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Shamsul Arrieya Ariffin, Azniah Ismail, Maizatul Hayati Yatim and Salman Firdaus Sidek

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An In-depth Assessment of Culturally Appropriate Design for a University Mobile Learning Educational Website (MLearn): A Malaysian University Context

Shamsul Arrieya Ariffin, Azniah Ismail, Maizatul Hayati Yatim and
Salman Firdaus Sidek

Faculty of Art, Computing & Creative Industry, Sultan Idris Education University,
35900 Tanjong Malim, Perak, Malaysia.

Abstract

The growing popularity of mobile devices, together with the constant technological improvement of mobile websites and applications. However, the particularities of mobile devices require special attention in respect of the usability aspects, such as culture. Therefore, this study evaluated the general usability and cultural aspects in terms of mobile learning for a mobile web system. The research methodology used was focus group discussions with undergraduate students. This research captured the experiences of students in using the MLearn website of Universiti Pendidikan Sultan Idris, Malaysia. This study also identified some usability challenges and suggestions for improvement, particularly in terms of culturally appropriate design principles for a local university context for a mobile website. This study affirmed that general usability and cultural principles in design are important for a usable mobile learning website system in a local university context.

Keywords: Usability, Mobile Learning, Culturally Appropriate Design

Introduction

Mobile learning is a fairly new approach in the educational paradigm where learning is concerned, particularly in respect of mobile learning websites in the Malaysian context. The mobile learning process may involve the usage of mobile devices, such as mobile phones and laptops. Mobile learning is also known as the process involving conversations across multiple contexts among people and personal interactive technologies (Shaples, Taylor, & Vavoula, 2005). In general, mobile learning concerns the accessibility to learn independently regardless of the place and time, and is facilitated by a range of mobile devices. The usage of mobile learning may also be extended to various fields and platforms including websites. Users can interact with mobile learning websites through a variety of smartphones or other Internet-capable mobile devices, all with different hardware and software. A commonly considered best practice is to perform usability tests prior to the launch of a new website to assess its user-friendliness.

Evaluation of the various applications is necessary to check the usability of a system (Preece, Rogers, & Sharp, 2011). One such technique that can be used for this is the heuristic evaluation of usability through interview sessions with the participants. Preece et al. (2011) state that an interaction tool must be a very efficient system that results in highly productive users.

Mobile Learning

Crompton (2007) defines mobile learning as “Learning across multiple contexts, through social and content interactions, using personal electronics devices”; while O'Malley, Vavoula, Glew, Taylor, Sharples, Lefrere, and Waycott (2005) define mobile learning as taking place when the learner is not fixed in a predetermined location, or when the learner “takes advantage of the learning opportunities offered by mobile technology.” Keegan (2005) suggests that mobile learning should be restricted to learning on small and portable devices. According to him, mobile devices should be portable. Meanwhile, Winters (2006) conceptualized the nature of mobile eLearning and addresses “mediated learning through mobile technology.”

The role of mobile learning in Asia is to improve access to education. Mobile learning makes education more accessible in that it enables learners to pursue their learning according to their own schedule. The portability of mobile technology means that mobile learning is not bound by fixed class times (Valk, Rashid, & Elder, 2010). Based on their research, they provided the results of six mobile learning projects that took place in several developing countries in Asia – the Philippines, Mongolia, Thailand, India, and Bangladesh. Most developing country mobile learning interventions are being undertaken in Asia, and the developments in Asia seem to indicate that the region could become the global leader in the educational use of mobile devices (Motlik, 2008). Mobile learning facilitates the design for authentic learning, meaning learning that targets real-world problems and involves projects of relevance and interest to the learner (Kukulsk-Hulme, 2007).

Hazirah and Seman (2011) said distance learning is not a recent phenomenon to Malaysians. Many individuals, especially those who are still working and aspire to be successful in their career development, enrolled for external degrees offered by reputed universities in the 1960s or earlier. Mobile learning initiatives in Malaysia are being undertaken mainly by universities, colleges, and business enterprises, and are becoming more prevalent in Malaysian society, particularly among those involved in education. According to Nordin, Embi, Norman, and Panah (2017), mobile learning is developing in Malaysia even though the practice is fairly new.

Mobile Usability and Cultural Guidelines

Nielsen (2011) defines mobile usability as a specialty in the usability field that is currently emerging. One research in the Human-Computer Interaction (HCI) field found that, to produce computer systems with the correct usability, it is important to understand the psychological, ergonomic, organizational and social factors that define how people work. Mobile usability reflects the perceived ease of navigating a site; for example, making purchases through the Internet and is considered to be a critical factor in the development of electronic commerce (Flavián, Guinalú, & Gurrea, 2006). Young (2008) proposes ideas for mobile cultural design for better usability, while Seong (2006) provides mobile learning guidelines for Malaysia but does not insist on cultural principles.

There are four (4) existing guidelines for comparison of Culturally Appropriate Design Guidelines (CADG) for mobile applications – Shneiderman’s Golden Rules of interface design (Schneiderman, 2010), Nielsen Design Guidelines (Nielsen, 2011), Human-Centred Design (ISO standard 13470), and Mobile Web Best Practices 1.0.

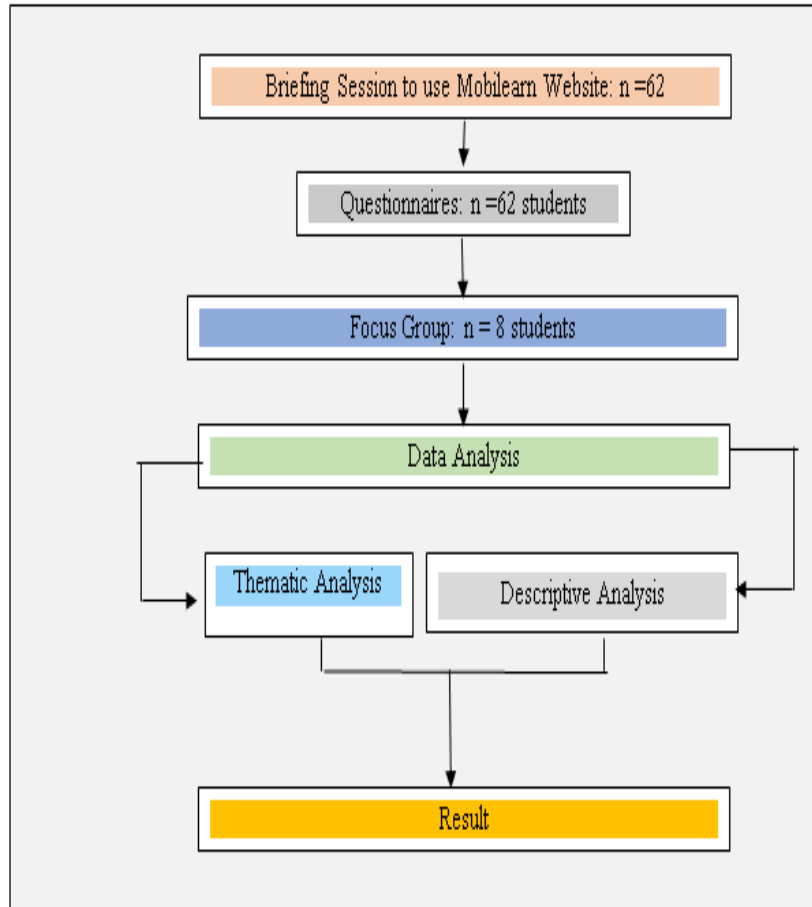
Table 1. Comparison of four existing guidelines for mobile application development with CADG

CADG	SGR	Nielsen	HCD	W3CBP
Accessibility		✓		
Consistency	✓	✓		✓
Good Ergonomic and Minimalist User Interface Design	✓	✓	✓	✓
Readability and Ease of Recall		✓		
Efficiency and Flexibility		✓		
Realistic Error Management	✓	✓		✓
Suitable Content for Local Cultural Aesthetic Value According to Local Culture		✓ (Not for Local Culture)		
Local Language				
Philosophical Values				

Methodology

This research methodology focuses on assessing the mobile learning website system of MobiLearn. MobiLearn is a UPSI web system that can be accessed through mobile phones. The participants were given one week to learn and familiarize themselves with this application. The participants’ discussions were fully documented, and face-to-face activities, such as focus groups were recorded. In addition, focus group interviews were conducted with eight (8) selected participants. Afterwards, the students’ focus group interviews were held; the session took 1 to 2 hours to finish.

Figure 1. Methodology Diagram



In Figure 1, the Methodology diagram, Thematic Analysis is one approach for assessing the meaning of the discussion data and interpreting the Culturally Appropriate Design Guideline principles. Themes were generated as they emerged from the research data. This paper only discusses the focus group discussion where the themes were generated from the qualitative data.

Table 2. Description of Every principle in Heuristic Evaluation

Principle	Description
Accessibility	Refers to the inclusive practice of removing barriers that prevent interaction with, or access to websites, by people with disabilities. When sites are correctly designed, developed and edited, all users have equal access to information and functionality.
Consistency	A harmonious uniformity or agreement among things or parts.
Good ergonomics	Design factors, as for the workplace, intended to maximize productivity by minimizing operator fatigue and discomfort.
Readability	Refers to the way in which words and blocks of type are arranged on a page.
Efficiency & Flexibility	Efficiency is a measure of how well a website does what it should do. Flexibility may refer to hardware, software, or a combination of the two. It describes a device or program that can be used for multiple purposes, rather than a single function.
Error prevention	Error prevention practices as part of application design mean implementing specific design techniques and using the capabilities of the product to help prevent system and application errors.
Suitable content	Suitable content means the content suits the culture or environment.
Aesthetic Value	Focuses on the study of the beautiful aesthetics of the user interface
Language	The system of communication used by a particular community or country.
Local philosophy	The study of ideas about knowledge, truth, and the nature and meaning of life.

The questions for the focus group discussions originated from the cultural design principles as illustrated in Table 2. Note: 'FG' = Focus Group student, for example FG1 = Student 1

Findings

This research focuses on the qualitative evaluation by the students for the Mobilearn mobile learning website system UPSI in the focus group discussions. The rationale behind the qualitative component of the study was to provide more in-depth and more contextualized insights into how people perceive the outcomes and benefits of participating in the Mobilearn mobile learning website system UPSI.

In terms of the research strategy, the qualitative focus group interviews aimed at obtaining an overall richer and more accurate picture of the participants in the Mobilelearn mobile learning website system UPSI. The data collected from the interview session and all the focus group participants were analysed and discussed. Being supported by the qualitative computations, it can be concluded that the culturally appropriate design could be improved. There were also usability challenges for students in using this new mobile learning system. Both the general usability and the cultural aspects were significant and interacted with each other and affected the mobile application for the users.

Accessibility

In terms of accessibility, sometimes students have an issue with the speed of using the Mobilelearn mobile learning website system UPSI. Such problems might arise from the application itself or from their Internet connection since the Mobilelearn mobile learning website system UPSI needs to be accessed through the Internet. Both the heuristics evaluation and focus group wanted the application to be accessible via a computer and offline.

According to FG3 – Focus Group *“...mobile app is okay, no problem for me, but when I see my friends open this system they are not successful; only a few can access it, the loading is too much, and they cannot scroll, even with a branded smartphone.”*

FG1 mentioned – Focus Group *“...to find this system in the browser is quite hard because I have tried before. I have to type specifically ‘Mobilelearn’ otherwise it will open the wrong website. This system is not like the MyGuru or MyUPSI Portals that can be found directly when entering the search. I have to type the full link for Mobilelearn then it will open the right website.”*

Consistency

The consistency usability factor appears to be one of the important factors in usability guidelines for mobile learning applications. Therefore, the navigation should be smooth. This was mentioned by FG5 – Focus Group Interview *“...image and icon are very consistent, but sometimes the icon does not function.”*

Good Ergonomic and Minimalist User Interface Design

The participants responded well to the application from the point of view of the ergonomic and minimalist user interface design. The interface of the Mobilelearn mobile learning website system UPSI was viewed as being simple and easy to understand. According to FG8 – Focus Group *“...the design is very simple for a simple student like me because it is easy to read and easy to look at; it is not too messy. For the icon, the system uses the images of students, so the user knows that the page is for students; hence, I understand what the system is going to inform.”* FG1 mentioned – Focus Group *“...so far, using this system is no problem for touch screens, everything is smooth, and nothing sticks.”* FG8 stated – Focus Group *“...there are too many touch screens, it cannot function well, and when I click the link, the link does not function. Then if I open the course material page, the page cannot connect to the next page. Sometimes the pages function but not always.”* FG5 stated – Focus Group *“...my opinion is that when the user wants to enter the password, it would be better to have a “show password” button to make it easier for the user to*

enter the right password. If it has a “show button” for the password, the user might be able to detect the wrong password and correct it, so there is no need to log in many times.”

Readability and Ease of Recall

Icons are conceptually distinct, and the interfaces are readable meaning that the users can easily navigate across the application. FG1 – Focus Group stated *“...the content of text, I’m not sure if it is okay or not because when I want to scroll down it becomes heavy and I cannot see the text content, but, before, there was no problem and I could read the page but cannot scroll down so I cannot read the text.”* According to FG2 – Focus Group *“...this system of Mobilelearn is just like the other mobile apps, it is very easy to read and clear with the presence of good icons.”* FG8 mentioned – Focus Group *“...for navigation in mobile phones, the forward button is okay, and 70% of the system functions nicely.”*

Efficiency and Flexibility

The students wanted a Mobilelearn mobile learning website system that is fast to access for immediate use. They also had issues with the speed of using the applications. The students noted that the Mobilelearn mobile learning website system UPSI application had an issue with the speed *“...mobile app is okay, no problem for me, but when I see my friends open this system they are not successful; only a few can access it, the loading is too much, and they cannot scroll, even with a branded smartphone.”* (FG5 – Focus Group), and, according to FG1, – Focus Group *“...this application is really good because like our department in UPSI we have our own website to find staff that work with UPSI; for example, I enter Dr . A., and, automatically the system recognizes and displays all the detailed information of Dr. A, which is very easy for us if we don’t remember our lecturer’s full name; for Dr A. the images are also displayed.”*

Realistic Error Management

The focus group students were concerned about the application’s lack of error function for providing users with instructions concerning how to utilize the applications. The students had an issue concerning when to use the application; *“...this happens sometimes when I want to go to the previous page, but it goes to Google, so I have to go back again to enter the home page.”* (FG7 – Focus Group). FG5 mentioned – Focus Group *“...this happens sometimes when I want to go to the previous page, but it goes to Google, so I have to go back again to enter the home page.”* According to FG1 – Focus Group *“...I think for searching lecturer information, this happens to me while I’m searching for detailed information about Mr N., then, suddenly, there is a popup message saying “please enter a minimum of 3 characters.” After successfully getting the information, the page comes back again without me entering it.”*

Suitable Content for Local Culture

The students agreed that the Mobilelearn mobile learning website system UPSI content was generally suitable for the local culture. They found the content used in this application very suitable for the local culture. According to FG7- Focus Group *“...the content is easy and simple to understand; for example, as students, we can only access the student’s page. The content is easy as we can click about UPSI if we want to know more using the UPSI logo icon. The content of the system is easy and understandable for students of diploma, degree, master, and PhD.”*

Aesthetic Value According to Local Culture

The students responded positively to the aesthetic value of the Mobilearn mobile learning website system UPSI interfaces, which were considered to be in accord with the local culture in UPSI. The graphic presentation also respects the local culture. FG4 stated – Focus Group *“...to me, the text uses easy and simple language, and is clear using the standard font of the user mobile phone.”*

The Language Used is For Local Culture

The students agreed that the Mobilearn mobile learning website system UPSI used the local language. However, some of them expressed that they wished that, since UPSI has International students, the applications were created for bilingual use. *“...to me, using English in this system is not hard because each word has an icon. When I look at the picture, then I know what the page is about. But, as we are Malaysian, we should reveal our culture of Education using Bahasa Malaysia to put in that system or make it bilingual.”* (FG8 – Focus Group). According to FG3 – Focus Group *“...to me, using English in this system is not hard because each word has an icon. When I look at the picture, then I know what the page is about. But, as we are Malaysian, we should reveal our culture of Education using Bahasa Malaysia to put in that system or make it bilingual.”* FG4 mentioned – Focus Group *“...it is really helpful and easy to understand because we are students of the university and we should know these kinds of thing.”*

FG5 stated – Focus Group *“...to me it is really helpful because we have bilingual for certain pages, like About UPSI, which I have to repeat reading as I do not understand English. So, in my opinion, maybe we can put English and Bahasa Malaysia, so users can choose either.* FG3 mentioned – Focus Group *“...the combination of language is really helpful and can improve our English and is easy to use. We also have international students, so the combination of English and the local language makes it easy for them.”*

The Local Philosophy Has Local Cultural Value

The students responded positively concerning the potential for UPSI philosophical values to be embedded with local design motifs in the mobile application interfaces. By adding local aesthetic value, it will reflect the local cultural identity. This statement is supported by students who responded *“...this system is suitable with the philosophy of education that can encourage students and also educators or teachers to be more IT literate and is in line with the philosophy of education.”* (FG1 – Focus Group) FG1 mentioned – Focus Group *“...the educational philosophy means that we have to succeed in education and this system is really helpful. Education is not just about the students but also the educators, so our education will extend to our students in UPSI.”* According to FG7 – Focus Group *“...this system is suitable with the philosophy of education that can encourage students and also educators or teachers to be more IT literate and is in line with the philosophy of education.”*

Discussion

This research presents opportunities and challenges that influence the cultural perspectives in the Mobilearn mobile learning website system UPSI. In addition, there are opportunities in mobile applications from the cultural perspective of Malaysia's development for a variety of

types of mobile application cultural content – support from the government to create mobile application cultural content, as well as student’s motivation and engagement with potential mobile application cultural content.

The lack of local content has been the main motivation and concern of this study. From the literature there is a lack of local content, and, although ‘Content is King,’ it has not materialized in terms of the mobile content in Malaysia (Lim, 2010), and there is a lack of quality educational content for Asia for Mobile learning websites (So, 2012).

Table 3. Culturally Appropriate Design Guidelines (Ariffin & Dyson, 2015)

No	Description	Culturally Appropriate Design Guidelines
1	General Usability	Accessibility
2	General Usability	Consistency
3	General Usability	Good Ergonomic and Minimalist User Interface Design
4	General Usability	Readability and Ease of Recall
5	General Usability	Efficiency and Flexibility
6	General Usability	Realistic Error Management
7	Cultural Aspect	Suitable Content for Local Cultural
8	Cultural Aspect	Aesthetic Value According to Local Culture
9	Cultural Aspect	Local Language
10	Cultural Aspect	Philosophical Values

Conclusion

The purpose of this paper was to define how user experience can be evaluated for mobile applications websites. This research has assessed the important aspects of culturally appropriate design guidelines and has evaluated a few principles of the mobile application through focus group discussions about Culturally Appropriate Design Principles (CADG) from the users (Ariffin & Dyson, 2015)

In general, the capturing of user experience is quite difficult, because there are so many different factors in terms of the user-product interaction. For evaluation, such factors should be clarified and a goal for the test defined in the test plan. This may help make the evaluation more systematic. In addition, this research focuses on the descriptive evaluation from the students for the Mobilelearn UPSI Application. This research has undergone several phases of evaluation for the cultural aspect and general usability principles, and affirmed the significance of these two major qualities for the improvement of a mobile website in the local Malaysian university context.

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