

TOWARDS THE DEVELOPMENT OF A MOBILE LEARNING MODEL FOR SMART PHONES USING STAKEHOLDERS' ANALYSIS

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Abstract: The objective of the current research is to develop a mobile learning model for smart phones which will be used by educational institutions for learning and training purposes but also for on-the-go communication for students and academics and information sharing. It would determine the important elements of mobile applications as a medium to facilitate m-Learning both in assembling responses from students and for reporting feedback to individual students. The mobile application would also integrate capabilities so the students would be able to access presentations by professionals through the 3G application in their mobile devices. They could also interact by posting their comments and sharing photos, images, voice and video through this application. The lecturer could facilitate and moderate debates while students could respond and learn without being in front of a computer. The application would also be used as a digital marketing channel for promoting Educational Programmes to potential candidates.

1 INTRODUCTION

Information and Communication Technologies (ICT) are rapidly evolving and they are being progressively included in education and training. The development of technology is placing new demands on expert knowledge, and on its use in instruction and learning.

It is now time to make the existing student resources more adaptable to their needs. Besides using the computer in their academic activities, students also have access to mobile devices which are with them wherever they may be. Academic Institutions have to be more innovative in terms of the services offered to learners and other university stakeholders and develop strategies to enhance learning and sharing capabilities and generate revenue. There is a need to take advantage of the ubiquitous mobile devices and become more market-oriented in order to attract more students.

Mobile learning can be used as an effective solution to improve communication between the stakeholders who are involved in education as well as an innovative marketing channel for promoting

programmes and educational corporate brands.

2 LITERATURE REVIEW

2.1 The Transition from e-Learning to m-Learning

In the past, distance education sought to respond to learner needs, managing to abolish geographical barriers to learning. Nowadays, in the digital era, other e-Learning solutions are needed in order to make access to information and to learning resources more flexible. It is vital to allow learners to experience reality allowing it to permeate their learning. E-Learning has a remarkable influence on learners' education. However, this is considered a "tethered" learning solution (Traxler, 2007). Over the past years another technology has emerged – mobile technology – through the use of devices such as the Personal Digital Assistant (PDA), Tablet PC, e-book, and mobile phone. Widespread ownership of these devices has allowed a new way of learning – mobile learning – which has rapidly entered

learners' and teachers' routines. Nowadays, both teachers and learners engage in mobile content production (Kukulska-Hulme et al., 2007).

Since 2000, literature on mobile learning has rapidly increased. Some believe m-Learning is used to support e-Learning, for example, when we are on the move, we can continue learning through mobile devices (Charmonman and Chorpothong, 2005). Others, like Hoppe, Joner, Millard, and Sharples (2003) assert that m-learning is e-Learning using mobile devices and wireless transmission. Although there were several attempts to define m-Learning, Sharples (2006) claims that mobile learning, as a concept, is ill-defined as it seems to be all things to all people although more recent researchers have foregrounded the mobility of the learner while others have focused on learning in informal settings. Therefore, it is difficult to develop a theory of mobile learning.

Even though there is no common ground regarding the definition of m-Learning, the combination of mobile computing and wireless technology is resulting in increasing transformations in the educational world. The m-learning revolution is underway (Cochrane, 2005).

Several academic institutions internationally have been using mobile applications for marketing and learning purposes. Most specifically, Montclair State University introduced 'Connect'; Wake Forest implemented the 'MobileU' program; Duke University supplied original iPods to faculty and incoming freshmen; Apple Inc. continues its long-standing efforts to work with schools to enable educators to use a more mobile approach to learning; finally, the International Academy of Design & Technology Online provides the capability to login and access many of the core features of the IADTOnline virtual campus.

2.2 The Need for Mobile Learning and Mobile Marketing in Education

The Global as well as the European economy is currently facing one of the deepest recessions since the 1930s (European Commission, 2009). Although there might be some evidence of improvement, recovery remains uncertain and fragile.

In the UK, for example, Government passed a new Legislation (HM UK Government, 2011) which raises student fees. However, there are serious concerns that the rise in student tuition fees in the UK from 2012 will cause a decrease in the number of prospective students. This pushes Higher Education Institutes in UK to identify and

implement innovative marketing strategies in order to reach and recruit students. The use of a mobile application for marketing purposes will enable Universities to reach easier the target audience, leading to the increase in the number of potential new students who wish to study in a Higher Education Institution in the UK.

3 DEFINITIONS OF MOBILE MARKETING

Mobile marketing is an interactive process that combines push and pull marketing activities. It receives a higher response rate compared to other marketing channels because of its two particular features: user permission and acceptance (Barnes and Scornavacca, 2004). In addition, mobile technology is advantageous because mobile devices are personalised and the use of mobile systems could provide data directly from users, with accuracy and immediacy. More specifically, m-marketing is defined as a form of marketing communication using mobile communication techniques to promote goods, services and ideas (Pousttchi et al, 2006). A similar definition comes from Dickinger et al. (2004) who claim that mobile marketing is using interactive wireless media to provide customers with time and location sensitive, personalized information that promotes goods, services and ideas, thereby generating value for all stakeholders. Finally, the Mobile Marketing Association (2008) defines Mobile Marketing as a set of practices that enables organisations to communicate and engage with their audience in an interactive and relevant manner through any mobile device or network.

4 METHODOLOGY

In order to develop the mobile application model, a large number of research theories and methods will be selected, reviewed and evaluated. During the early stages of the research, an established framework such as stakeholder analysis was used to identify and examine the interactions between organisations and constituents in external environment. A combination of qualitative and quantitative methods will be used to select primary data. The data will provide a clear insight on what type of services the university students need and will use. Interviews with professionals from the University will be conducted and will provide

answers on how the marketing mobile model will be created and used more effectively. Focus Groups could also be incorporated to collect data (i.e. students and staff) in order to know their opinions. The impact of the mobile marketing model will be evaluated through pre and post-surveys and from four aspects: 1) how students initially responded to the Mobile Application, 2) how students felt after interacting through the mobile application with fellow learners and University departments, 3) how students felt about their relationship with their instructors in the new mobile blended learning environment, and 4) mobile blended classroom effects on students' study habits. Cluster analysis will be used to measure the validity of the surveys we will be using in the evaluation study, and identify if the students chose a particular University based on the Mobile Application.

Stakeholder analysis was originally introduced by Freeman (1984) as a tool for managers to proactively engage their external environment in the face of a rapidly changing global marketplace.

Mitchell et al (1997) suggested a framework for stakeholder identification based on three criteria, namely, power, legitimacy and urgency. Stakeholder analysis has been widely applied in strategic management, corporate governance (Burgoyne, 1994; Donaldson and Preston, 1995) as well as in information systems studies.

Following Donaldson and Preston (1995) and Mitchell et al (1997), we extend stakeholder analysis to the context of Mobile Learning. Through this analysis, we seek to identify salient stakeholders, their position and potential roles. Table 1 provides a representation of the key stakeholders in mobile learning. As shown in the figure, there are five primary groups of stakeholders; Learners, Educators, Administrators, Enterprises and Community. The mobile application will enable stakeholders to interact and share educational resources more effectively as well as improve the overall communication.

4.1 Learners

This primary stakeholder has a key role in the stakeholder analysis as it requires continuous and easy access to Electronic Learning Resources within the University. It integrates various study modes (part / full time, short courses, distance / in class, etc.), types of learners (young / mature students, professionals) and different educational levels. The mobile learning application will improve the access to accurate and updated information and enhance the

learning experience by improving the interactions and overall communication among students as well as between students and academics that facilitate interactions through the 3G application. The 3G m-Learning application will stimulate the learning reflection by integrating an innovative and appealing teaching approach.

4.2 Educators

'Educators' is the second primary stakeholder and it is involved in teaching, scholarship and research activities. It liaises closely with teaching, technical and administrative staff to ensure quality in the teaching and learning environment. Through the use of innovative technologies academics could stimulate learning and teaching practices, provide enhanced learning guidance and improved administrative support which will lead to an improved learning experience. They will also support the delivery of subjects, support the setting and marking of assignments and examination papers as well as improve the feedback. The mobile application will improve the quality and variety of search tools for research purposes and improve communication with fellow researchers, colleagues, business collaborators and students. In addition, the use of an innovative technology will stimulate students' motivation for learning as well as provide support associated with student recruitment, induction and programme planning. It will also allow educators to relay information and solve problems with students who are on mobility programmes or in internship positions in far-flung placements.

4.3 Administrators

'Administrators' is the third primary stakeholder and involves a large number of services within the University. The student office provides student and staff administration support, assessment moderation and data management as well as updated information to students and staff. The 3G mobile application will enable easier access to information related to courses, academic calendar, tutorial timetable, faculty information such as address book with phone numbers, email addresses and office locations as well as creation of personalised content.

The Learning Resources intend to increase the quantity and improve the quality of books, journals and on-line resources as well as inform students and staff about research tools and guidelines through workshops and on-line tutorials. The administration

team of the library is also responsible for managing the student resources database (books, journals, etc.) and sending notifications to individuals who borrow books about return dates. They can also inform students and staff about when a publication will be available for collection once it is requested.

The 3G application will improve search capabilities for learning resources and provide an additional compact way to access audio-visual resources and electronic references. The application can integrate QR code technology to scan and borrow publications with the click of a button. The QR technology could also be used as a tracking system to locate books within the library a capability which will save significant time for librarians while trying to return books to the right shelf but also for readers who wish to find a book which might not be placed in the right shelf. The 3G applications could also send notifications about events and last minute changes in the opening times to users.

The Placement Office assists students with their specialised knowledge and contacts. This service could also include short internships, voluntary work or even a yearlong placement. The Careers Office through a combination of workshops, one-to-one advice and employer events assists students to focus their ambitions on realistic career goals and become employable. The Alumni Office reconnects with old graduates with the University to learn about Alumni career resources. In several occasions the above three units co-exist under one Department. The 3G application will enable easier interaction with companies who intend to recruit students for placements or part-full time jobs as well as provide a dynamic and interactive way to communicate with former or current students as well as potential candidates about job vacancies and training courses.

The IT Department supports the construction and maintenance of computers, portable devices and manages the University network (intranet-extranet). The Department will aim to support the development and maintenance of the mobile application, identify and solve technical problems as well as provide training to University Departments who will be involved in updating the application with content.

The Money, Welfare and International Affairs Unit supports students to tackle financial or practical problems such as health and housing or legal difficulties that may arise while studying at the University. Advisors are available for private consultation and offer personalised advice to students. In addition, students and staff have the opportunity to study abroad for a period of time as part of their degree course. The mobile application

will enable payments (e.g. student fees) through the 3G application and provide information about important dates and reminders for the various types of services. Tutorials and short videos related to mobile payments can be accessed through the application. Individuals could also access through the mobile application psychological support anonymously.

Students' Association promotes and supports campaigns and represents the student body. The application will improve students' involvement at all levels and support the representation of opinions to the Institutions decision-making bodies. Also, students will be able to sign up for clubs and societies. The Association will use the mobile application as an additional channel to inform students about freshers' fairs where national and local companies exhibit their products and services. It will also inform about support services for students, such as debt advice and counselling. Finally, it will accelerate the sign up process for a society or sports club and provide information about what is offered by the Student Association.

4.4 Government

The Government provides guidance and support to academic institutions and makes them aware of changes in the educational system. The application will reduce bureaucracy, improve communication with institutions and work as an additional evaluation channel.

4.5 Enterprises and Community

The University provides Masters Degrees, short courses and professional training to organisations as well as undertakes research projects on behalf of companies. The organisations offer placements and internships to University students as well as professionals give guest lectures to educational institutions providing information about the market and link professional knowhow to theory. The application will provide reminders about events and enable interactivity between academia, the business world and the local / global community.

5 RESEARCH FINDINGS

The proposed mobile model will enable distribution of lectures, symposiums, class materials, school news and several other data. It will enable academic

Table 1: Stakeholders' Analysis for Mobile Learning.

Internal Stakeholders	Involvement/Role of the Stakeholder within an Academic Institution	Objectives of each Stakeholder while Using the 3G Mobile Application
Learners	Require easy 24/7 access to Learning Resources (includes learning material and assessment criteria).	Improve access to accurate and updated 24/7 information, from distant locations Enhance the learning experience by improving interactions and overall communication Stimulate reflection on learning
Academics	Involved in teaching, scholarship and research activities Stimulate learning/research through the use of innovative technologies improve the learning experience.	Enhance the teaching and learning experience Improve the quality and variety of search tools for research purposes Improve communication with fellow researchers, colleagues, business collaborators and students. Stimulate students' motivation
Administrators	<u>Student Office</u> Duties involve data management, student and staff administration support, assessment moderation and management; updated information to students and staff.	Search and access information about courses, academic calendar, tutorial timetable, faculty and staff information (phone numbers, office locations, email addresses, etc.) and create favourites and personalised content.
	<u>Learning Resources</u> Maintain and improve the quantity and quality of books, journals and on-line resources as well as inform students and staff about research tools and guidelines through workshops and on-line tutorials.	Enhance audio-visual and electronic resources. Improve Search Capabilities for Library resources Integrate QR Technology Provide updated information and notifications
	<u>IT Department</u> Support the construction and maintenance of computers, portable devices and network (intranet-extranet) within the University and enable compatibility between operating systems and applications.	Support the development and maintenance of the Mobile App. Reduce bureaucratic procedures
	<u>Placement / Careers / Alumni</u> Assist students with specialised knowledge and contacts. The Careers Office provides advice and employer events.	Enable to reconnect with old graduates, stay current with the University and learn about Alumni career resources
	<u>Money, Welfare and International Affairs</u> Helps students to manage with financial, practical or legal difficulties. Advisers are available for private consultation and offer personalised advice to students.	Provide information about key dates and reminders of delayed fee payment. Payments could also be conducted through the mobile device. Tutorials and short videos could be downloaded to help students proceed with the payment. Individuals could also access through the Mobile app psychological support anonymously.
	<u>Students' Association</u> Promotes and supports campaigns and represents the student body.	It will improve students' involvement at all levels and support the representation of opinions to the Institution's decision-making bodies.
Government	Regulates and provides guidance and support to institutions	Reduce bureaucracy improve communication with Educational Institutions
Enterprises and Communities	Attend programmes and courses in Universities. Offer funding to Universities for research purposes and training opportunities to students.	Improve interactivity between academia and the corporate world

staff and students to make/take course materials with them on their mobile phones using a simple interface. Short courses could take place through a mobile device. The Sports Department could also use the service to archive the recording of sporting games and events. Besides, the brand and corporate image of the University will become stronger

following the latest developments in learning and fulfilling the needs of the new generations. The application could be used by the student office, careers office as well as the media and press office in order to create a calendar of past and future events such as workshops, seminars, conferences, open days and any other form of institutional events that

are dedicated to students and staff. The proposed research will evaluate the cognitive principles of multimedia, the means to deliver multimedia content that respects those principles, hardware requirements and identify technical and learning limitations.

The marketing team, after using this 3G business marketing model as a mean to communicate with students, will have a positive impact on building brand awareness, changing brand image, enhancing brand loyalty, providing personalised and immediate services to students anytime anywhere. In addition to promoting academic courses it will also enhance the linkage between academia and the industry. This communication between faculty and students can be established by using a variety of technologies in any mobile devices such as (IVR) Interactive Voice Response, (MMS) Multimedia Messaging Service, (SMS) Short Message Service, and (WAP) Wireless Application Protocol or mobile applications.

Using mobile applications for marketing services can take many forms depending on the objectives of both developing and using these applications. For instance, it can be used for information services such as events listing, news, enquiries because these services can make mobile users life more efficient than the past as they can be accessed anytime and anywhere. On the other hand, the success factor for information services application is customer's needs, personalisation, and content relevance. Moreover, information should be based on interests of customer and mobile users' profile. For open days in universities, location based services application can also be an effective method in using mobile application for marketing, this method can be found in many areas such as shopping, travel information, entertainment and event information. Location can be separated by the technology used such as GPS, WLAN, Bluetooth and infrared, mobile users can use mobile applications in this category in order to find location and information about products and services easily.

6 CONCLUSIONS

The above study reflects the growing recognition that priority should be given to the use of innovative technologies, for educational purposes, which will stimulate and enhance the learning experience. Mobile learning is unique in that it allows truly anywhere, anytime, personalised learning. The development of a mobile learning model for smart phones requires in depth research not only for the hardware part but also towards the development of a

learning model which will integrate a 3G application. The current study identified the stakeholders which are involved towards that process, examined their involvement in the mobile learning model and outlines their objectives. The analysis also investigates the applicability of a 3G mobile technology in the educational setting and the way it should serve in reference to the future application development.

The current research concluded that since technology plays a central role in educational institutions, in order to make them more competitive, institutions should focus on developing and improving their own resources. Institutes could take advantage of the new mobile devices and their ubiquitous characteristics in order to convert teaching and learning into an up to date experience. Moreover, all the involved stakeholders could take advantage of a mobile learning system. Therefore, institutions should focus on the benefits from this learning strategy as several supports may arise. With regards to the applicability of such a model, as it focuses on the use of personal technology to have access to institutional information, there will be ubiquitous and more widespread access information. This fact makes the development of mobile applications a very thriving and exciting initiative. The present study was developed based on the analysis of different services offered by institutions. However, each institution has its own idiosyncrasies which may require model adaptations.

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REFERENCES

- Barnes, S.J. and Scornavacca, E. (2004) "Mobile Marketing: The Role of Permission and Acceptance", *International Journal of Mobile Communications*, Vol. 2, No. 2: 128-139, 2004.
- Burgoyne, J. G. 1994. Stakeholder analysis in Cassel. C. and G. Symon (ed.), *Qualitative Methods in Organizational Research: a practical guide*. Sage, New Delhi, pp. 187-207
- Charmonman, S., & Chorpothong, N. 2005. Digital Lifestyle and the Road Ahead. Proceedings of the Fourth International Conference on eBusiness. December 5-9. Beijing, China. Retrieved October 16, 2011 from: <http://www.ijcim.th.org/SpecialEditions/v13nSP3/pdf/p2-1-8-DrSrisakdi.pdf>

- Cochrane, T. 2005. Mobilising learning: A primer for utilising wireless palm devices to facilitate a collaborative learning environment. Proceedings of ASCILITE 2005. Retrieved October 19, 2011 from: http://www.ascilite.org.au/conferences/brisbane05/blogs/proceedings/16_Cochrane.pdf
- Dickinger, A., Haghirian, P., Murphy, J., & Scharl, A., 2004. An investigation and conceptual model of SMS marketing. Paper presented at the 37th Hawaii International Conference on System Sciences HI.
- Donaldson T. & Preston L. E. 1995. The Stakeholder Theory of the Corporation: Concepts, Evidence, and Implications, *Academy of Management Review*, Vol. 20, No. 1, pp. 65-91.
- European Commission. 2009. Economic and Financial Affairs 'Economic Crisis in Europe: Causes, Consequences and Responses' Luxembourg.
- Freeman, R. E. 1984. *Strategic Management: A Stakeholder approach*. Boston: Pitman.
- HM UK Government. 2011. How much will university or college cost? London: DirectGov. Retrieved August 10, 2011 from: http://www.direct.gov.uk/en/EducationAndLearning/UniversityAndHigherEducation/StudentFinance/Gettingstarted/DG_171573
- Hoppe, H.U., Joiner, R., Millard, M. & Sharples, M. 2003. 'Guest editorial: wireless and mobile technologies in education'. *Journal of Computer Assisted Learning*, Vol. 19 pp. 255-259.
- Kukulka-Hulme, A., Traxler, J. & Pettit, J. 2007. Designed and User-generated Activity in the Mobile Age. *Journal of Learning Design*, 2 (1) pp. 52-65. Retrieved October 10, 2011 from: http://wlv.academia.edu/JohnTraxler/Papers/107884/Designed_and_user-generated_activity_in_the_mobile_age
- Mitchell, R, Agle, B. & Wood, D. 1997. Towards a theory of stakeholder identification: Defining the principle of who & what really counts, *Academy of Management Review* 22(4) pp.853-886.
- Mobile Marketing Association, 2008 'Mobile Applications' Retrieved December 13, 2011 from: <http://mmaglobal.com/mobileapplications.pdf>
- Pousttchi, K., Wiedermann, G., 2006, A Contribution to Theory Building for Mobile Marketing: Categorizing Mobile Marketing Campaigns through Case Study Research. Proceedings of the International Conference on Mobile Business (ICMB 06)
- Sharples, M. (Ed.) 2006. *Big Issues in Mobile Learning: Report of a workshop by the Kaleidoscope Network of Excellence Mobile Learning Initiative*. LSRI, University of Nottingham. Retrieved October 8, 2011 from: <http://mlearning.noe-kaleidoscope.org/repository/BigIssues.pdf>
- Traxler, J. 2007. 'Defining, Discussing, and Evaluating Mobile Learning: The moving finger writes and having writ...' *International Review of Research in Open and Distance Learning*, 8(2), June 2007. Retrieved October 28, 2011 from: <http://www.irrodl.org/index.php/irrodl/article/view/346/882>

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