Mobile Communication Devices as a Tool of Educational Process: a Brief Reference to Indian Scenario

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Abstract
Mobile technology has opened various avenues for education. M-learning is a new way of learning, in which mobile devices including handheld tablets, PDA, mobile phones, symbian and smart phones are used for teaching-learning purposes. It makes learning portable, spontaneous, effective and exciting. We can record the lectures, read E-books, provide feedback, access internet, multimedia materials, and practical exercises and use software for educational purpose. This paper discusses the concept of M-learning and examines its significance in education. The paper explores the challenges of M-learning and examines the present trends of M-learning in India.

[**Keywords**: Mobile technology, M-learning, E-books, internet, mobile devices]

Introduction

We live in an era of information and communication technology (ICT) owing to the revolution in the field of digital technology, in which mobile technology occupies a vital role. The impact of new technology that is growing rapidly at present is affecting many sectors, including the field of education. ICT provides an interesting learning environment, the virtual classroom that allows users to participate in the learning process without travelling and let people interact from different places. The tools used are numberless; they range from video-conferencing, internet with hypertexts, interactive learning objects, audiovisual materials, forum, instant messaging, blogs, whiteboards, wikis, ipod etc. They all offer synchronous and asynchronous communication. But in recent time there has been a sort of 'revolution'. People are being more and more attracted by mobile phones; the majority of the people have got at least one mobile phone. Students use them, even at school, in the classroom despite school regulations against their use during lessons.

ICT in education covers a wide spectrum and it is being used widely in different education segments. The main areas of development are infrastructure development (connectivity and hardware), teacher training, technical support, content development, curricula and pedagogical approaches. For most developed countries, the infrastructure is in place and progress has been made along the most of the other dimensions. Digital tools, such as laptops and interactive whiteboards, are in increasing use in classrooms. Content has made the shift from replicating existing material in digital formats, to creating new types of content that maximise the format and align with curriculum and learning objectives. In short, ICT becomes transformative when it begins to change and enhance teaching and learning. A few countries are achieving this to an extent, but many hit a barrier when it comes to making this leap. Some countries that are less developed in terms of more traditional ICT in education might see the potential of going straight to mobile as a way of realising this.

Mobile Education takes place when a student uses a portable device, such as a smartphone, netbook or tablet to access content or to interact with other learners, and with teachers. It has the advantages of enabling learning to take place anytime and anyplace and of providing a more personalised and motivating learning experience. The increasing availability of the smartphone, tablets, gaming handsets and other handheld devices is beginning to present a compelling learning platform available to a significant proportion of the education market.

The evolution of the Internet application especially, has heralded certain new ways of communication between educators and learners in the educational system, especially in higher education institutions. Adult peoples are largely adopters of new technologies and that why most of the students and teachers have their own mobile phones. As far as the use of these tools in education is concerned, not all courses are suitable for a mobile learning (M-learning) environment, but short courses are considered suitable for this kind of learning. The use of quizzes, glossaries, the interaction with tutor and other peers, may satisfy a wide range of needs and aims on behalf of students. Communication takes place through e-mails, SMS, MMS, and it is important for students to provide a feedback on their progress. We can record lectures, read e-books, provide feedback, access Internet; multimedia materials, practical exercises and use software for enhance learning. We may say it is an advanced and revolutionary device for E-learning. Mobile learning is used to support, or as an element of, E-learning. Mobile learning is less restrictive because it allows learning to occur anywhere and anytime. It is informal or opportunistic, as well as private, situational, and unstructured. It is in development, as we are still at the early stages of using mobile devices to create learning opportunities.

The Concept of M-learning

Over the past decade there have been numerous definitions of the concept of “mobile learning” (M-learning). Some have attempted to include laptops as relevant devices for mobile learning, while others have argued that the user experience – both in terms of content possibilities and use-cases – means that including laptops as mobile learning devices muddies the concept. While that might have been an easy response when we only had phones, PDAs (Personal Digital Assistance), and laptops to consider, what of the Apple iPad and similar tablet devices? They are more mobile and have smaller screens than laptops, but are less ubiquitous than mobile phones, and in several respects have an essentially different overall user experience. There are number of different definitions of mobile learning. M-learning is described as E-learning through mobile computational devices. Alternative definitions emphasizes on the mobility of the learner, rather than the device. It is a novel concept which makes learning portable, spontaneous, effective and exciting. The most important feature of M-learning is it decreases limitation of learning location.

Why M-learning

The interest in mobile learning has come from a number of places. These are as follows:

- Advances in technology and high levels of mobile phone penetration have made mobile devices the ideal targets for mobile learning applications;
- It is as important to have behavioral change as well as technological change; social norms are rapidly evolving and for most people the benefits of the mobile phone now outweigh its disadvantages. Educators need to tap into the new behaviours and technologies rather than trying to change or resist them.

- Participants coming to business schools have their own mobile devices and there is a need to provide more flexible opportunities for study that build in some choice in how participants will use technology;
- Participants have increased expectations and are depending on technology to help them fit learning into their complex, demanding lives;
- An increasing number of employers and organizations are already making use of mobile learning;
- Mobile devices offer an effective way of increasing participation and engagement;
- Mobile devices can support pre and post-programme learning;
- Busy participants can use their mobile devices to extend their opportunities to learn.

Significance of M-learning

Mobility: One of the basic significance of M-learning is that it decreases limitation of learning location; it focuses on the mobility of learner and learning. Mobile devices can be used anywhere, and any time, including at home, college, or even in traveling. Mobile phone's size, weight and wireless network connectivity give it fully functional mobility which allow learning to occur anywhere and at anytime.

Capability of computer: Substantially mobile devices have many of the functional capabilities of modern computers, especially smart phones, symbian and PDA phone devices, which help learner to support various learning software of M-learning.

Data storage capacity: Basically mobile phone memory comes in two different types. Inbuilt memory called internal memory and expendable memory called external memory. Both memories can be used to data storage; we can save our important data or files on memory card. There are so many mobile phones available today which support 2Gb up to 32 Gb memory card, which helps learner to store, edit and share educational data or files for M-learning.

In fashion: Basically young students are largely adopters of new technologies because novelty has its place in life. Today's mobiles are not just a communicative device of students for many it is a part of life. Young students use the mobile phone as a way of expressing their sense, style and luxurious life, in this way mobile phones are now became a symbolic tool of fashion.

Cheap in Price: At the beginning mobile was considered a luxury. The price of a handset and call rates was beyond the reach of an ordinary person, but in present condition price fall, increasing demand and liberalization in government policy have given rise to mobile revolution. Generally mobile devices are cheaper than desktop computers which concern as basic accessory for E-learning. It is easier to accommodate several mobile devices in a classroom than several desktop computers.

Frequent Connectivity: Connectivity is the most important fetcher of M-learning. With the help of a strong connectivity network, one can connect and interact with each other. There are various mobile applications like Bluetooth, Wi-Fi, infrared which help user to connect with other devices and users. It offers an interactive learning experience where learners can interact with each other.

Easy to Use: Today mobiles are became a very handy device. It is easier to carry everywhere, we can access information, take photographs, record our thoughts with one device,

and we can share these with our friends, colleagues which make mobile phone as user as friendly and personal device.

Sharing Capacity: Basically, all the multimedia mobile phones have the capacity of transferring information between mobile to mobile or mobile to PC. A USB cable is a fast and reliable data transfer method between a phone and a PC. A serial cable is a reliable connection method between a phone and a PC. Infrared connects mobile device wirelessly to PC or other mobile device within a short range. Bluetooth wireless technology connects mobile device wirelessly to PC or other mobile device within a short range. In this way these connections help learner to exchange data with other people and gain considerable knowledge.

Best Multimedia Device: Mobile devices are not a single utility tool but it is a multi-utility device which engages learners through providing rich media content like music, videos, games and other entertaining and informational content which make it best multimedia device.

M-learning Applications

Mobile devices can be used for a range of learning activities, relating different types of learning. Few of these are:

Educational E-books and E-courses accessed through portable devices: Aptara's 2011 research revealed that of the 1,350 publishers surveyed worldwide, 84% either already produce e-books or plan to do so in the near future. As educational content is digitized, consumers are simultaneously learning more through their mobile phones. For example, Urban Planet Mobile, a leading provider of English-learning services over mobile phones, has over 100,000 subscribers in Indonesia.

Learning Management Systems (LMS) and authoring tools: Educators are using LMS to manage content and lesson plans and customize them using built-in authoring tools. There is also a demand for standalone authoring tools free of any particular LMS provider, and tools such as Apple's iBooks author are already generating significant interest.

Game-or simulation-based learning tools: These applications integrate curriculum with augmented or virtual reality-based environments, helping students understand and learn in exciting ways. Students in vocational courses also rely on simulation-based applications to learn processes and concepts. For example, plumbers can learn to fix taps through simulations.

Collaboration tools: Networking platforms allow users to generate content and share and discuss it with a larger group. Mobile phones make this possible in real time, allowing users to get immediate feedback. Collaboration tools, often embedded within the LMS, represent a rapidly growing product category and help educators and learners to keep in touch with colleagues. Ultranet, a student-centered learning environment, allows students, teachers and parents to connect and collaborate to improve learning outcomes.

Adaptive assessment services: Educators can now assess students' understanding using wireless assessments on handheld devices. These provide real-time updates on individual student progress, allowing educators to track class progress and tailor instruction for students requiring remedial support. In addition to wireless generation, parametric provides wireless assessment services.

Test preparation support: Students worldwide take standard tests such as the SAT, GRE and GMAT. Instead of traditional study groups and practice tests, they now often use mobile-based mock tests with built-in guidebooks and applications. Candidates can compare their performance with thousands of others. A growing number of test preparation products are targeting developing regions, where inadequate higher education capacity drives much higher competition and hence demand for these services.

Distance tutoring and homework support: Many developed Asian countries such as Japan and South Korea demand extensive supplementary education support outside the classroom—driving almost 10% of the total expenditure on education. MegaStudy and TutorVista are just two of the online services bringing together tutors from around the world to help students around the clock and understand their curriculum and complete their homework. Many apps like Tutor PRO, 2x2 Tutor, which are compatible with portable devices, are already targeting the supplementary spend.

Key Challenges of M-learning

A number of critical challenges must be addressed that unleash the educational potential of mobile technologies. Among these few of are:

Negative aspects of mobile learning: Cognitive, social, and physical challenges must be surmounted when mobile devices are incorporated into children's learning. Disadvantages include: the potential for distraction or unethical behaviour, physical health concerns; and data privacy issues.

Cultural norms and attitudes: Though many experts believe that mobile devices have significant potential to transform children's learning, parents and teachers apparently are not yet convinced.

No mobile theory of learning: currently, any widely accepted learning theory for mobile technologies has been established, hampering the effective assessment, pedagogy, and design of new applications for learning.

Differentiated access and technology: Wide diversity among mobile technologies represents a challenge for teachers and learners who wish to accelerate academic outcomes as well as the producers who seek to facilitate such learning.

Limiting physical attributes: Poorly designed mobile technologies adversely affect usability and can distract children from learning goals. Physical aspects of mobile technologies that may prevent an optimal learning experience include: restricted text entry, small screen size, and limited battery life.

Initiatives Required from Educational Sector

The initiatives for the inclusion of mobile learning in mainstream education and training are:

1. Enrolment of mobile learning students in courses on the institution's official prospectus. This is essential for incorporating mobile learning into the mainstream. If the mobile learning course is not included in the institution's prospectus and listed as available for student enrolment it remains peripheral with the status of a research project in an

isolated university department and cannot be considered as part of mainstream provision.
2. Enrolment of mobile learning students into fee-paying courses. This is applicable to countries in which fees are payable for enrolment in further and higher education courses.
3. Enrolment of mobile learning students into accredited courses. As happened in the field of distance education and then in E-learning, the achievement of accreditation for mobile learning is an indication that the sector has entered into the mainstream.
4. Motivate students to use mobile devices judiciously for learning purposes.
5. Campus should be made Wi-Fi enabled for location independent.

Present trends of M-learning in India

M-learning in India at present is still in its infancy. However, the future promises to be an exponential market. There exists future possibility for this market to register double-digit growth. Acceptance in India will happen on account of the need of access for learning material due to the shortage of time, the ubiquity of power-point presentation tutorials, e-books, videos, etc., as learning objects as these are being adopted in schools and educational institutions as a preferred media for teaching and learning. Some notable M-learning examples in India are:

- Popular IT training institutes like Aptech Learning Services have already developed this platform in order to meet the present educational needs of corporates and institutions. Currently, some institutions are catching up with this trend just for selling their services, but there are institutions like Educomp's Millennium schools, which use the Virtual Classroom at www.wiziq.com for teaching remotely to students who cannot physically attend classes.

- Major mobile manufacturers such as Nokia, Sony Ericsson and Motorola have tied up with service providers like Airtel, Vodafone and others to provide mobile content, which also includes learning content. Companies that specialize in content aggregation provide the actual content. Mobile value added service (VAS) providers develop the mobile technology and delivery. Most of these companies have already launched their services pan in India and even GRE exams are available on the M-learning platform.

- Various training and learning related content for organizations, educational institution, etc. pushed to users through mobile application over SMS, USSD, etc. by Spice, Tata DoCoMo etc.

- As far as Indian universities are concerned, HP has awarded a 'Technology for Teaching' Grant to Jadavpur University, Kolkata to transform teaching on the campus. The university will receive technology such as HP tablet PCs, external storage and optical drives, wireless networking cards and printers, as well as a stipend for staff to work on projects that they will have to complete in 15 months. This project is already in an advanced stage. HP is helping Jadavpur University to establish an M-learning centre where students taking M. Tech. course in distributed and mobile computing can access content using handheld devices. The university already has a digital library, and a content management and development system using an M-learning authoring tool. Students will be able to tap a server-based open source wireless laboratory, built on existing laptop computers and wireless technology. M-learning not only helps in teaching learning process, it is useful for student support too. Recently, IGNOU has implemented

SMS alert facility whereby all important notifications, news, bulletins etc are texted to the learners.

- M-learning is also seen as an additional tool to spread literacy in India beside conventional training programs, as presently mobile penetration in India is second only to radio and television. This is also possible because handset manufacturers in India are increasingly providing local language support to increase their geographical reach and penetrate existing market better. Most of the entry- and mid-market handsets available in India support user interfaces in Hindi, Marathi, Gujarati, Tamil, Bengali, Kannada, Malayalam, Telugu and Punjabi.
- Libraries have been changing their role from the storehouses of information to providing access to information. Various digitization initiatives are being undertaken. The government of India with the collaboration of C-DAC (Centre for Development of Advanced Computing) aims at bringing one million books of digital library at the doorsteps of the common citizens. Several projects like the NSDL (National Science Digital Library) and Vidya Vahini projects are under way. Vidya Vahini aims to connect government and government aided secondary schools in India. INFLIBNET, NIC, NISCAIR, NASSDOC, NISSAT, ICHR, INDEST, DELNET, UGC, Universities, government bodies and IITs are providing information through e-journals, e-books as well as databases on Internet.

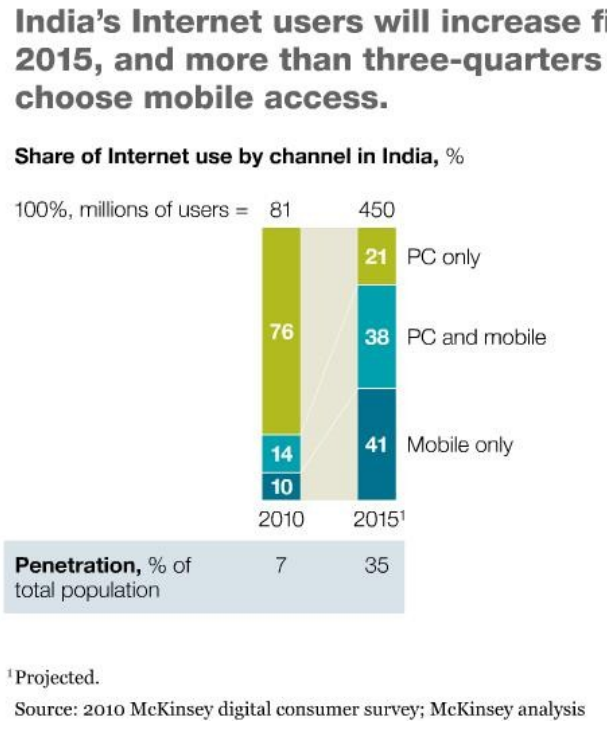

Figure 1

It is a well-known fact that mobile learning hasn't yet picked up steam within India. The primary reason for this is the low rates of mobile Internet penetration in our country. If India's latent demand is unleashed, McKinsey research forecasts that the total number of internet users will increase more than fivefold, to 450 million, by 2015 (Figure- 1). Total digital-content consumption will double, to as much as $9.5 billion. Including access charges, revenues from

total digital consumption could increase fourfold, to $20 billion-twice the expected growth rate of China. Other influencing factors are also falling into place, with prices of handsets and costs of accessing the network going down. If this pans out as predicted, it would sidestep a number of hurdles relating to providing cheap internet access across a large; it would automatically helps in spreading education across the country also.

Conclusion

As we progress through the 21st Century, and the already hectic pace of our lives increases, society will need to find faster and more inventive ways to utilise previously unproductive time. Lifelong learning will be essential for maintaining a competitive advantage in the global economy, for personal growth, and for simply functioning efficiently in an increasingly technological environment. With an increasing requirement to conduct learning activities independently, the ability to read, comprehend and understand our learning processes, will be key factors in our successful development and our ability to function in the 21st century. These requirements and skills can be improved through the use of M-learning. The Indian educational industry is in evolving stage. India might well be one of the leading countries to adopt M-learning in coming years owing to the number of young users. Moreover, the mobile services in India are quite affordable; even an ordinary person can own and use a cell phone. Added to this is the fact that India happens to have one of the largest populations in the 18 years to 28 years age group. Naturally, the shift from 'd-Learning' to 'e-Learning' and now from 'e-Learning' to 'm-Learning' will be the next big wave, which will revolutionize the education in India.

Notes & References

Bhat, A., "Mobile Learning Has A Promising Future in India" (Available Website: http://www.upsidelearning.com/blog/index.php/2011/05/18/mobile-learning-has-a-promising-future-in-india, 10/10/12)

Bist, S. R., "ICT Enabled Development and Digital Divide: An Indian Perspective", *5th International CALINER-2007*, Panjab University, Chandigarh, 08-10 February, 2007

Bondarenko, V., "Mobile Communication Technology as a Tool of Educational Process", *International Journal "Information Technologies and Knowledge"*, Vol. 1, 2007, pp- 78-80

Carina, P. S., Trudi, W and Emily, T., "Going Mobile in Executive Education", *Research on UNICON,* November 2011 (Available Website: http://www.uniconexed.org/2011/research/UNICON-Going_Mobile_In_Executive_Education-Schofield-Taylor-West-Nov-2011.pdf, 12/10/12)

Dhaliwal, K. R and Joshi, V., "Mobile Phones- Boon to Rural Social System", *Literacy Information and Computer Education Journal (LICEJ),* Volume 1, Issue 4, December 2010, pp-261-265

Distance Education in IGNOU- Best Courses and Trends, "India Vidya", (Available Website: http://indiavidya.com/distance-education-in-ignou-best-courses-and-trends/--, 13/10/12)

Johari, M. S. S and Ismail, I., "Mobile Phone as a Tool for Future Education", *International*

Journal of Network and Mobile Technologies, Vol. 3, Issue 2, 2012, pp- 11-18

Luvai F. Motiwalla, "Mobile learning: A framework and efaulation", *Computer and Education*, 49, 2007, pp- 581-596 (Available Website: www.elsevier.com/locate/compedu, 13/10/12)

Mugurel, P., "Mobile Learning Detractors", *Economy Informatics*, Vol. 10, No. 1/2010, pp- 53-62

"m-Learning supplements e-Learning" by Nivedan Prakash (Available Website: http://www.expresscomputeronline.com/20081117/market03.shtml, 13/10/12)

Patil, Y. S and Sawale, A., "Prospective of M-Learning System to Enhance Balwadi (Pre-School) Teachers Education", *ZENITH International Journal of Business Economics & Management Research*, Vol. 1, Issue 3, December 2011, pp- 238-243

Pisey, S., Ramteke, P. L and Burghate, B. R., "Mobile learning exploring the challenges and opportunities of distance education", *World Journal of Science and Technology*, 2012, pp- 19-23

Sevari, K., "The Role of Mobile Phones in Education and Instruction of Classroom Materials", *Advances in Education*, Vol. 1, No. 1, January 2012, pp- 19-22

Shuler, E. M., "Pockets of potential Using Mobile Technologies to Promote Children's Learning", January, 2009, (Available Website: http://www.joanganzcooneycenter.org/upload_kits/pockets_of_potential_1_.pdf, 12/10/12)

Stone, T., "Enterprise Mobile Learning and Development", A Guide for CLOs and Training Managers (Available Website: http://www.trainingindustry.com/media/3579534/element%20k%20enterprise%20mobile%20learning%20and%20development.pdf, 15/10/12)

"Transforming learning through mEducation", McKinsey&Company (Available Website:http://www.mckinsey.com/locations/india/mckinseyonindia/pdf/Transforming_learning_through_mEducation.pdf, 14/10/12)

Vijay, P and Sakthivel, R., "A Study on Application of Information and Communication Technology in Education, *International Journal of Social Sciences & Interdisciplinary Research*, Vol. 1 No. 5, May 2012, pp- 110-113

Wikipedia. www.wikipedia.org

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