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## Technical Evaluation Report

### ***63. Mobile Learning in Developing Nations***

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#### **Abstract**

This paper looks at the diffusion and applications of mobile phone technology in Asia and Africa, compared with North America. It indicates that Asian distance education can be the global leader in the development of educational uses for the mobile phone; and it considers the potential for mobile learning in Africa and other developing regions. The paper concludes that it would be a serious disservice to learners and instructors if Asia and Africa were to cast their lot with Web-based learning. By comparison, mobile phone technology is widespread, easy to use, and familiar to learners and instructors.

**Keywords:** Mobile learning; mobile phones; Asia; Africa; North America; distance education

#### **Introduction**

Distance education (DE) in Asia is at a crossroads. It has to choose whether or not it wishes to follow western practices, which will entail increased investment in e-learning methods, or whether it wishes to find its own path and explore new delivery methods that are more suitable for learners in the region. Reliance on e-learning initiatives does not appear to be the best path for distance education in Asia at present. Korea and China, two of the continent's more developed nations, have reported that the implementation of Internet-based learning has been fraught with problems (Baggaley & Belawati, 2007): e.g., lack of proper course monitoring; lack of adequate feedback to students; poor instructional design; poor training for instructors; lack of necessary technology; lack of Internet accessibility; lack of online resources; high costs; and lack of credibility for online degrees, in general.

If the so-called 'developed' nations of Asia are unable to properly implement e-learning projects, what hope is there for the lesser developed nations of Asia and the world? While many developing nations find Internet-based e-learning unsuitable for their needs, mobile learning methods – specifically those involving the use of cell-phones for both formal and informal learning – hold great promise for them. The technology is more affordable; learners are familiar with it; and with proper instructional design it promises educational opportunities with an increased flexibility for learners, satisfying the 'anytime/ anywhere' component of DE for thousands if not millions of learners.

## Mobile Phone Diffusion in Asia

Prensky (2004), as cited in Attewell (2005), stated there were approximately 1.5 billion mobile phones in the world. Salaberry and Upton (2007) placed the number as high as 2.5 billion. In the week that the current *IRRODL* report went to press, the total number of mobile phones was reported as reaching 3.3 billion, or half of the world's population (Economist.com, 2008). The fact that mobile phone diffusion is relatively high in China and Korea – as well as Japan and the other developed nations in Asia – should come as no surprise. China is the largest global market for mobile phones. Harwit (2004) wrote that, at the beginning of 2004, China had almost 270 million mobile phone users. Thornton and Houser (2004) reported that by the beginning of 2000 “nearly 60 million Japanese . . . constantly carried mobile phones” (p. 4). Macao and Hong Kong both have well over 100 mobile phone subscribers per 100 people; while Korea has over 80 mobile phone subscribers per 100 people (UNESCAP, 2007).

When these figures are compared with the mobile phone figures in North America the rate of diffusion in Asia appears more startling still. Wijayanto (2006) observes that cell-phone penetration in Asia stood over 700 million units, compared to fewer than 400 million cell-phones in the Americas *combined*. While Asia is already the world's leading consumer of mobile phones, its usage will continue to grow; and the Asia-Pacific market will expand by over 45 per cent by 2010 (ETForecasts.com, 2008). It is not merely the cell-phone's diffusion in the Asian ‘tiger’ nations that is surprising, however. Its penetration in the lesser developed countries of Asia has also been appreciable. Malaysia, Thailand, and the Philippines all have more than 50 subscribers per 100 people (UNESCAP, 2007), figures that compare favourably with mobile phone penetration in the United States – approx. 70 subscribers per 100 people (Chafe, 2008). Indonesia and Mongolia each have over 20 subscribers per 100 people (UNESCAP, 2007). For all of these lesser developed nations, the number of subscribers per 100 people is considerable in relation to the average gross domestic product (GDP) per capita.

Why have cell-phones become so popular in Asia? According to Gizmocafe.com (2005), a “total lack of any unified standard in North America has stunted the growth of hand-held technologies and services available on this side of the world” (§ 1); secondly, the lack of a unified standard in North America has curbed “the growth and development of the 3G digital wireless networks and [cell] phones that could allow high speed data transfers from anywhere” (§ 1). Kaplan (2006) finds that 3G systems “provide considerably higher bandwidth than current phones, and . . . include images, Internet access, and videos” (p. 9).

Thirdly, North Americans remain strong adopters of Internet technology at the expense of mobile phones. Dholakia and Dholakia (2004) stated that Canada and the United States “are positioned relatively low in terms of mobile phone adoption” (p. 1392). This trend dates back for a decade. The United Nations Development Programme (1999), as cited in Ngini, Furnell and Ghita (2002), reported that in 1998, North America – with less than 5 per cent of the world's population – had 50 per cent of its Internet users. This figure was contrasted with that of South Asia, home to over 20 per cent of all people, but with less than one per cent of the world's Internet users.

Mobile phone diffusion is not nearly as high in Africa as in Asia. Wijayanto (2006) indicated that cell-phone penetration in Africa was just under 76 million units. But it is on the rise. Polikanov and Abramova (2003) stated that Tanzania had surpassed the United Kingdom in number of mobile operators, that mobile phones exceeded land line telephones in Rwanda and Somalia, and that “mobile communications have doubled the share of the population with access to a telephone” in Zimbabwe (p. 46). Hamilton (2003) observed the same phenomenon in Morocco,

and that almost all of the African countries have access to mobile service with many having “at least two operators, one of which is usually privately owned” (p. 125). Privatisation of the telecommunication industry is considered essential for widespread diffusion.

## **Mobile phones and Education**

The use of mobile phones in education in Asia has increased in the last few years. Whattananarong (2005) states that “the term ‘m-learning’ has gained serious currency in describing wireless-enabled learning strategies and processes across the entire gamut of instructional delivery” (p. 2). Graduate students at King Mongkut’s Institute of Technology, North Bangkok, used mobile phones to participate in tests, and more than 90 per cent of the participants owned the mobile phones themselves. The students sent short message service (SMS) messages to a given telephone number in order to respond to quiz questions shown on a projector screen. Student scores among the mobile phone users were the same as those of the traditional test takers. Meanwhile, Thornton and Houser (2004) studied the use of mobile phones in Japan to teach English as a Second Language (ESL). They reported that mobile phones in Japan outnumber PCs five to one, and that while 43 per cent of Japanese students use a computer to send email, 99 per cent of their subjects transmitted email on their mobiles. Thornton and Houser concluded that, in situations where class time for the courses is limited, there is a real need to provide extra-curricular learning opportunities.

In relation to SMS design, Whattananarong (2005) indicated the need for short, clear and concise data entry; and Ring (2001), as cited in Thornton and Houser (2004), advanced the idea that “Web-based course material should be decomposed into small pages that can be easily read on small mobile screens” (§ 18). When English vocabulary lessons were set-up using the email and SMS functions of mobile phones, the students’ response was overwhelmingly positive. Thornton and Houser concluded that 71 per cent of students liked receiving lessons on their mobile phones better than on the PC; 93 per cent found mobile phones to be valuable for teaching; and 89 per cent wanted to continue using their mobile for educational purposes. Learning results were positive also, with an average of 6.5 English words learned using the SMS method, compared with only 3 words learned using a PC.

More recently, Ramos, Trinona and Lambert (2006) observed that educational uses of mobile phones are increasing dramatically in the Philippines. They state that “with dropping prices and increasing functionality, it is virtually certain that not too far into the future, all students will have a cell-phone”, and the University of the Philippines Open University already has formal SMS-based mobile courses in English, math and sciences. The need is discussed for development of non-formal SMS-based courses. Ramos and colleagues report that 80 per cent of students surveyed embrace the idea of learning through SMS. While the cost of an SMS message for non-formal education would be higher than that of a regular SMS, 81 per cent of the students sampled “said they would set aside a portion of their load credits to learn through SMS” (p. 74).

There is also a commitment from the government of Mongolia to developing an efficient tele-communications network (Batchuluun, 2007). Telecommunication liberalisation there coupled with partial privatisation have resulted in increased competition, and the mobile phone market has seen a huge boom. With a dispersed population as in Mongolia, mobile phones need to be explored as an educational tool. Cost is an important factor for SMS educational use, and for Mongolian adult learners, SMS is a less expensive, popular alternative to landline telephones. The English for Special Purposes Foundation (ESPF) in Mongolia has developed English units for waiters and bank tellers that via SMS messages, and has reported that 94 per cent of learners are

willing to use SMS for learning English (Batchuluun, 2007), while a majority (67%) say they were willing to spend 35-50 per cent of their SMS units for learning English. Batchuluun concludes that mobile phones “can be a vital resource in developing countries . . . The programming and development of SMS content and the cost of access must be carefully considered, and a good balance found between providing adequate learning content and charging no more than students are willing to spend” (p. 125).

The educational use of mobile phones is also gaining momentum in Africa. Visser and West (2005) wrote that in South Africa less than 11 per cent of the population owns a landline telephone whereas 90 per cent of the country’s population has access to telephones due to the widespread use of cellular telephones. Brown (2003) studied the use of mobile phone support at the University of Pretoria in South Africa, and reported that mobile learning “has already started to play a very important role in e-learning in Africa,” and that the growth of m-learning “has brought e-learning to the rural communities of Africa to learners that we never imagined as e-learning learners just a few years ago” (p. 11). Brown observed that responses to information provided via SMS messages were “in mass and almost immediate” (p. 9), and that, without the use of SMS, “posted information would have taken between 3 and 18 days . . . to reach all the students” (p. 9). A particular benefit reported by Brown's study was the value of bulk SMS messaging, which resulted in a saving 20 times greater than when the postal service was used to distribute information to learners. The use of mobile phones for bulk SMS mailing has also been employed in Kenya, for in-service teacher training (Traxler & Dearden, 2005). Kenya, as much of sub-Saharan Africa, has poor physical infrastructure, and in response to this problem, Kenya has developed “lively and energetic mobile phone networks.” Traxler and Dearden also reported that SMS “is not frozen . . . enabling topical content and responses to emergencies and contingencies” (p. 7). The system “can be used peer-to-peer, in local decentralized groups” (p. 7), and is socially inclusive.

## **Conclusions**

Just as North America has been the driving force behind Internet-based distance education, Asia will play the leading role in mobile learning (i.e., m-learning), particularly with respect to the educational use of mobile phones. Qiu and Thompson (2007) write that the leap in mobile phone diffusion in the late 1990s was coupled with “the impressive production capacity of Asia as the world’s leading manufacturer of mobile handsets and accessories” (p. 897). In a study of mobile communication in Japan, Ito, Okabe and Matsuda (2005), as cited in Qiu and Thompson, stated that it “is more likely to be influenced by local uses and the surrounding contexts as opposed to the personal computer (PC)-based immersive technology experienced typically in the West” (p. 897). Qiu and Thompson extrapolated this argument to the entire Asian region, arguing that “Asia offers excellent cases for the exploration of something one may call ‘mobile modernities’ – i.e., a particular set of technological, social and cultural realities that are supplementary and antithetical to the singularly conceptualized ‘Internet modernity’” (p. 898). Asia will continue to be the driving force in educational uses of the mobile phone for the foreseeable future owing to its willingness to band together under a unified digital network. The Global System for Mobile Communications (GSM) is the standard for digital mobile network in Asia. In North America, the lack of a unified digital network and the reliance on an analogue system has prohibited 3rd-generation (3G) mobile phone diffusion. GSM allows Asian learners to download “video to their cell phones from pay services, while North Americans are largely scratching their heads over the curiosity of downloading content to a mobile device” (Gizmocafe.com, 2005, ¶ 2).

There is clearly great promise for the use of mobile phones in education in Africa also. As a DE delivery mode, SMS has already proved to be cost-effective and efficient. Visser and West (2005) noted that the next generation of mobile phones “have started to include full Internet access and introduce an ‘always on’ cellular technology which enables the cellular telephone user to access the Internet directly” (p. 120). Two of the driving forces for mobile phone technology in developing countries will be the development of the under US \$20 handset and 3G network expansion (ETForecasts.com, 2008). With increasing cell-phone penetration, the use of SMS in both formal and non-formal education can benefit learners at a fraction of the cost of other methods.

Kirkwood (1998) cautioned against letting the tail of technology wag the pedagogical dog. Internet applications in Asia can be very seductive to administrators looking to create DE courses, but they are a poor fit for the Asian region; and they are an *especially* poor fit for developing countries. Many areas of Asia and Africa are isolated from the rest of the world owing to poor geographical and physical infrastructure; and the cost of connecting these areas via the Internet is prohibitive. Dholakia and Dholakia (2004) wrote that “in regions with difficult geography or poor economic conditions, mobile networks can be designed and implemented in far quicker and cost-efficient ways than fixed networks” (p. 1393). It is vital, therefore, for DE providers in the developing world to resist the desire to adopt technology for technology’s sake. Internet-based learning may be an effective method in western countries where Internet access is more prevalent, but it has not shown its worth in Asia. In Korea and China, Web-based learning has been plagued by poor instructional design, poor instructor training, poor matching of technology with learner skills, a lack of technology, and a lack of accessibility. Korea is one of the most wired nations in the world and Internet-based learning has been strongly supported in China; so the inability of these nations to develop efficient e-learning methods should act as a deterrent for the developing nations considering a move to Web-based learning.

It would be a serious disservice to both learners and instructors if Asian and African DE were to cast their lot with Web-based learning. It is an educational medium that is a poor match for all involved. Mobile phone technology is widespread, easy-to-use, and is familiar to both learners and instructors; and Asian DE has the opportunity to be the leader in the development of the mobile phone's educational uses worldwide. Mobile phone use in DE will not only benefit learners in Asia, but can be exported to other developing and developed areas around the globe. Mobile phone diffusion in Asia particularly is spreading at a dramatic rate with the advent of cheaper handsets and better services. The unified GSM mobile network allows phones to operate in different countries and to be used for sharing images, Internet access and videos; and Asian educators can now take advantage of mobile phone ubiquity by designing educational content for use on the technology. Whether in the so-called advanced countries of Asia (i.e., Korea, Japan) or in the lesser developed nations (e.g., Thailand, Mongolia, and the Philippines), cell-phone usage for learning, has proved to be beneficial for both instructors and learners, not only as a cost-efficient method, but as an effective educational tool.

## References

- Attewell, J. (2005). *Mobile technologies and learning: a technology update and m-learning project* summary. London: Learning and Skills Development Agency. <http://www.m-learning.org/docs/The%20m-learning%20project%20-%20technology%20update%20and%20project%20summary.pdf>

- Baggaley, J., & Belawati, T. (2007). (Eds.). *Distance Education Technology in Asia*. Lahore: Virtual University of Pakistan.
- Batchuluun, B. (2007). Evaluations of distance-based delivery methods (Mongolia). In J. Baggaley & T. Belawati (Eds.) *Distance Education Technology in Asia* (pp. 118-126). Lahore: Virtual University of Pakistan.
- Brown, T. (2003). *The role of m-Learning in the Future of e-Learning in Africa?*  
<http://www.tml.tkk.fi/Opinnot/T-110.556/2004/Materiaali/brown03.pdf>
- Chafe, Z. (2008). Cell phones widely used, Internet growth slows.  
<http://www.worldwatch.org/node/5464>
- Dholakia, R., & Dholakia, N. (2004). Mobility and Markets: Emerging outlines of m-commerce. *Journal of Business Research* 57(12), 1391-1396.
- Economist.com (2008). *Halfway There: How to promote the spread of mobile phones among the world's poorest*. [http://www.economist.com/business/displaystory.cfm?story\\_id=11465558](http://www.economist.com/business/displaystory.cfm?story_id=11465558)
- ETForecasts.com (2008). *Cellular subscriber forecast by country*.  
[http://www.eforecasts.com/products/ES\\_cellular.htm](http://www.eforecasts.com/products/ES_cellular.htm)
- Gizmocafe.com (2005). *Cellular Networks: America's mobile technophobia*.  
<http://www.gizmocafe.com/handhelds/cellular-networks.aspx>
- Hamilton, J. (2003). Are main lines and mobile phones substitutes or complements? Evidence from Africa. *Telecommunications Policy* 27(1), 109-133.
- Harwit, E. (2004). Spreading Telecommunications to Developing areas in China: Telephones, the Internet and the digital divide. *China Quarterly* 180, 1010-1030.
- Kaplan, W. (2006). Can the ubiquitous power of mobile phones be used to improve health outcomes in developing countries? *Globalization and Health* 2(9), 1-14.  
<http://www.globalizationandhealth.com/content/pdf/1744-8603-2-9.pdf>
- Kirkwood, A. (1998). New Media Mania: Can information and communication technologies enhance the quality of open and distance learning? *Distance Education* 19(2), 228-241.
- Ngini, C., Furnell, S., & Ghita, B. (2002). Assessing the global accessibility of the Internet. *Internet Research* 12(4), 329-338.
- Polikanov, D., & Abramova, I. (2003). Africa and ICT: A chance for breakthrough? *Information, Communication and Society* 6(1), 42-56.
- Qiu, J., & Thompson, E. (2007). Editorial: Mobile communication and Asian modernities. *New Media and Society* 9(6), 895-901.
- Ramos, A., Trinona, J., & Lambert, D. (2006). Viability of SMS technologies for non-formal distance education. In J. Baggaley (Ed.) *Information and Communication Technology for Social Development*. (pp. 69-80). Jakarta: ASEAN Foundation.  
[http://www.aseanfoundation.org/documents/ICT4D\\_book\\_v2.pdf](http://www.aseanfoundation.org/documents/ICT4D_book_v2.pdf)



- Salaberry, R., & Upton, L. (2007). *Language assistance products support mobile advertising in underprivileged countries*.  
[http://www.edioma.com/downloads/papers/MMA\\_LanguageAssistance.pdf](http://www.edioma.com/downloads/papers/MMA_LanguageAssistance.pdf)
- Thornton, P. & Houser, C. (2004). *Using Mobile Phones in Education*. 2<sup>nd</sup> IEE International Workshop on Wireless and Mobile Technologies in Education.  
[http://ieeexplore.ieee.org/xpl/freeabs\\_all.jsp?arnumber=1281326](http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=1281326)
- Traxler, J., & Dearden, P. (2005). *The Potential for Using SMS to Support Learning and Organization in sub-Saharan Africa*. <http://www.wlv.ac.uk/PDF/cidt-article20.pdf>
- UNESCAP (2007). *Statistical Yearbook for Asia and the Pacific 2007*.  
<http://www.unescap.org/stat/data/syb2007/17-Information-and-communication-technology.asp>
- Visser, L., & West, P. (2005). The Promise of m-learning for Distance Education in South Africa and Other Developing Nations. In Y. Visser, L. Visser, M. Simonson, & R. Amirault (Eds.) *Trends and Issues in Distance Education: International perspectives* (pp. 117-129). Greenwich, CT.: Information Age Publishing.
- Whattananarong, K. (2005). *An experiment in the use of mobile phones for testing at King Mongkut's Institute of Technology, North Bangkok*.  
<http://seameo.org/vl/krisman/mobile04.pdf>
- Wijayanto, B. (2006). Using SMS methods to combat avian 'flu. In J. Baggaley (Ed.) *Information and Communication Technology for Social Development*. Jakarta: ASEAN Foundation.

