iCollect Mobile Application for e-Portfolio: Experiences from an Instructional Design Perspective

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Abstract

The present study seeks to shed some light on a workable model of George's rapid prototype (2000) for the use and development of a mobile application for learning through an e-portfolio. In particular, this application focuses on sharing various types of artifacts, reflective journal writing and learning experiences between students and their peers in a more convenient way via mobile devices such as iPhones, iPads or Android-based smart devices. This study explores the prototype development and implementation phases of mobile accessibility on an e-Portfolio service available to the institutional community. Initially, a needs analysis of the end-users was conducted to best determine the preferences and styles of interactivity that they might expect using mobile applications. Clearly, this consideration will provide the platform with added value for the students and the lecturer alike. The resulting platform will enrich the learning and teaching experiences, as well as realising the true unleashed potential of communicating and sharing via the mobile approach. Given that the use of mobile devices for educational purposes is currently ubiquitous, the current effort illustrates best how such tools might be used to support teaching and learning processes.

Keywords: e-portfolio, mobile learning, instructional design, educational app

Introduction

In this era of technology, many academics in Malaysian higher education institutions (HEIs) have started to integrate information and communication technology or ICT, into their classrooms. This technology includes the use of mobile platforms and allows for flexibility in the learning and teaching process, both inside and outside of classrooms.

The term "mobile learning" can be defined as any sort of learning that happens when the learner is not at a fixed, predetermined location or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies (Wikipedia, 2010).

It seems timely that mobile learning is used as a part of the learning and teaching process in higher education in Malaysia. In line with the country's aspirations to become a developed, prosperous and competitive nation with first-class human capital, a document titled 'The National Higher Education Strategic Plan' (NHESP or the Malay Acronym PSPTN) was introduced by the Ministry of Higher Education (MOHE) in 2007. As stated in the NHESP (2007–2010), the transformation of higher education focuses on the development of holistic Malaysians who are intellectually creative, innovative, adaptable and capable of critical thinking. In this National Higher Education Strategic Plan, the Malaysian Ministry of Higher Education has delineated seven strategic thrusts that include "improving the quality of teaching and learning", which is thrust number 2 (Malaysian Ministry of Higher Education, 2007). Thus, the integration of technology, including mobile learning, enhances the quality of teaching and learning in Malaysian HEIs.

Problem Statement

Realising the need to offer mobile access to e-portfolio materials is a main motivating factor behind this research. The existing scenario clearly illustrates this need, wherein the utilisation of mobile devices among educators and students is currently increasing exponentially and will continue to do so in the years to come. The mobile accessibility of the e-portfolio, in this respect, is necessary, or the potential use of technology cannot be made beneficial, especially in regard to academic and education – the two areas always neglected by modernity and technology.

Research Objective

The main objective of this study is to develop a mobile application for an e-portfolio, using George's instructional design model (2000) for the step-by-step design of a rapid prototype. This mobile e-portfolio service will be made available to end-users, mainly university students and academics.

The above endeavour entails executing sub-objectives in the following stages:
1. Accessing needs and content – analysing needs from development and identifying the nature of the content in detail.

2. Setting objectives – detailing the development objectives and identifying how each of the objectives can be achieved in this research.
3. Designing – constructing a prototype through programming, debugging, sketching storyboards and designing an accurate user interface.
4. Research – utilising the prototype and performing continuous evaluation.
5. System installation and maintenance – installing the prototype through proper channels—in this case, releasing the application to appropriate vendors (e.g. the Apple store and Google Play) for commercial purposes.
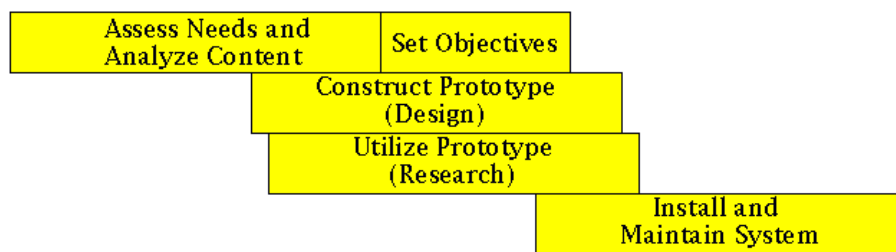
Figure 1: Rapid Prototype ID Model.

The model (as illustrated in Figure 1) allows for better communication between the designer and users right from the beginning. The feedbacks given by the users can be implemented at the earliest stages of the development of any prototype. This non-linear approach affords greater flexibility in detecting any drawbacks and defects that exist in the development stages. It is, however, appropriate to apply this model only in situations where time and costs are crucial factors (Wikibooks, 2014).

Literature Review

Mobile Learning

The notion of mobile learning as similar to other technology-based learning facilities can be attributed theoretically to various learning frameworks, including the behaviorist (Skinner, 1968), constructivist (Bruner, 1966), situated (Brown, Collins and Duguid, 1989), collaborative (Vygotsky, 1978), informal and lifelong (Eraut, 2000) models, as can the use of technology to provide teaching and learning support.

In the Malaysian scenario, based on a 2010 Malaysian Communications and Multimedia Commission (MCMC) Report, it is found that 91% of the population of 27 million subscribe to mobile phone services, compared to only 17% who subscribe to fixed lines (Universiti Kebangsaan Malaysia and Ministry of Higher Education, 2013). As such, in terms of mobile penetration in Southeast Asia, Malaysia falls second, behind Singapore (Zoraini Wati, Chng and Norziati, 2009). Together with the advent of wireless technologies and the sophisticated development of communications, the use of mobile devices has become the current trend in the learning and teaching process in classrooms. These developments have prompted academicians and researchers alike to take a pedagogical view toward developing educational applications for mobile devices to enhance teaching and learning among students. A growing body of literature has focused on several issues related to mobile learning, such as the development of mobile learning systems to enhance student learning (Chen and Hsu, 2008; Chen, Kao and Sheru, 2003; Ketamo 2003) and the effectiveness of mobile learning (Al-Fahad, 2009; Baya'a and Daher 2009; Evans, 2008; Lu 2008; Thornton and Houser 2005).

In addition, strong evidence supports the effectiveness of mobile technology in a wide range of activities for learners of all ages (Thornton and Houser, 2004; Colella, 2000; Proctor and Burton, 2003; Colley and Stead 2003). Other studies related to establishing a mobile learning foundation have focused on students' perceptions and attitudes regarding the use of this type of technology. The findings of these studies have revealed that the integration of mobile learning into classrooms generates strong positive interest among students (Rogers et al., 2010; Al Fahad, 2009; Wang et al., 2009; Cavus and Uzunboylu, 2009; Uzunboylu et al., 2009; Clarke et al., 2008). Furthermore, studies have indicated that students greatly enjoy learning via mobile devices (Rogers et al., 2010; Shih et al., 2010; Clarke et al., 2008) and they perceive themselves to be competent and at ease when using mobile devices in performing learning assignments (Guenther et al., 2008; Hsu et al., 2008). Moreover, in terms of learning flexibility and portability, the learners perceive convenience when using the mobile applications and tools (Al Fahad, 2009; Clarke et al., 2008; Cavus and Ibrahim, 2009).

E-portfolio

E-portfolios have long been used to compile students' works, which may consist of information about their assignments, artifacts, learning experiences, views and reflections on the enrolled courses. Later, the students can share, demonstrate and showcase this information with others, particularly their instructors and peers (Barrett, 2006). Applying a mobile approach in using an e-portfolio provides a more flexible learning solution and conforms to a notion of a "just in time, just enough and just for me" learning mode.

The increase in the use of mobile devices necessitates reexamination of the e-portfolio as a platform for learning. The e-portfolio systems that are equipped with mobile applications include PebblePad, PortfolioUP for Mahara, iPortfolio mobile Curtin University and Epsilen mobile (Barrett, 2012). In a mobile e-portfolio environment, Barrett posits that there are three application phases: planning, doing and reflecting. Most of the time, software used in performing these three cycles is segregated in nature. Cotterill et al. (2006) highlight how the challenges in producing a single system that combines all the three functionalities are very intricate. These challenges include the needs to support multiple platforms, match technology with pedagogy, use menus that have tick-box and pull-down styles and integrate multimedia features.

Education has embraced new mobile technology in the teaching and learning process. This notion is obvious as smartphones become more ubiquitous and equipped with enhanced capabilities for meeting today's demands. Hence, academic staff and researchers must examine the latest techniques to incorporate the functions of mobile phones into the educational lives of their learners.

iCollect **Mobile Application**

iCollect is able to accommodate "just in time, just enough, and just for me" learning. In *iCollect*, the portfolio can be composed and edited using a mobile device on the two known platforms (iOS and Android) via an intuitive mobile graphical user interface. This implementation provides ease and simplicity to the students or the users at large in working with their portfolios. The app is also equipped with several additional features,

such as bilingual capabilities (Arabic and English) and interface, and an integrated dictionary and translator tools. Additionally, not only can the app be utilised for formative assessment, as any other e-portfolios are, it can also be used as a self-advertisement tool in the form of a business card for the user.

Needs Analysis

Quantitative data collection procedures were applied during the period of this research. A sample of 38 university students (28 = males, 10 = females) studying Arabic language in the department of Arabic Language and Literature, International Islamic University Malaysia, participated. The demographic details are tabulated in Table 1.

Table 1: Demographic information of the subjects

	Male	%	Female	%
Year 2	26	68.4	6	15.8
Year 3 & 4	2	5.3	4	10.5
Total	28	73.7	10	26.3

The students were asked if they subscribed to any social networks such as Facebook, Twitter and others. The results revealed that the majority of them (97.4%) subscribed to these networks. Facebook was the most used (100%), followed by Twitter (32.4%) and others (13%). Familiarity with these networks may have a bearing on the features that the students would prefer on *iCollect*.

The same students were asked to use the web-based *iCollect*. They were then asked to rank the functional tools according to their preferences. A lower number corresponded to higher rank. Their responses are displayed in Table 2.

Table 2: Overall feedback on web-based portfolio (*iCollect*)

Functional Tools	Dashboard	Profile	Settings	Journals	Artifacts	Portfolio	Connect	Members	Questions
Preferable Rating	3	1	5	2	6	4	8	7	9

Table 2 shows that the most popular feature of the web-based *iCollect* was 'Profile', and the least was 'Questions'. They also suggested that the functional tools should be maintained or changed with minor modifications if the service is to be accessed using mobile devices. The results of the open-ended questions revealed the following outcomes:

1. Having a profile, providing detailed presentation, writing journals and sharing artifacts are the most favorable functional tools.
2. The e-portfolio should utilise the potentials of social networking in enhancing learning through sharing and collaborating.
3. The portfolio should also be able to cater to the integration of Web 2.0 tools, such as Google drive, Twitter, YouTube, etc.
4. There is a need to include language-learning tools, such as a dictionary and a translator.
5. The developed application should be conveniently accessible through both desktop and mobile, as the use of mobile devices (smartphone and tablets) is currently increasing.
6. The interface of the developed application should also be optimized for user friendliness.

Objectives

The objectives of the development are outlined in the following goals:

1. To access the functionalities needed in learning using the current designated e-portfolio website.
2. To design and develop a mobile interface on this e-portfolio website.
3. To design and develop a mobile interface for updating artifacts and communicating using the integrated communication tools on the website.

Design and Utilisation

In an education environment, e-portfolios have been generally known as electronic-based tools that are used to share various types of artifacts, reflective journal writing, and learning experiences between the students and their peers. The *iCollect* platform presented in this paper is a mobile-based *iCollect* implementation. To support its usage and provide for the needs of its users, our *iCollect* software is equipped with up-to-date features, such as social networking and web 2. 0 tool storage.

There are five main sections in *iCollect*; Profile, Journal, Artifacts, Networking, and Language Tools. These, along with their sub-features, are shown in Table 3.

**Table 3**: Sub-features under each section of *iCollect*

Profile	Journal	Artifacts	Networking	Language tools
• Profile photo • Profile biodata	• Pages entries (Web 2.0 tools) • Shared pages • Journal entries	• Pictures • Audio files • Video files • Other formats	• Friends • Find Friends • Groups • Inbox messages • Events	• Dictionary • Translator

Through the Student Profile section, users can update their profile information directly. In the Artifacts section, users can access and upload photos, videos and files, including their descriptions, to her/his portfolio. Then, in the Networking section, a user can request to become friends with another user, and he/she can also approve a friendship request from another user. The inbox messaging function enables the users to exchange messages with one another. Furthermore, integration with popular Web 2.0 tools such as Twitter and Google Drive is provided in the Journal function. The students' learning journals and collections of shared pages are also available in this section. In the Learning Tools section, integration to Google Translate functionality and other available dictionary services are made available to the students for easy access to those services.

The bilingual interface of the integrated menu in *iCollect* has been designed to the expectations to of students with Islamic and Arabic backgrounds. This design would remove some hindrances that may intimidate those users and prevent them from using the mobile app or

technology as a whole. Some screenshots of *iCollect* demonstrating these functionalities are showcased in Figure 2.
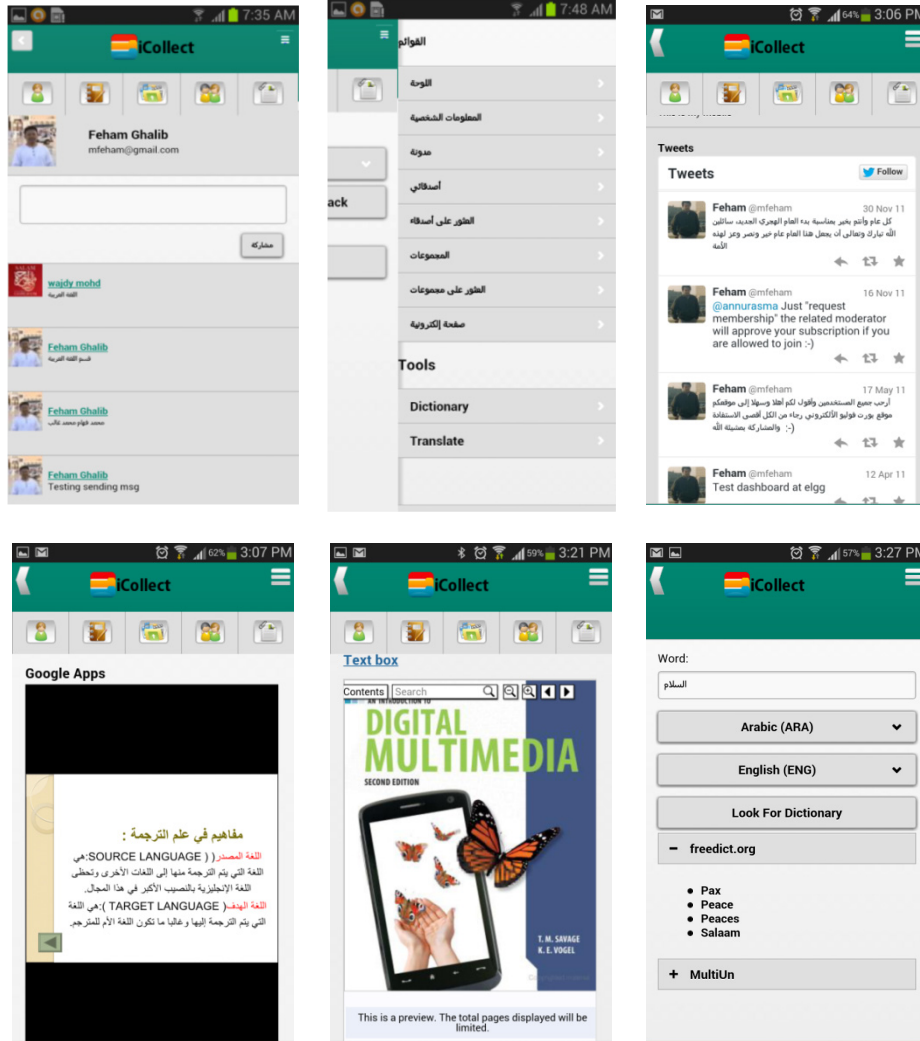
Figure 2: (in clockwise view) Dashboard, bilingual interface, Twitter feeds, Google Drive document, Google Book item and dictionary tool.

The discussion between the user and the developer has been continuously organised to establish the workability of the functionalities stated above. There are many issues that must resolved, which have developed though iterative experimentation and testing. These considerations include user

interface friendliness, functionality of the tools, social networking elements and numerous minor bugs found during the debugging process. Furthermore, a user acceptance test (UAT) was also conducted to test the workability and usefulness of the mobile app by a group of targeted users consisting of four lecturers and seven students. The UAT employed detailed procedures for testing and evaluation. The suggested views and outcomes of UAT were then taken into consideration for the overall enhancement of the app. Figure 3 below shows the detailed list of items found in the UAT, grouped according to modules. Overall, the UAT results indicated that most of the modules and sub-modules tested in the app are acceptable. There were, however, minor issues related to the profile's contact information and peer sharing pages. The developer has rectified both of these issues accordingly.

Module A: Registration
- ***iCollect* account registration**
Module B: User's Profile
- Profile's picture
- Edit profile's picture
Module C: Journal
- Create journal entry
Module D: Files
- Photo uploader
Module E: Groups
- Group options
- Inbox messaging
- Events
Module F: Page
- Page listing
- Create new page
Module G: Pages shared by me
- Sharing
- Sharing options
Module H: Dictionary
- Dictionary search
Module I: Translator
- Translate word
Module J: Help
Module K: About App
Module L: Settings
Module M: Logout

Figure 3: Modules and sub-modules of *iCollect* UAT.

System Installation and Maintenance

The designated mobile application is planned to be available on both the Apple Store and Google Play (Android). It then can be downloaded by the end-users at their convenience via their individual smartphones, and users can access their e-portfolio service at any time or place. For maintenance of the app, the developer will commit to regular updates. These updates can be deployed through the developer's account in both stores. Thus, through this process, students will automatically experience the latest version of the app.

Discussion

The need to build a bridge between technological innovations and the needs and preferences of learners persistently encourages the use of a targeted innovative tool that can trigger learning attainment, engagement, and motivation (Muhammad Sabri and Nor Aziah, 2011; Kinzie et al., 2002; Lee, 2012). In the present review, the learners' preferences are captured from the results, indicating the crucial role of some *iCollect* functions. These include the Profile, Journal, Dashboard, Portfolio and Main Interface sections. Having experimented with *iCollect*, these are the most-used functions among the learners and are equipped with a less complicated user interface for familiarity reasons. Other than familiarity, these sections are also considered places for initiating good interactions with peers and friends during the learning process. Furthermore, the integrated language learning tools (dictionary and translator tools) requested by the learners have also been taken into account via the integration of Bing Translation and a bilingual dictionary.

The step-by-step development of mobile *iCollect* via a rapid prototype model implies the necessity of harmonious integration between the aspects of technology and pedagogical/andragogical principles. This integration ensures that the learning outcomes can be made achievable and the process of teaching and learning can be carried out in a seamless and effective manner (Siemens, 2002; Kurtus, 2000). It is anticipated that the existing mobile *iCollect* will be characterised not only as a user-friendly tool but a tool that can also provide a spectrum of learning experiences from which the learners can benefit. In fact, the issue is very much needed by learners with backgrounds from Arabic and Islamic-based studies.

Conclusion

A workable e-portfolio is very pertinent to the teaching and learning processes. In addition to serving as an additional dimension of learning for the students, it also reflects a method of assessing them in formative way from the first day of the academic semester. The lack of Arabic and Islamic-oriented tools used in the technology-assisted learning and teaching environment justifies the development of the current mobile *iCollect* application. Hopefully, it will contribute significantly towards making the teaching and learning process not only efficient and effective but engaging and enjoyable to the students.

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References

Al-Fahad, F. N. 2009. Students' attitudes and perceptions towards the effectiveness of mobile learning in King Saud University, Saudi Arabi. *The Turkish Online Journal of Educational Technology* 8(2): 111–119.

Baya'a, N. and W. Daher. 2009. Learning Mathematics in an authentic mobile environment: The perceptions of students. *International Journal of Interactive Mobile Technologies* 3: 6–14.

Brown, J. S., A. Collins and P. Duguid. 1989. Situated cognition and the culture of learning. *Educational Researcher* 18: 32–42.

Bruner, J. 1966. *Toward a theory of instruction*. Cambridge, MA: Harvard.

Cavus, N. and H. Uzunboylu. 2009. Improving critical thinking skills in mobile learning. *Procedia Social and Behavioral Sciences* 1(1): 434–438.

Cavus, N. and D. Ibrahim. 2009. M-learning: An experience in using SMS to support learning new English language words. *British Journal of Educational Technology* 40(1): 78–91.

Chen, C. M and S. H. Hsu. 2008. Personalized intelligent mobile learning system for supporting effective English learning. *Educational Technology & Society* 11(3): 153–180.

Chen,Y. S, T. C. Kao and J. P. Sheru. 2003. A mobile learning system for scaffolding birdwatching learning. *Journal of Computer Assisted Learning* 19(3): 347–359.

Choo, W. H. 2010. The readiness of postgraduate students towards mobile learning. Master's thesis, Faculty of Education, Universiti Teknologi Malaysia.

Clarke, P., C. Keing, P. Lam and C. McNaught. 2008. Using SMSs to engage students in language learning. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2008*, 6132–6141. Chesapeake, VA: Association for the Advancement of Computing in Education.

Colella, V. 2000. Participatory simulations: Building collaborative understanding through immersive dynamic modeling. *Journal of the Learning Sciences* 9(4): 471–500.

Colley, J. and G. Stead. 2003. Take a bite: Producing accessible learning materials for mobile devices. Proceedings of MLEARN 2003: Learning with Mobile Devices. London, UK: Learning and Skills Development Agency, 43–46.

Cotterill, S. J., M. Angarita, P. Horner, D. Teasdale, J. Moss, S. Jones, G. Firth, S. Hennessy, A. M. McDonald, R. Fajardo, J. G. Cendales and G. Quintero. 2006. Towards the m-portfolio. A paper presented at the ePortfolio International Conference, Oxford, UK, 11–13 October.

Eraut, M. 2000. Non-formal learning, implicit learning and tacit knowledge in professional work. In *The necessity of informal learning*, ed. F. Coffield, 12–31. Bristol: The Policy Press.

Evans, C. 2008. The effectiveness of m-learning in the form of podcast revision lectures in Higher Education. *Computers & Education* 50: 491–498.

George, M. P. 2000. *Rapid instructional design: Learning ID fast and right*. San Francsico: Jossey.

Guenther, S., T.Winkler, K. Ilgner and M. Herczeg. 2008. Mobile learning with moles: A case study for enriching cognitive learning by collaborative learning in real world contexts. In *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2008*, 374–380. Chesapeake, VA: Association for the Advancement of Computing in Education.

Hsu, H., S. Wang and L. Comac. 2008. Using audioblogs to assist English-language learning: An investigation into student perception. *Computer Assisted Language Learning* 21(2): 181–198.

Ketamo, H. 2003. xTask-an adaptable learning environment. *Journal of Computer Assisted Learning* 19: 360–370.

Kurtus, R. 2000. What is e-learning? http://lomo.kyberia.net/diplomovka/webdownload/ partial/What%2520is%2520e- Learning.pdf/

Lu, M. 2008. Effectiveness of vocabulary via mobile phone. *Journal of Computer Assisted Learning* 24: 515–525.

McNaught, C., D. Leung and D. Kember. 2006. Report on the student engagement project. http://www.cuhk.edu.hk/clear/download/SEP_Report_UGCinst_Oct06.pdf/

Moreno, R. 1999. Introducing social cues in multimedia learning: The role of pedagogic agents' image and language in a scientific lesson. PhD diss., University of California, Santa Barbara.

Muhammad Sabri Sahrir and Nor Aziah Alias. 2011. A study on Malaysian Language Learners' perception towards learning arabic via online games. *GEMA Online Journal of Language Studies* 11(3): 129–145.

Proctor, N. and J. Burton. 2003. Tate modern multimedia tour pilots 2002–2003. In *Proceedings of MLEARN 2003: Learning with Mobile Devices*. London, UK: Learning and Skills Development Agency.

Richey, R. C. and J. D. Klein. 2007. *Design and development research*. New Jersey, USA: Lawrence Erlbaum Associates, Inc.

Rogers, Y., K. Connelly, W. Hazlewood and L.Tedesco. 2010. Enhancing learning: A study of how mobile devices can facilitate sense making. *Personal & Ubiquitous Computing* 14(2): 111–124.

Shih, K., H. Chen, C. Chang and T. Kao. 2010. The development and implementation of scaffolding-based self-regulated learning system for e/m-learning. *Journal of Educational Technology & Society* 13(1): 80–93.

Siemens, G. 2002. *Instructional design in eLearning*. http://www.elearnspace.org/Articles/InstructionalDesign.htm/

Skinner, B. F. 1968. *The technology of teaching*. New York: Appleton-Century-Crofts.

Thornton, P. and C. Houser. 2005. Using mobile phones in English education in Japan. *Journal of Computer Assisted Learning* 21: 217–228.

———. 2004. Using mobile phones in education. In *Proceedings of the 2nd IEEE International Workshop on Wireless and Mobile Technologies in Education*, 3–10. Washington, DC: IEEE Computer Society.

Universiti Kebangsaan Malaysia and Ministry of Higher Education. 2013. *Mobile learning: Malaysian initiatives research findings*, eds. Mohamed Amin Embi and Norazah Mohd. Nordin. Malaysia: Centre for Academic Advancement, Universiti Kebangsaan Malaysia.

Uzunboylu, H., N. Cavus and E. Ercag. 2009. Using mobile learning to increase environmental awareness. *Computers & Education* 52(2): 381–389.

Vygotsky, L. S. 1978. *Mind in society: The development of higher psychological processes*. Cambridge Mass, London: Harvard University Press.

Wang, M., R. Shen, D. Novak and X. Pan. 2009. The impact of mobile learning on students' learning behaviours and performance: Report from a large blended classroom. *British Journal of Educational Technology* 40(4): 673–695.

Wikibooks. 2014. Rapid prototyping. http://en.wikibooks.org/wiki/Instructional_Technology/Instructional_Design/Rapid_Prototyping.

Wikipedia. 2010. MLearning. http://en.wikipedia.org/wiki/MLearning.

Zoraini Wati Abas, Chng Loi Peng and Norziati Mansor. 2009. A study on learner readiness for mobile learning at Open University Malaysia. Proceedings of the IADIS International Conference Mobile Learning, Barcelona, Spain. 26–28 February.