Preface

The main aim of this book is to present to education stakeholders – teachers/lecturers, principals, policy makers and researchers in education and information technology, an argument for the inclusion of mobile technologies for ubiquitous learning at all levels of education. The argument is based largely on (i) the capacity of these technologies to make a difference and innovate learning and teaching (ii) research that demonstrates benefits in learning with mobile technologies and (iii) the need for teachers to be sensitive to the upbringing and culture of today’s generation of students whose lives are very much influenced by these technologies and the easy access to the Internet.

THE INFLUENCE OF TECHNOLOGY ON SOCIETY

The assumption that computer-mediated learning will occur in the classroom, managed by a teacher, is now being challenged, not by schools and educational software developers, but by the consumer growth of personal technologies. Many children already have access to a wide range of computing and communications devices. (Sharples, 2003, p. 505)

These children are the ‘milennial’ students who have been born after 1980 (McMahon & Pospisil, 2005; Oblinger, 2003, 2004; Raines, 2002). Chansanchai (2006) describes millennials as young adults who are so attached to their gadgets and that for them, life without their mobile phones, iPods, computers or being online is unimaginable. This view of changes in people is accompanied by changes in understandings of technology. The conceptual shift over the last decade from Information Technology (IT) to Information Communication Technology (ICT) reflects a shift from IT as providing, storing and processing information to a focus on ICT’s ability to ‘strengthen and multiply communicative relationships – between ideas, especially as a feature of non-linearity and hypertext, as well as between people’ (Nixon, Atkinson and Beavis, 2006, p.133). Consistent with this, millennial students are ICT-skilled people who are frequent online users and who embrace technology in their everyday lives and use it as a central plank of their relationship building. They are networked socially through technology and stay in contact with friends, family and peers via email, mobile phones, SMS, MSN, Skype, discussion boards and chatrooms. They become part of online communities and collaborate to create and share information on the Web using Web 2.0 technologies such as wikis, blogs, VoiceThreads and video sharing sites (YouTube) and they socialise through networking sites such as MySpace and FaceBook. Nixon et. al. (2006) have argued that students’ activities outside schools embrace ICT in this manner where they are engaged in communicative networks that are not only for recreational purposes, but also for the exchange of skills and knowledge. Mobile devices further enhance Nixon et. al.’s network of a ‘multiplicity of communicative
relationships’ both formal and informal. The mobility of the devices, such as the mobile phones and PDAs with wireless capacity, provides learners with communicative capabilities and access to information and social networking sites anytime and anywhere. Lefoe and Olney (2007) assert that the research (e.g. Sharples, 2006; Seppälä & Alamäki, 2003) in recent years has shifted the focus from the (mobile) technology to the mobility of learners as those learners take advantage of the flexibility in situated learning in environments that are mobile rather than fixed at predetermined locations. In this regard, learning with mobile devices is becoming a normal part of self-directed and lifelong learning. Hence, necessary changes to best facilitate students’ learning need to be considered. In addition to content and pedagogy in curriculum design, the view that learning is a cultural activity needs to be recognized. By linking students’ learning experiences outside of educational institutions to those within the institutions’ contexts, students’ learning could be enhanced and institutions should be supportive of this.

Within the range of mobile technologies - IT devices that are portable and personal, are laptops, tablet PCs, mobile phones, iPods, MP3 players, ultramobiles, smartphones, game consoles, global positioning systems (GPS), digital cameras and recorders as well as handheld computers (also called PDAs, pocket PCs and Palm). The emphasis of this book, however, is on portable technologies that fit into the palm of a hand and are pocket sized. Because of this, most authors exclude laptops, tablet PCs and notebooks.

Research (e.g. Hardey 2007) has shown that ownership of handheld technologies, particularly mobile phones, sets the trend that defines the youth culture of today. In education, an understanding and embracing of this culture in the classroom could potentially lead to fewer mismatches between the teacher and students in terms of learning engagement with technology, potentially leading to better learning outcomes. As Kolb (2009, p. 4) said:

*Educators dismiss mobile phones, instant messaging and other popular technology communication tools as “distracting” to classroom learning. Yet if educational technology theory, research and pedagogy are reconceptualised to include the tools and knowledge that students already possess, then students will have better opportunities to connect learning inside and outside of school.*

The book attempts to reconceptualise theory, research and pedagogy of learning with mobile devices that students are familiar with. The changing nature of people connected with mobile devices and the fast-paced development of ICT and mobile technologies place growing demands on the ICT capabilities of school teachers, tertiary lecturers and teacher educators. The book will provide these and other educational stakeholders (principals, policy makers, researchers and parents) with theoretical frameworks and research-informed pedagogies for learning with mobile technologies across primary, secondary and tertiary education sectors. The chapters discuss the capacity of mobile devices for ubiquitous learning, the appropriate and just-in-time uses of these devices to bring about better learning outcomes independently and collaboratively (including internationally) in both formal and informal situations. The book provides insights into how developing countries are innovatively adopting mobile devices for their children’s learning (Chapter 8) as well as how tertiary institutions (Chapters 2, 4, 5 10 and 11) and schools (Chapters 3, 9, 12, 13, 14 and 15) are designing and implementing sound pedagogies into the students’ use of mobile and handheld devices for learning. In each case, the challenges and ongoing research are discussed.

The book provides a holistic view of research and pedagogy for using mobile technologies in education. While a number of the chapters focus on mobile devices largely as pedagogical tools, two of the chapters focus on using mobile devices as tools for research. Chapter 6 provides the framework for
using video-capture software in PDAs to capture students’ ‘thinking’ as they make use of the devices as pedagogical tools to solve problems. Chapter 7 discusses broadly the use of a suite of mobile devices to capture data and the management of a mobile, digital data collection process and its accompanying challenges in gathering, coding and archiving the research data.

As the focus of this book is on ubiquitous learning with mobile and handheld devices, the authors in the book have made attempts to define ubiquitous and mobile learning within the contexts of their research and work. The term ‘mobile learning’ tends to be used more commonly by researchers and often interchangeably with ‘ubiquitous learning’. My very brief attempt to show the relationship between these two terms in the next section sets the tone for the book.

UBIQUITOUS AND MOBILE LEARNING

Ng, Nicholas, Loke and Torabi (2010, p.43) stated the two dimensions characterizing ubiquitous learning as:

(i) it is not constrained by physical space, plans or timetables but is pervasive and occurs anywhere at anytime and (ii) as a consequence of the distributed nature of the immediate access to a variety of sources of information or means of reflecting on experiences in interaction with others, ubiquitous learning is characterized by the transformation of understanding and the ability to question experiences and information.

A dimension of the “distributed nature of the immediate access to information” is where the learning environment is equipped with technologies that could ‘talk’ with or support one another to provide the necessary information and help for the learner. In this regard, the authors of Chapters 2 and 3 present slightly varying views of ubiquitous computing environments. One view, as described in Chapter 2, is that the learning environment is fitted with context-aware facilities and objects which are adaptable to the learner’s needs in providing resources and peer-assistance. The other view, as described in Chapter 3, is the physical presence of a variety of technologies surrounding the learner which could be drawn on to complement and to enhance learning. This is particularly true at the school level where handheld devices are less sophisticated or are shared due to budgetary constraints. For example, a student with a PDA that does not have camera or video recording functions may need to work with his/her mobile phone’s camera or the school’s digital camera to capture images for a project. The dispersion of many computing devices and objects throughout the physical environment that could service one person has been described by Weiser (1991, 1996) as the third wave of computing of which we are now part. Weiser articulated the concept of ‘ubiquitous computing’ as technologies receding into the background of people’s lives such that they are being increasingly used unconsciously for various purposes. In both the context-aware and non-context aware (ubiquitous) computing environments of Chapters 2 and 3 respectively, the technologies are readily available to assist the students with their learning. In this regard, the computing is ubiquitous in that it is so embedded in the students’ lives that it “disappears” (O’Malley & Fraser, 2006) and does not occupy their attention all the time. In a ubiquitous computing environment, the student is able to make use of technology seamlessly and effortlessly for learning and to complete tasks. When computing becomes ubiquitous, it has the capacity to support ubiquitous learning.
Ubiquitous learning is able to situate the learner in both the real and virtual world, regardless of time and place, where questions encountered in the real world can be immediately answered individually by accessing and conducting research on the Internet or collaboratively through text messages, twittering or posting online. For these purposes, an important component of ubiquitous learning is mobile learning where mobile devices enable continuity in a person’s learning as a consequence of their continual access to learning resources and networks.

The meaning of ‘mobile learning’ has been defined differently by different people. The complexity involved in its definition and what education around it means have been discussed by Traxler (2009). The more technology-centred definition indicates the portability and capacity of mobile devices to enhance learning. The more learner-centred approach stresses that it is the learner who takes advantage of the opportunities offered by mobile technologies to learn while on the move between areas of life, whenever the need arises regardless of when and where. The book chapters capture mostly one aspect of ubiquitous learning, that is, through student-centred mobile learning in formal and informal settings that are structured around curriculum. The aspect of ubiquitous learning that studies how, when and what students learn informally, whether related to school curriculum or not, is a more difficult methodology and is less pronounced in the book. This is where future research work should focus.

As Stephen Heppell stated in the Foreword of this book, new and emerging technologies present challenges for education. It means that educators embracing mobile technologies in their teaching will have to rethink pedagogy, boundaries and curriculum. This book will assist them in undertaking this ‘rethink’.

OVERVIEW OF THE BOOK

The book has 15 research-based chapters that are divided into three sections. In Section I (Theories and Frameworks), various theories and frameworks underpinning mobile and ubiquitous learning are described or developed. These theories and frameworks consider the learning environments of learners using mobile technologies, personal identities of users of handheld devices and the social perspectives of ubiquitous learning. Section II (Design and Implementation) emphasises the need for careful planning and design when implementing new ways of teaching (and learning) with mobile technologies in existing learning frameworks. Section III describes innovative pedagogies and the research associated with them.

The book will provide readers with a rich collection of research-informed ideas for integrating mobile technologies into learning and teaching. Each chapter looks critically at the issues, related benefits and limitations of learning ubiquitously within the context of the research reported. Proposals for ways forward with the research in each chapter will also be made. A brief description of each chapter is given below.

Section 1: Theories and Frameworks

Chapter 1. The Digital Revolution in Education: Digital Citizenship and Multi-literacy of Mobile Technology. In this chapter, Ria Hanewald and Wan Ng review the emerging technology landscape by outlining the digital revolution and key developments that have emerged over the past two decades. The chapter contextualises the concept of mobile devices and learning in relation to the various aspects of the digital revolution: technical (online/Internet connection, Web 1.0 and Web 2.0), skills and knowledge (multi-literacies, digital citizenship), pedagogy-associated learning theories (behaviorism, constructivism, situated, collaborative and conversational) and key principles (ubiquitous, mobile and personalized use).
Chapter 2. Visualizing Knowledge Awareness Support in Ubiquitous Learning. Moushir M. El-Bishouty, Hiroaki Ogata and Yoneo Yano describe a ubiquitous computing environment called PERKAM (PERSONalized Knowledge Awareness Map) which supports learners while they are undertaking their tasks and allows the learners to share knowledge, interact, collaborate and exchange individual experiences. The application utilizes ubiquitous technologies to detect the learner’s environmental objects and location, then recommends the best matched educational materials and peer helpers in accordance with the detected objects and the current location.

Chapter 3. Ubiquitous Computing Does Not Guarantee Ubiquitous Learning in Schools: The Case of Handheld Computers. Howard Nicholas argues in this chapter that ubiquitous computing is a necessary, but not sufficient condition for ubiquitous learning. He articulates key features of ubiquitous learning suitable for school environments to develop a model that shows how the contribution of ubiquitous computing to ubiquitous learning is constrained by pedagogic frameworks that shape the relationship between handhelds, other elements of the technological suite and learning.

Chapter 4. Beyond Mobile Learning: Identity Construction and the Development of Social Awareness. In this chapter, André Caron, Letizia Caronia and Pascal Gagné assert that learning through mobile devices is a large and complex process that involves different aspects of an individual’s psychological, cultural and social development. Drawing on research involving 123 Canadian university students recruited from different disciplines, they address the two questions of: How does the use of an iPod affect the students’ identity? How does it contribute to the development of social skills and social awareness?

Chapter 5. Activity in a Mobile Learning Environment: Ubiquitous Personalised Learning Using Context and Social Presence Awareness. Ray Kekwaletswa contributes to the understanding of the phenomenon of mobile learning, where personalized learning and support is a result of social awareness activities of learners as they traverse varied learning contexts. He investigates how learners use awareness to model their actions for the provision of personalized learning support. Ray has based his theoretical framework on Activity Theory and used Contextual Inquiry methods to gather his data to explore how mobile learners use context and social presence awareness to facilitate their ubiquitous social interactions.

Chapter 6. Insights into Students’ Thinking with Handheld Computers. Wan Ng and Howard Nicholas set up a framework for the exploration of the use of the handheld computer (PDA) as a research tool for capturing students’ thinking processes as they construct representations in science and mathematics, or solve problems in these learning areas on their handhelds. By using avi-screen capture software operating in the background to do this, the research documents a non-intrusive method of capturing the verbal and screen-based (visual) elements of students’ thinking as they use the handhelds as a pedagogical tool to complete individual or collaborative tasks.

Chapter 7. Using Mobile Technologies as Research Tools: Pragmatics, Possibilities and Problems. Ria Hanewald explores the use of mobile technologies as research tools while discussing both the benefits and limitations of this mode. She maps out a practical framework for the management of a mobile, digital data collection process and its accompanying challenges, namely the potential and pitfalls in gathering, coding and archiving research data. The use of mobile technology devices and the amalgamation of hardware, operating systems, networking and software to facilitate and support this process are discussed. The lessons learned from the technical aspects underpinning fieldwork for research purposes will assist others in maximizing the potential of mobile technology to support their research projects.
Section 2: Design and Implementation

Chapter 8. Mobile Phones, Developing Countries and Learning. Many of us take for granted the availability of computers and associated technologies. For about half the population in the world, computers and the Internet are almost alien concepts. Elba del Carmen Valderrama Bahamón and Albrecht Schmidt share with us an important contribution that discusses the obstacles encountered in developing countries and different ways of overcoming them to address both the scarcity of computers and computer illiteracy in schools in developing countries. They advocate that the accessibility of mobile phones could change this situation and provide the potential to build feasible educational applications that enhance the learning experience of students in these countries to bridge the digital divide.

Chapter 9. Historic Monument Education: The Impact of a Collaborative Inquiry-based Mobile Learning Strategy on Social Relationship Development. Ju-Ling Shih, Chien-Wen Chuang and Gwo-Jen Hwang use inquiry-based models and collaborative learning principles to design and implement an inquiry-based mobile learning strategy that integrates the physical environment and digital resources to enhance elementary students’ learning about historic monuments during field studies. The use of mobile devices in the strategy enabled students to have more a customized learning pace and process while at the same time being able to get individual attention when they were dispersed in the field. The impact on students’ learning performances, learning satisfaction and social relationships are described.

Chapter 10. Implementation of Mobile Learning at the Open University Malaysia. In this chapter, Chng Loi Peng, Zoraini Wati Abas, Norlia T. Goolamally, Yuzery Yusoff and Harvinder Kaur Dharam Singh present the introduction of mobile learning at the Open University Malaysia as part of its ongoing effort to offer an effective blend of learning modes. Ensuring that potential students are ready to learn in non traditional ways that embrace new technologies (with a readiness survey) and careful consideration of the pedagogical and technical aspects were crucial for the success for the new style of teaching. The challenges identified associated with creating and delivering learning materials for mobile phones that suit various mobile operating systems and the different screen sizes of mobile phones are described.

Chapter 11. Educational Podcasts at University Campus Suffolk. Tim Goodchild and Sam Chenery-Morris present in this chapter, the introduction and development of podcasts at University Campus Suffolk (UCS). The podcasts discussed in the chapter have all been developed in relation to pre-registration health and social care courses within the Faculty of Health at UCS. The chapter describes where podcasts sit in the paradigm of mobile learning, a brief history of podcasting and the development of a model for the educational use of podcasts and their introduction and evaluation at UCS.

Section 3: Research and Innovative Pedagogy

Chapter 12. Imagine Mobile Learning in your Pocket. Cecilie Murray examines the experiences of students and teachers in a range of mobile learning projects in the K-12 environment. Four research projects highlight the experiences of students and teachers as they grapple with mobile technologies and the wireless environment, with implementation and technical issues and with learning approaches and pedagogical innovations. The projects focused on Literacy, Mathematics and cross-curricular learning with Australian primary and secondary students as well as students in international collaborative projects. The benefits and challenges are described for each mobile learning project.
Chapter 13. Using Mobile Phones for Teaching, Learning and Assessing Irish in Ireland: Processes, Benefits and Challenges. Faced with the issue of decreasing motivation of school children in the learning of the Irish language, Katrina A. Keogh outlines the processes, benefits and challenges of two pilot projects which investigated the integration of mobile phones into the teaching, learning and assessment of Irish in post-primary schools in Ireland. The pedagogy involved is a novel way of motivating students to study Irish in and outside of the classroom. The pedagogy is innovative in terms of the use of a system that sends out text messages with lists of vocabulary words/short questions and is able to record students’ oral responses in Irish for teachers to assess and provide feedback at a later time.

Chapter 14. The Pedagogy of Mobility. In this chapter, Katherine Stewart and John Hedberg consider the nature and role of field work and discuss pedagogy associated with fieldwork with a view to locating practice within a 21st century learning context. Four innovative case studies are presented to describe a variety of field work events, each employing different mobile devices and activities. General principles around the technologies, the activities and the tools that comprise the pedagogies embodied in these cases are presented.

Chapter 15. Formal and Informal Use of Handhelds by Australian and British Students: A Comparative Case Study. Bridging home and school learning is an important aspect of students’ education and this chapter explores the use of mobile devices to do this. In the chapter, Wan Ng and Stamatina Anastopoulou present a comparative study of how Year 7 (12–13 year old) students in Australia and UK with personal ownership of handheld computers used them in formal (school) and informal (home) situations and their perceptions of the usefulness of these devices for their learning. The data show that entertainment activities with the handhelds dominate both school and home use for both groups of students and that there is little continuity between the activities carried out in the school and activities in the home. Wan and Stamatina argue that schools have a responsibility to bridge home-school learning and to support these students to become self-directed learners for lifelong learning. Examples of how this could be done are presented.

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REFERENCES


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