projects or case studies, contribute to overcome the resistance to mobile learning adoption, commonly observed in primary and high schools environment by the school administrators, teachers boards, and parents.

Some of the most commonly observed barriers in the region concerns the risks of students expose to inappropriate content, to inappropriate behaviours such as cyber-bullying, gaming addiction, and the perception that mobile devices will probably distract rather than will facilitate the educational process. Apart from the concerns about students' misuse of mobile phones additional barriers are related to potential health implications of students using mobile devices such as asthenopia, or excessive eye strain (Bedinghaus, 2011; Knowlton, 2011) radiation absorption, Thermal and Non Thermal effects, cancer, etc. (Wikipedia, 2012; Cohen 2012; WHO, 2011) affecting both their psychological and physical development.

The cost and availability of mobile devices is another important barrier towards the adoption of mobile learning. For that reason universities tend to follow the BYOD projects approach. On the other hand, as it is rare for young students to posses their own mobile devices, in Primary or in Secondary Educational Level schools the approach of OPD or of SCPD is followed. Another key barrier, mainly in the Asia region, concerns the lack of teacher training and support or the lack of high quality educational material. As a result, most the teachers are reluctant to adopt this new emerging teaching/learning method.

Intense educational programs either in Primary or in Secondary schools pose an additional restriction to the adoption of mobile learning as students and teachers feel the pressure to meet the program's standards having no time to experiment with other educational scenarios.

As elsewhere in the world, a set of clear guidelines and policies (at a governmental level) on the use of mobile phones in the school /university environment is fundamental to overcome the above mentioned barriers.

Cross Comparison Conclusions

Reviewing the status of mobile learning around the globe, some critical issues can be highlighted. The current section aims to point out similar problems, hesitations and mindsets across the seven reviewed regions of Canada, USA, Latin America, Europe, Russia, Africa- Middle East, Asia and Pacific. Emphasis is given not on the benefits but on the common roadblocks towards mobile leaning in an effort to identify the cause of the problems which slows down the adoption of mobile learning. As a deeper understanding of the causes may contribute to the solution of a problem, some useful recommendations are also reported.

Rapid proliferation of mobile devices (including the smartphones) is a commonly observed phenomenon. From the isolated rural areas of Nepal and Mongolia to the most crowded ones of China and New York, the number of mobile subscriptions is growing impetuously. Recent studies estimate that "...the worldwide mobile

subscriber base is expected to reach 6.5 billion by the end of 2012, taking global mobile penetration to approximately 91 percent" (Portio Research, 2012). Access to a mobile device is significantly superior compared to access to a laptop or a PC due to the low cost of mobile phones. Although a new challenging environment for mobile learning immerse worldwide, supported also by the expansion of 3G or 4G technologies (comScore, 2012), the adoption rate of mobile learning does not evolve at equally frenzy rates. The main reasons for such delay can be grouped in five categories which are described below in descending order of importance.

Insufficient (educational) policies

Availability of mobile learning initiatives around the world, despite their differences in scope, complexity and implementation cost, is a significant indicator that mobile learning is gradually getting the attention of governments, districts, (educational) institutions, industry and other stakeholders.

Though, one of the most critical obstacles towards the wide adoption of mobile learning can be considered the lack of (educational) policies, at a national level, which outlines the framework of the appropriate use of mobile devices as part of the everyday education process.

In regions where a national education policy advances the use of mobile devices, such as South Korea, Colombia, Malaysia, Japan , Manitoba, Alberta, District of Columbia, , Australia, and partly UK and Rwanda, potential hesitations towards the adoption of this educational model have been significantly restricted. On the contrary, in regions where no specific guidelines regarding the use of mobile devices are described as part of their educational policies, facilitation or the prohibition of mobile learning is equally possible to occur. It is very often the case where school principles or institutions or even broader (educational) boards, based on the blurriness of the (educational) landscape, are adopting the worst case scenarios prohibiting and even banning mobile devices form the school or the work environment.

Hesitating Mindsets (health and psychological issues)

In all of the seven regions examined, the positive implications of mobile learning have been widely acknowledged. In Asia and Canada specific case studies took place in order to examine potential positive effects for disable students and autistic children to learn communicate and interact with others using mobile devices (Ally and Palalas, 2011; So, 2012). Though, accessibility issues also arise for many mobile devices as they cannot be used by people of different ages and/or of different disabilities.

Lack of educational policies which specifically address issues of mobile learning causes another side effect which also seems to be a significant roadblock for the adoption mobile learning. In almost all of the examined regions some school boards, school principals, teachers, and parents report hesitations about the misuse of mobile phones in the class. The most commonly reported hesitations, in all seven regions, concern students' distraction in the class, security issues, exposure of students to risk

environments containing inappropriate material, hostile behaviours such as cyber bullying, sexual offences or sexting, potential cheating during school's examination and gaming addiction.

Negative effects on students' health and on their physical development, reinforces further the ambiguity to the key role players (i.e in Asia region) regarding the appropriateness of using mobile devices in schools. The most commonly reported negative implications concern, Thermal and Non Thermal effects, radiation absorption causing cancer, asthenopia, excessive eye strain as result of excessive use of mobiles, etc (Bedinghaus, 2011; Knowlton, 2011; Wikipedia, 2012; Cohen 2012; WHO, 2011).

Until clear scientific evidence emerge proving the appropriateness of the use of mobile devices –especially by young students- without any potential negative implications on their heath and specialized educational policies are formed, such critical concerns will continue to led many districts and other key role players to exclude mobile devices from the school environment (i.e in Latin America, partly in USA, in Africa and in Europe).

Socioeconomic and technology limitations

High start up cost of mobile initiatives, especially of OPD programs is an additional barrier. Even in SCPD projects, the communication cost and the cost of mobile devices are limiting the adoption of mobile learning.

Equity issues among students' ability to access modern mobile phones such as smartphones due to low income or due to social-demographic origins, may also be an issue during a BYOD project. Such dilemmas arise not only in the poor areas of central Africa, or of Afghanistan, Bhutan and Nepal but are also present in more wealthy regions such as New Zealand and the USA.

On the other hand, a technological driven limitation can be considered the low population coverage by 3G or 4G networks. (Latin America, Russia, Ukraine). Furthermore availability of large number of standards and operating systems, programming languages, audio and video format, screen sizes and resolution (Russia, Africa, Canada, and USA) also serves as a drawback towards mobile learning.

Lack of human resources (skilled personnel)

As mobile learning is in its infancy, specific educational plans or guidance both for teachers and students on how to use their personal devices for educational purposes are rare. Lack of teacher training and support, or even of high-quality educational content as reported in Canada, USA, Russia and Asia, in addition to difficulties incorporating existing learning content to mobile initiatives, reinforces teachers' resistance to adopt mobile devices in schools. Similarly in the region of Russia low level of technical training regarding the development and the evaluation of mobile content in commonly reported as an additional barrier to mobile initiatives. As a result

of the above mentioned deficiencies, many teachers (and trainees) are reluctant to adopt this new emerging teaching and learning method.

Hardware limitations

Finally, device related limitations including battery life, user interface usability, device memory, hardware and/or ergonomic limitations -such as screen size, small keyboards for typing and security issues, are also listed among the most commonly reported barriers towards mobile learning. Though such barriers are the least important as technology rapidly excels and new gadgets and more handy and advance mobile devices emerge every year proving that mobile devices and smartphones are spreading faster than any technology in human history (Degusta, 2012).

It is obvious that some of the abovementioned limitations/barriers will be easily overcome (i.e the Hardware Limitations) as mobile devices rapidly evolve through time, while for others (i.e the Hesitating Mindsets) a social swift will be required. One way or another, mobile learning has been already "landed" in the educational landscape and it is expected to alter dramatically the way people, students and teachers learn, react, communicate and interact with the educational material and each other. A whole new set of pedagogical theories, of instructional design guidelines and teaching and learning practices will emerge in the near future, pointing to more skilled and effective tutors and students who will use Augmented Reality in the same way that overhead projectors are currently used in the classrooms.

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