International Journal of Scientific & Engineering Research, Volume 3, Issue 10, October-2012
ISSN 2229-5518

A Mobile Design Framework for Continuous Mobile Learning Environment in Higher Education

Paduri Veerabhadram[1], D de.Beer[2], Pieter Conradie[3]

Department of Information and Communication Technology

Vaal University of Technology

Private Bag X021, Andries Potgietar Blvd,Vanderbijlpark 1900, South Africa

vpaduri@gmail.com,veerabhadramp@vut.ac.za, deond@vut.ac.za,pieterc@vut.ac.za,

Abstract— This paper proposes a conceptual framework for mobile learning applications, that provides systematic support for the design of a mobile continuous learning system. It is based on a combination of the theory of continuous learning, mediated by technology, and several literature studies on mobile learning. It explores how mobile device learning application can be designed with reference to identified theories, factors and tools. The proposed framework provides support for the successful design of mobile continuous learning systems.

Index Terms- mobile learning, conceptual framework, social networks, Continuous learning.

1 INTRODUCTION

M-learning centers on the acquisition of knowledge through a mobile device and focuses on how society and its institutions can support an increasingly mobile population (macro-level), how mobile learning technology can be coupled with other forms of learning taking place in organizations and schools (meso-level), and aims for a clarification of the conditions necessary for m-learning to be successful for a learner or a group of learners (micro-level) [Sandberga, *et al*. (2011)].

Extensive attention has been focused on new learning strategies with appropriate software tools and environments ([Chun, Hwangb, Tsaib & Tsengc (2010)], [Chen, Hsieh & Kinshuk (2008)], [Yeh, Chen, Hung & Hwang (2010)]. Furthermore, the 21st century, called the 'Information Age', brought along with itself an era where computer technologies develop rapidly and become widespread among all levels of the community (Isman, 2006).

As such, Daoudi Najime (2008: 11) defines m-learning as the use of mobile technologies for learning. Jihen Malek (2008: 20) defines it more specifically as any learning that takes place when the student is not confined to a pre-determined site, or as training that takes place when the student takes advantage of the opportunities mobile technologies offer.

In this paper, we discussed the pedagogical perspectives of mobile learning in section 2. Section 3 provides a literacy review for existing systems, while section 4 outlines a framework for mobile learning. In section 5 the proposed design framework and concept for mobile learning application environment is discussed, concluding in section 6 by again highlighting the benefits and merits of mobile framework for continuous learning.

2. THE PEDAGOGICAL PERSPECTIVES OF MOBILE LEARNING

Several pedagogical approaches to learning can be identified. These include the beviourist, constructivist, problem-based, context-awareness learning, socio-cultural theory of learning, concersational learning and activity theory pedagogies.

2.1 Behaviourist Learning

F. A. Mr.Paduri Veerabhadram with the Vaal University of Technology, Vanderbijlpark,South Africa.(e-mail:vpaduri@gmail.com).

S. B. Pieter Conradie Jr., is with the Vaal University of Technology , Vanderbijlpark,South Africa.(e-mail: pieterc@gmail.com).

T. C. D de Beer is with the the Vaal University of Technology , Vanderbijlpark,South Africa.(e-mail: debeer@iclix.co.za.deond@vut.ac.za)

Within the behaviourist learning paradigm, learning is thought to be best facilitated through the reinforcement of an association between a particular stimulus and a response (drill and feedback). Mobile devices in particular can enhance the behaviourist learning process. The use of mobile devices to present teaching materials/content specific questions (stimulus), obtain responses from learners (response), and provide appropriate feedback (reinforcement) – provide 'drill and feedback' activities, fits within the behaviourist learning paradigm.

2.2 Constructivist Learning

Constructivist learning is an active process in which learners construct new ideas or concepts based on their current and past knowledge (Bruner, 1966). Within a constructivist learning framework, instructors should encourage students to discover principles for themselves, thereby transforming learners from passive recipients of information to active constructors of knowledge. Instructors must give learners an environment in which to participate in the learning process, and the appropriate tools to work with that knowledge. Mobile devices provide a unique opportunity to have learners embedded in a realistic context at the same time as having access to supporting tools. Each learner carries a networked device which allows them to become part of the dynamic system they are learning about.

2.3 Problem-based Learning

Problem-based learning (PBL) (Koschmann *et al*. 1996) aims to develop students' critical thinking skills, by giving them an ill-defined problem that is reflective of what they would encounter as a practicing professional. Throughout the process of exploring a problem, students are encouraged to identify the areas of knowledge they will require to understand the problem. The group then collects these learning issues, along with data, hypotheses and plans for future inquiry in a structured manner, which can be facilitated by shared information resources (e.g. physical or electronic whiteboard), using the collected information to develop a plan for the next iteration of problem formulation, solution, reflection and abstraction.

2.4 Context Awareness Learning

Context awareness means gathering information from the environment to provide a measure of what current phenomena occurs around learners. Activities and content that are particularly relevant to that environment can then be made available. Mobile devices are especially well suited to context-aware applications, simply because they are available in different context, and so can draw on those contexts to enhance the learning activity. Context-aware mobile devices can support learners by allowing a learner to maintain their attention on the world, and by offering appropriate assistance when required. Context awareness is being explored not just as a way to deliver appropriate content, but to enable appropriate actions and activities, for example, interactions with other learners in the same or similar contexts.

2.5 Sociocultural Theory of Learning

The sociocultural theory of learning views that learning takes place in a social context (Rogers, 2002), and the forming and re-forming of concepts need not necessarily take place only at the level of the learner, but that collaborative group work and sharing with peers can be a powerful way of confronting learners' own conceptions (pre-conceptions), contributing to the need to restructure cognitive schemas. Learning is perceived as being as much about communication as it is about content. Of course, communication is not confined to peer-to-peer. It can involve teachers, experts, experienced colleagues, workmates, friends and family.The mobile environment can make a significant contribution to this process, by facilitating the rapid access to other users at any time and in any place. By sharing content, knowledge, and experience, learners can develop into 'communities of practice' (Wenger, McDermott and Snyder, 2002). These informal discussion groups can form as and when needed to optimise the learning process. Mobile collaborative learning specific focuses on the use of mobile technologies to promote, facilitate and enhance interactions and collaborations between students. Both the capabilities of mobile devices and their wide context of use contribute to their propensity to foster collaboration.

2.6 Conversational learning

Conversation learning (Pask, 1976) describes learning in terms of conversations between different systems of knowledge. Learning is a continual conversation with the external world and its artefacts, with oneself, and also with other learners and teachers. The most successful learning comes when the learner is in control of the activity, able to test ideas by performing experiments, ask questions, collaborate with other people, seek out new knowledge and plan new actions.

The most compelling examples of conversational learning occur when mobile technology is used to provide a shared conversation space. Effective learning occurs when people can converse with each other, by interrogating and sharing their descriptions of the world. A mobile learning device can assist conversational learning by integrating learning descriptions across different locations, for example, by making connections between exhibits in a museum, or by holding the results of learning actions for later retrieval and reflection. It can also provide tools to support learning in context, such as electronic measuring instruments, maps, and reference guides.

2.7 Activity theory

Activity theory builds on the work of Vygotsky (1978, 1987) and is a way of considering learning using three features, namely, a subject (the learner), an object (the task or activity) and tool or mediating artefacts. Its central tenet is that human behaviour is situated within a social context that influences their actions. The meanings of actions are mediated by the rules of their community and the division of labour within the community, thererby influencing the ways in which participants will behave.The emphasis that activity theory places on

tools, including computer based tools, thererby mediating activities, is very helpful. This shifts the attention away from simply the interaction between computers, but to the activity as a whole. Activity theory is thus a productive way to evaluate learning environments that are rich in technology.

3. LITERACY REVIEW

A possible mobile framework is offered by Mohammad *et al*. (2007). As such, Mohammad *et al.* (2007) view their work as an extension of e-learning. Their work revolves around the idea of adapting e-learning materials for the use of mobile devices. They argue that in doing so, a number of key points have to be addressed, identifying a few dimensions that need to be adapted. The dimensions are context, user, mobile device and connectivity. Furthermore, by analyzing the context in which the mobile learning will be used, they considered the users and their characteristics as well as learners' learning strategies. Technical aspects studied included the technology environment in which the mobile learning will be operating, for example connectivity speed and cost. These technical aspects are also outlined by Sharples *et al.* (2002), Liu *et al.* (2008) and Parsons *et al*. (2007). Parsons *et al. (*2007) specify that there are four requirements for a general framework for mobile learning. They are the generic mobile environment issues, the mobile learning contexts, the learning experience and the learning objectives. The framework offered by Parsons *et al.* (2007) was generated from their research on successful mobile learning programmes. Parsons *et al*. (2007) propose a framework that could be used in designing materials for mobile learning. Sharples *et al.* (2002), Liu *et al*. (2008) again suggested that the design of a mobile learning framework should detail the entire process, from determining the environment in which it will be operating, to the steps needed in designing the actual activities. Therefore, the framework includes generic elements, as well as enhancement of the learning experience.

3.1. A mobile learning framework based on activity theory

Portraying learning as a mobile activity is not to separate it from other forms of educational activities, since some aspects of learning are fundamentally mobile in the ways outlined above. By placing mobility of learning as the objective of analysis, it might be comprehended, specifying how knowledge and learning materials can be transferred across contexts (e.g., homes and schools, delivered and managed across life transitions new technologies can be designed to support schools). Indeed, wireless devices have the potential to give instant gratification to students, by allowing them to interact with the Internet, access course materials and retrieve information from anywhere.

Mobile applications generally allow users to control or filter information flow and interaction through handheld devices. BenMoussa (2003) identified several benefits for mobile connectivity. First, mobile devices offer personalized or individualized connectivity. Second, mobile connectivity improves collaboration via real-time or instant interactivity that may lead to better decision making. Third, mobile connectivity enhances users' orientation or direction. These benefits are proved to be equally useful in improving the learning environment. Churchill and Churchill (2008) explicated that mobile technology provides five affordances, namely as a multimedia-access tool, connectivity tool, capture tool, representational tool and analytical tool. Additionally, Churchill and Churchill (2008) also state that handheld technologies for education have five potential educational benefits. First, portability, as handhelds can be taken to different locations. Second, social interactivity, as handhelds can be used to collaborate with others. Third, context sensitivity, as handhelds can be used to find and gather real or simulated data. Fourth, connectivity, as handhelds enable connection to data collection devices, and to a network. Fifth, individuality, as handhelds can provide scaffolding to the learners' approaches to investigation.

A central concern is to the understanding of how people artfully engage with their surrounding environments, thereby creating impromptu sites of learning. Sharples (2000) contends that the advances in learning and technology have facilitated setting the stage for a successful mobile learning environment. As learning has become more individualized, learner-centered, situated, collaborative, and ubiquitous, continuing technology has similarly become more personalized, user-centered, mobile, networked, ubiquitous, and durable (Motiwalla, 2007).From the concept of the activity theory, Engeström analyzes the collective activity through an expanded framework that shows the interactions between tool-mediated activity and the cultural rules, community and division of labor. Rules operating in any context or community refer to the explicit regulations, policies, and conventions that constrain activity as well as the implicit social norms, standards, and relationships among members of the community (Jonassen.2002). The community consists of the individuals and subgroups that focus at least some of their effort on the object. Division of labor refers to both the horizontal division of tasks between cooperating members of the community and the vertical division of power and status (Engestrom, 1999). Sharples *et al.* (2005) adapted Engeström's framework to show the dialectical relationship between technology and semiotics. They renamed the terms – control, context and communication – that could be adopted either by learning theorists or by technology designers (refer figure 1). Thus, based on the technological approach of the activity theory (such as mobile devices for learning), learning is mediated by knowledge and technology that act as instruments for productive enquiry in a mutually supportive and dynamically changing relationship. The mediation can be analyzed from a technological perspective of human–computer interaction, physical context and communication activities.

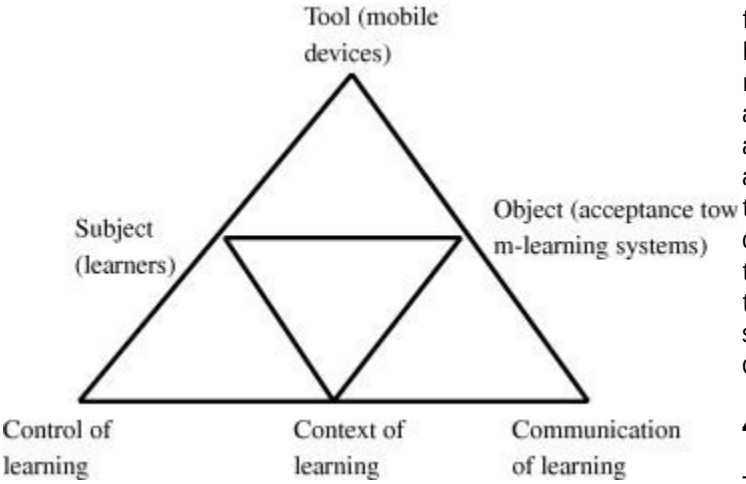

Figure 1: the technological approach of the activity theory

The control of learning may be focused on the teacher, or can be distributed among the learners. From the activity theory, control rules operating in any context or community, refers to the explicit regulations, policies, and conventions that constrain activities, as well as the implicit social norms, standards, and relationships among members of the community (Jonassen, 2002). Thus, control may also pass between learners and technology. The technological benefits are derived from the way in which learning interact with the technology, whether learners can access e-learning materials conveniently, whether they can control the learning pace and style of interaction. Thus, from the m-learning perspective, the control of learning is based on learners' self-regularity or autonomy.

From a technological perspective of context of learning, there have been some debates about whether context can be isolated and modeled in a computational system, or whether it is an emergent and integral property of interaction. Indeed, context of learning can embrace multiple communities of actors (both people and interactive technology) who interact around a shared objective. In other words, context of learning is an emergent and integral property of interaction. Thus, from the m-learning system perspective, the context of learning is based on the quality of system interactive functions, physical context, or learning content. Basically, the higher the quality of a system's functions, the more satisfaction learners have been getting. Regarding communication of learning, if a technological system enables certain forms of communication (such as email or online discussion), learners begin to adapt their communication and learning activities accordingly. As learners become familiar with the technology, they invent new ways of interacting, by creating new rules and exclusive communities. This appropriation of technology not only leads to new ways of learning, it also sets up a tension with existing technologies and practices. On a broader scale, mobile technology supports interactions and communication, such as file and information retrieving and knowledge sharing. Moreover, Arievitch (2007) states that the main educational principles originating from activity theory can be outlined as follows: first, students are active learners, not passive recipients of knowledge. Second, students acquire new knowledge within meaningful learning activities. Third, teachers have to provide adequate learning technology or tools for students' learning activities, and finally, to frame the mastery of a new activity in a series of interrelated stages. Arievitch (2007) also argues that to ensure that learned actions are effective, three psychological requirements should be fulfilled during learning, namely to ensure the action is meaningful and intelligent, to ensure the action is based on operating with cognitive tools such as signs or symbols, and to ensure the action is independent and competent.

4. FRAMEWORK FOR MOBILE LEARNING

The general requirements supplied by Sharples et al. (2005) are also shared by Parsons et al. (2007). They argue that because of the uniqueness of mobile learning, one cannot use an e-learning framework for mobile learning materials. The benefits and limitations of mobile devices have to be noted and addressed accordingly in the design of learning materials for mobile usage. There are a number of mobile content frameworks available to assist the design and development of mobile content materials. Liu *et al*. (2008) mention that there are four elements that need to be incorporated into the design of a mobile framework. Their framework was developed based on the reflections of action research from the Nokia Mobiledu Project. With mobile learning activity design as the core of the framework, the four elements include (1) requirement and constraints analysis, (2) mobile learning scenario, (3) technology environment design and (4) learner support services design, illustrated in figure 2.

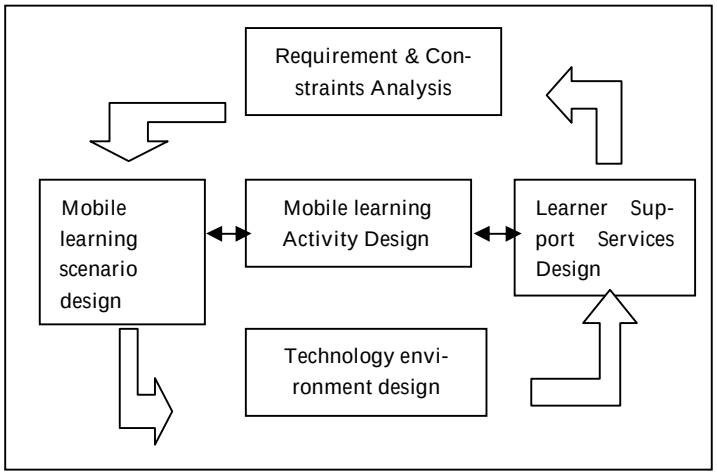

Figure 2: Design framework for mobile learning (Liu *et al*. 2008)

Requirement and constraints analysis looks at the demand for mobile learning by studying two levels of requirement analysis: the general level and the concrete level. The general level seeks to find the answers to the common features of mobile learning, the position and status of ICT in education, the potential users and existing mobile learning applications, as well as motivations and expectations. Meanwhile, requirement

analysis contemplates the users and the users' learning environment. It comprises potential users' attitudes, skills, experiences, use patterns, learning characteristics, motivations, learning tasks and possible barriers, as well as possible mobile learning situations, environment and influencing factors. Liu *et al*. (2008) emphasise that the understanding of user needs and the factors that influence their learning is crucial to the design of mobile learning activity. Mobile learning scenario is another factor that is essential to mobile learning activity design. Liu *et al*. (2008: 186) describe mobile learning scenario as describing how learners with certain characteristics in certain settings carry our various activities to achieve learning goals. Describing a mobile learning scenario requires those involved to brainstorm and translate the results onto a storyboard. Focus groups are formed to discuss various aspects of a mobile learning scenario and finally an evaluation is conducted to see the significance of mobile learning in increasing the

level of learners' motivation. Learners also need support services to increase their confidence and competencies, as well as to overcome any arising difficulties. Liu *et al*. (2008) suggest four areas that could be addressed in support services: (1) consulting services, (2) blended learning services, (3) training and (4) community support services. It is noted that the framework proposed by Liu *et al.* (2008) is comprehensive in the sense that it has taken into account all the necessary factors that concern the users, the learning itself and the environment in which the learning will operate. According to Parsons *et al*. (2007), a generic mobile environment encourages a close examination of the following: mobility, user interface, the use of a rich media and communication support. A study conducted by Dewitt (Saedah and Dewitt 2007) also demonstrates the use of text messages among secondary school students and how this promotes collaborative learning. Parsons *et al*. (2007) classify this as user roles and profiles. Parsons *et al*. (2007) categorise it as core, periphery and context. The second element proposed by Parsons *et al.* (2007) is mobile learning contexts. They categorise this element into six dimensions: (1) identity, (2) learner, (3) activity, (4) collaboration, (5) spatial–temporal and (6) facility. They place the first four as situational context for mobile learning and the last two as environmental context. Similar, to the general requirements outlined by Sharples *et al*. (2005) this involves a closer look at the users themselves and the role that they play. For example, do the users take up the role of a learner or teacher? In considering the 'learners', one is forced to look at a number of psychological factors which include learners' needs, their study preferences, motivation levels and their experience in using the devices. The last two elements proposed by Parsons *et al*. (2007) are learning experience and objectives. They noted two useful metaphors in mobile design: cinematic metaphor and the game metaphor. The former deals with story elements and narrative, while the latter deals with the features of games, such as excitement, competition and popularity.

5. RESULTS AND DISCUSSION

The present available literature was explored to identify existing mobile learning frameworks based on actvity theory, either adopted by learning theorists or by the technological approach of the activity theory. Liu et al. (2008) can be identified as comprehensive in the sense that it has taken into account all the necessary factors that concern the users, the learning itself and the environment in which the learning will operate. Based on these factors, we developed a proposed continuous mobile design framework (refer figure 3), specifically for the BlackBerry mobile, to be used among Vaal University of Technology students.

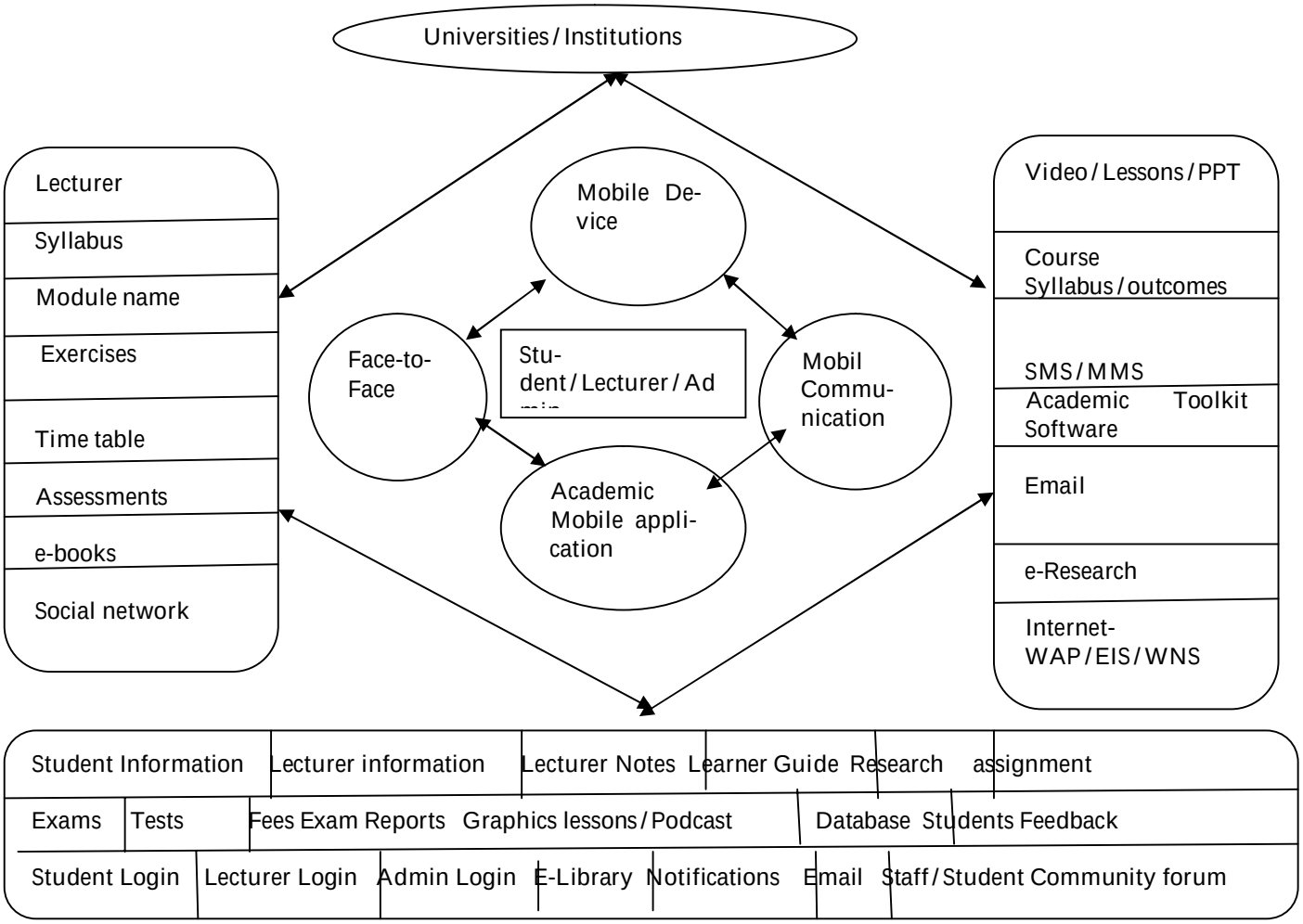

Figure 3: The design and the role of different academic tools

The process of designing and evaluating a mobile learning system revealed that the framework of an academic tool kit is important. It is, however, realized that this framework cannot be utilized in all types of the mobile learning systems. The mobile learning system is again usable in all kinds of courses offered in information technology. However, this research has not considered specific courses in information teachnology, for example software engineering or any other project based courses.

Utilizing the framework requires reviewing the structures and redistributing the actions and services, based on the course requirements. The mobile learning system is usable for those students and employees who are on the move most of the time. In this system all students and lecturers have an equal opportunity to have access to the course material and re-courses, assignments, presentation and communications, including newsgroup, chat and e-mail. Students and lecturers do not need to wait for available computers in order to perform their course responsibilities when they are on the move. A notable value for students is to have instant access to course resources whenever needed thereby enabling them to return assignments and receive feedback, and they are able to communicate with the course staff and other students. The lecturers or the system are able to provide instant feedback to students' assignments; this can be considered as an encouraging reward for students. Lecturers and other staff have direct access to students and can solve their problems in real time. The lecturers are able to inform others of any changes to the schedules almost instantly. By having direct access to the feedback database, the teacher can evaluate student progress in any course.

7. CONCLUSION

This paper discussed the factors relevant in designing a

framework for continuous education, and subsequently proposed a design framework being implemented by the authors. The factors identified are mainly from the work of Parsons *et al.* (2007). In addition, an important factor added to the research is the element of theories of learning. Especially with regard to continuous learning, it is postulated that the propsed framework will be of benefit in designing m-learning environments.

ACKNOWLEDGMENT

The authors wish to thank Mr.Roger Baxter and Mrs.Antoinette Lombard(HoD) This work was supported in part by a grant . from ICT Department.

REFERENCES

[1] ACMComputing Curricula (ACM-CC 2001): 1 http://www.acm.org/education/education/education/curric_vols/cc2001.pdf. Accessed: August 19, 008 Mahmoud, Q.H., and Dyer, A.,

[2] Integrating BlackBerry Wireless Devices into Computing Programming and Literacy Courses", 2. Proceedings of the 45th Southeast Conference, Winston-Salem, NC, USA, March 2007, pp. 495-500.

[3] Abd Rahman, H., Badusah, J. and Wahid, R. (2009) ' Penggunaan Telefon Bimbit/PDA Dalam Kalangan Pelajar Institusi Pengajian Tinggi Swasta', in Proceedings of Seminar Pendidikan Serantau ke 4 2009, UKM.

[4] Brindley, G. (1984) Needs Analysis and Objective Setting in Adult Migrant Education Program, Sydney: NSW Adult Migrant Education Service.

[5] Dewey, J. (1916) Democracy and education. An introduction to the philosophy of education, New York: Free Press.

[6] Hargreaves, A. (2003) 'Teaching in the Knowledge Society: Education in the age of unsecurity'.Online, available at http://books.google.com.my/books (accessed 1 March 2009).

[7] Knapper, C. and Cropley, A.J. (2000) Continuous learning in Higher Education. London: Routledge (Taylor & Francis Group).

[8] Keegan,D.(2002)The future of learning: From elearning to mlearning Online available at http://learning.erocsson.net/mlearning2/project_one/index.html (accessed 2 November 2007).

[9] Kukulska-Hulme, A. and Traxler, J. (eds) (2005) 'Mobile Teaching and Learning' in Mobile Learning: A handbook for Educators and Trainers, London: Routledge.

[10] Liu, H., Salomaa, J., Huang, R. and Ma, D. (2008) 'An Activity-Oriented Design Framework for Mobile Learning Experience' in Fifth IEEE International Conference on Wireless, Mobile and Ubiquitous Technology in Education: pp185–7.

[11] National Research Council (1999) How People Learn: Brain, Mind, Experience and School, Washington DC: National Academy Press.

[12] Maarschalk, J. (1988) 'Scientific literacy and informal science teaching', Journal of Research in Science Teaching, 25(2):135–46.

[13] Mohammad, H., Mohammad A., Hamdan, Z. and AboAli, A. (2007) 'A Framework for Mobile Learning Content Design', Paper presented in ICT-Learn 2007 Sixth International Internet Education Conference and Exhibition, Cairo.

[14] Parsons, D., Ryu, H. and Cranshaw, M. (2007) 'A Design Requirements Framework for Mobile Learning Environments',

Journal of Computers 2 (4) Academy Publisher.

[15] Preece, J., Rogers, Y. and Sharp, H. (2007) Interaction Design: beyond human computer interaction (2nd ed), New York: John Wiley & Sons.

[17] Prensky, M. (2001) Digital Game Based Learning,New York: McGraw-Hill.

[18] Idrus, R. and Hanafi, A. (2007). 'Lifelong and lifewide distances education'in Abdul Razak, N., Kamarul Kabilan, M. and Silong, A. D. (eds) Online Continuous learning in Malaysia: research and practice: pp1–8, Serdang: University Putra Malaysia Press.

[19] Rogers, Y and Price, S. (2004) 'Extending and Augmenting Scientific Enquiry through Pervasive Learning Environments' in Children, Youth and Environments 14(2):67–83. Online, available at www.colorado.edu/journals/cye/ (accessed 2 March 2009).

[20] Saedah, S. and Dewitt, D. (2007) 'Collaborative mobile learning' in1st InternationalMalaysian Education Technology Convention Proceed ings: pp930–5.

[21] Sharples, M., Corlett, D and Westmancott, O. (2002) 'The Design andImplementation of a Mobile Learning Resource' in Personal and Ubiquitous Computing 6:220–34.

[22] Sharples, M. (2000) 'The Design of Personal Mobile Technologies for LifelongLearning' in Computers and Education 34:177–93. Online, available at www.elsevier.com/locate/compedu (accessed 28 February 2009).

[23] Sharples, M., Taylor , J. and Vavoula, G. (2005) 'Towards a Theory of Mobile Learning' in Proceedings of MLearn Conference 2005.Onlinne available www.compassproject.net/sadhana/teaching/readings/sharplesmobile.pdf(accessed 27 February 2009).

[24] Vavoula, G. and Sharples ,M. (2001) 'Studying the Learning Practice: Implications for the Design of a Continuous learning Support System' in IEEE: pp379–80.

[25] Wan Mohd Fauzy.(2007) 'Chunking for contextual mobile learning' in 1st InternationalMalaysian Education Technology Convention Proceedings: pp457–63.

[26] Wang, Y. (2004) 'Context Awareness and Adaptation in Mobile Learn ing'presented in the 2nd International Workshop on Wireless and Mobile Technologies in Education.

[27] Thornton, P. and Houser, C. (2005) 'Using mobile phones in English education in Japan', Journal of Computer Assisted Learning, 21:217–28.

[28] Thorpe, M. (2005) 'The Impact of ICT on Continuous learning' in Perspective on Distance Education: Continuous learning and Distance Higher Education, UNESCO.

[29] Vision 2020. Online, available at www.wawasan2020.com/vision/p2.html (accessed 5 March 2009).

[30] Open University Malaysia. Online, available at www.oum.edu.my/portal/index.php?op=view&m=36&page=317 (accessed 1 January 2009).

[31] Yamat, H., Ismail, A and Alias, A. (2007) English Language Skills For Continuous learning: A Question of Acquisition or Learning? in Proceedings of International Conference on Continuous learning, Bangi: Faculty of Education,University Kebangsaan Malaysia Press.

[32] D.W.Kritt, L.T.Winegr(Eds.),Education and technology, critical perspective, possible futures, Lexington Books, Plymouth(2007), pp.49-72.

[33] Innovations in Education and Teaching International, 42 (2) (2005), pp. 111–121.

[34] BenMoussa, C. (2003). Workers on the move: New opportunities through mobile commerce. In Presented at the Stockholm mobility roundtable, May 22–23.

[35] J. Attewell, C. Savill-Smith (Eds.), Mobile learning anytime anywhere, Learning and Skills Development Agency, London (2004), pp. 35–42.

[36] Computers and Education, 50 (1) (2008), pp. 77–90.

[37] Educational Technology and Society, 11 (3) (2008), pp 153–180.

[38] Mr.Paduri Veerabhadram, Dr Pieter Conradie, Prof. M.de.Beer, Research paper is accepted for publication of Academic Tool Kit Framework Design Integrating Mobile Device fromInternational Journal of Advanced Technology& Engineering Research(IJATER) Volume 2 Issue 2, July 2012 ISSN 2250-3536.

[39] http://www.teachertechnologies.com/2010/04/some-thoughts-on-the-7-current-trends-in-ict-and-education-gary-putland/.

[40] http://research.acer.edu.au/cgi/viewcontent.cgi?article=1001.

[41] http://youtube.com/watch?v=nJ0nlh5FU5A&feature=related.