Faculty of Cognitive Sciences and Human Development

DESIGN AND EVALUATION OF MOBILE-BASED MICROLEARNING APPLICATION ON MARINE CONSERVATION

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Bachelor of Science with Honours
(Cognitive Science)
2019

UNIVERSITI MALAYSIA SARAWAK

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DESIGN AND EVALUATION OF MOBILE-BASED MICROLEARNING APPLCATION ON MARINE CONSERVATION

MICHELLE CHONG JOO CHIEN

This project is submitted

in partial fulfilment of the requirement for a

Bachelor of Science with Honours

(Cognitive Science)

Faculty of Cognitive Sciences and Human Development

UNIVERSITI MALAYSIA SARAWAK

2019

The project entitled 'DESIGN AND EVALUATION OF MOBILE-BASED MIROLEARNING APPLICATION ON MARINE CONSERVATION' was prepared by Michelle Chong Joo Chien, 56603 and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfillment of the requirements for a Bachelor of Science with Honours (Cognitive Science).

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ACKNOWLEDGEMENTS

First, I would like to thank my supervisor, Professor Dr. Chen Chwen Jen for her time and effort in guiding me toward the completion of this Final Year Project. I greatly appreciate the patience and encourage she has given me throughout my final year. I am grateful to be able to complete my Final Year Project under her supervision.

Also, I would also like to thank my family. They have always been so supportive and understanding throughout the year. Without their heart-warming opinion, I will not be able to go through whenever hardships hit me.

To my fellow friends, there will always be ups and downs in life, but I truly appreciate those who are willing to lend their helping hands. Special thanks to my friends who have worked with me greatly, Kelly Sim Kai Nie, Pui Poh Ching, Vivian Jong Yah Lin, and Richard Lee Kin Chun. The completion of the Final Year Project is possible because you are always there for me.

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ABSTRACT

The advancement of mobile technology has enabled learning to become more interactive and interesting. The main objective of this project is to produce a mobile-based microlearning application on marine conservation for young adults. In the meanwhile, the specific objectives of this project are to design the learning resources on marine conservation and to evaluate the user interface satisfaction of the mobile-based microlearning application on marine conservation for young adults. This project employed the instructional design model proposed by Morrison, Ross and Kemp to design and evaluate the application. This mobile-based microlearning application provides five (5) basic topics on marine conservation. A total of ten (10) learning resources in the form of infographics and short videos have been integrated into the learning application. The usability evaluation using the Questionnaire for User Interface Satisfaction (QUIS) has revealed satisfactory acceptance of target users (young adults) towards the mobile-based microlearning application.

Keywords: microlearning, marine conservation, mobile application, young adults

ABSTRAK

Kemajuan dalam bidang teknologi mudah alih membolehkan pembelajaran menjadi lebih interaktif dan menarik. Objektif utama projek ini adalah untuk menghasilkan aplikasi mikrolearnin berasaskan mudah alih tentang pemuliharaan marin untuk orang dewasa muda. Sementara itu, objektif umum projek ini adalah untuk merekabentuk sumber pembelajaran tentang pemuliharaan marin dan untuk menilai *user interface satisfaction* aplikasi mikro-learning berasaskan mudah alih tentang pemuliharaan marin untuk orang dewasa muda. Projek ini menggunakan model reka bentuk pengajaran yang dicadangkan oleh Morrison, Ross dan Kemp untuk merekabentuk dan menilai aplikasi mikro-learning ini. Aplikasi mikro-learning berasaskan mudah alih ini menyediakan lima (5) topik asas tentang pemuliharaan marin. Sejumlah sepuluh (10) sumber pembelajaran dalam bentuk infografik dan video pendek telah disepadukan ke dalam aplikasi pembelajaran ini. Penilaian kebolehgunaan menggunakan *Questionnaire for User Interface Satisfaction* (QUIS) teleh mendedahkan penerimaan pengguna sasaran (orang dewasa muda) yang memuaskan terhadap aplikasi mikro-learning berasaskan mudah alih.

Kata kunci: mikro-learning, pemuliharaan marin, aplikasi mudah alih, orang dewasa muda

CHAPTER ONE

INTRODUCTION

1.0 Overview

According to Kenchington, Ward and Hegerl (2003), human activities such as overfishing, damaging pollution and habitat destruction in the sea and from land has increased the damage to coastal and marine environment. In addition, the amount of plastic waste being thrown into the sea is an unknown figure as it is increasing day by day which is estimated to harm millions of marine species every year (Parker, 2018). Therefore, the purpose of this study is to raise awareness of marine conservation among the young adults through mobile-based microlearning application. This chapter discusses about the background of the study, problem statement, objective of the study, significance of the study, definition of terms and scope of the study.

1.1 Background of the Study

According to Valavanidis (2016), the pollution of marine environment is increasing dramatically worldwide. According to Chen and Tsai (2016), the marine environmental awareness among the young adults will have a significant effect upon sustainable marine development. There is virtually unanimous agreement that education on marine protection is necessary to motivate everyone to properly dispose wastes (Center for Environmental Education, 1987a).

Studies show that most of the conservation organizations will organize various educational programs for the public which includes lectures, workshops, science days and events on marine conservation to raise awareness on the importance of marine conservation

(Morigenos, n.d.). Therefore, it is important to raise awareness of marine conservation among young adults.

Microlearning is a modern and effective learning approach to many sectors as it leverages the impact of small learning moments to help people to perform their best. A new trend in online learner behavior has emerged with the increased adoption of mobile learning and the learners are now seeking microcontent to "micro-learn" (Rao, 2018). Furthermore, it has become more popular in the recent years due to its features such as learner centric, interactive, affordable and well-designed (Jomah et al., 2016). According to Fox (2016), microlearning is a type of learning which is delivered in a mini-sized format. It enables individuals to be able to manage their learning on various subject matters.

Microlearning differentiates itself from traditional e-Learning (Bruck, 2006) as it requires a redefinition of a course, in terms of breaking it down into smaller units which permits more control by the learner and prevent unnecessary cognitive overloading of the learners. The researchers (Bruck et al.,2012) focused on the fact that microlearning breaks the learning content into small chunks and offers feedback as well as a high degree of interaction.

According to Jomah et al. (2016), among the advantages of microlearning is that the learning can be performed in short duration and requires only a little effort from individual sessions. The mobile-based microlearning application only consists of very limited and important information. According to Sanchez-Alonso et al. (2006), the information in the microlearning application can be in the form of infographics or short video and regularly updated. It also allows users to learn anywhere and anytime at their fingertips.

Callisen (2016) reported that the microlearning will work for young adults if it includes as much interaction as possible such as an interactive quiz, or even a game, can be a very powerful learning tool in this 21st of century. On the World Ocean Day, the young adults are

invited to take part in a Minecraft social media activation to raise awareness of marine conservation (Cruz, 2018).

1.2 Problem Statement

In the 1960s, it was generally acknowledged that major marine species were dramatically deteriorating (Smellie, 2014). In the past recent years, almost 90% of global fish stocks are considered to have been either over-fished or exploited up to the limits of sustainability (BMZ, 2016). Surveys have shown that an estimated 18 billion pounds of plastic waste being disposed into the world's ocean from coastal regions every year. These plastic wastes have caused harm to the ocean creatures. Counting from coral reefs suffocated in bags, turtles gagging on straw, and to whales and seabirds that starve due to their stomach are full of plastics (Howard et al., 2018). In short, there is a strong indication that marine environment has been deteriorating in the recent years.

It is particularly important to offer marine education to the public (Sakurai et al., 2018). There are many existing educational programs such as lectures, workshops, campaigns, events and many more that allow schools and conservation organizations to conduct, support and encourage on marine education for public. These educational programs are about how the marine species can be saved (National Geographic, 2010), the action that must be taken to preserve marine environment (Morigenos, n.d.), limit the damage caused by human behavior (WWF, n.d.) and restoring entire marine ecosystems (TRACC, n.d.). According to Morigenos (n.d.), Morigenos Research Courses organizes various educational programs for all age groups which include lectures, workshops and science days to raise awareness on the actions that must be taken to preserve marine environment. Also, the Tropical Research and Conservation Centre (TRACC) (n.d.) also organizes various community projects to protect sea turtles, restore coral

reefs that destroyed by the local fish and offer A-Level Marine science course, PADI courses and Dive Master internship.

However, it is costly and time-consuming to organize educational programs such as lectures and workshops on marine conservation in promoting actions or responsibilities of public. The traditional learning methods are expensive for instructors to deliver knowledge to learners in a learning process. It may not seem so costly in the short term, but they come with ongoing expenses such as instructors' salaries, printing costs, venue rental and many more which over time can be added up to large amounts of money. According to Odhaib (2018), conventional learning methods such as workshop and lectures are more costly compared to mobile learning. On the other hand, delivering the education on marine conservation individually would be a difficult and time-consuming process for the instructors and learners (Craven, 2017). Also, it is very difficult to reach out to every learner around the world by using the traditional learning methods.

In this 21st of century, there is no organization is practically using mobile-based microlearning application to raise awareness of marine conservation to public. A mobile-based microlearning application on marine conservation is one of the solutions to the problems. With mobile learning, those organizations can save a great deal on printing materials since all of the content can be hosted online without the need to be printed for each training session. In the learning process, mobile learning provides faster learning at reduced cost, increased access to learning and clear accountability for all learners (Papanis, n.d.). According to Odhaib (2018), the mobile learning provide various benefits like it is convenient, higher engagement, flexibility to learners, potentially lower costs, ease of updating and many more. In the past, microlearning has been implemented in corporate training (Axonify) (Niewiadomski, 2016), Duolingo for language learning and BuzzFeed Food TV for cuisine (Lewis, 2015). Therefore,

the mobile-based microlearning application on the marine conservation may include infographics, short videos and interactive quiz in this study.

1.3 Research Objectives

1.3.1 Main Objective

The main objective of this study is to produce a mobile-based microlearning application on marine conservation for young adults in order to raise awareness of marine conservation.

1.3.2 Specific Objectives

1. To design and develop the learning resources on marine conservation of the mobile-based microlearning application for young adults.
2. To evaluate the user interface satisfaction of the mobile-based microlearning application on marine conservation for young adults.

1.4 Significance of the Study

This study has been carried out particularly to design, evaluate and produce a mobile-based microlearning application for the purpose of raise awareness on marine conservation as well as improve the responsibilities and actions of the young adults. In general, microlearning application engages the learners better as it is targeted for a specific learning objective and the content is not more than 3 minutes. Then, this study has been carried out particularly to introduce a new learning method for the marine conservation. In the world full of technologies, there is somehow falls behind by not having a mobile-based microlearning application on marine conservation. As mentioned before, the conservation organizations still organize various educational programs for the public such as lectures, workshops, science days and events on marine conservation to raise awareness on the importance of marine conservation In

fact, a mobile-based microlearning application on marine conservation not only provides a platform to ease of updating, but also affords higher engagement and flexibility to learners.

1.5 Definition of Terms

The terms that will be defined are microlearning, microcontent, marine conservation, mobile learning, mobile application and young adults.

1.5.1 Microlearning

Microlearning is a short-term focused learning activity on small content units and learners can comprehend in a short duration (Hug, 2010). Besides, the researcher, Giurgiu (2017) has been proved that microlearning provides learners the opportunity to more easily absorb and retain the information provided by the course lessons and activities that are more digestible and manageable. According to Chee and Yahaya (2017), microlearning is a modular and fragmented learning approach which differs from the traditional classroom instructions as it is not constraint by space, time, content format and teaching surrounding.

1.5.2 Microcontent

According Zhang and Ren (2011), microcontent learning uses various methods of media in brief forms to deliver contents. Microcontent is the part that integrates into microlearning as it defined as information whose length is determined by a single topic and content that covers a single concept which is being used for presentation in mobile application (Giurgiu, 2017). In short, microcontent and microlearning combine together can delivery with a sequence of micro-interactions which enable learners to learn without information overload.

1.5.3 Marine Conservation

Marine conservation can be also known as marine resources conservation is the protection and preservation of marine ecosystems and it is focused on limiting human-caused damage to marine ecosystems and restoring damaged marine ecosystems. According to Science Daily (n.d.), marine conservation is essential for protecting the marine environment and safeguarding the marine resources that consumers rely on for food security and livelihood.

1.5.4 Mobile Learning

According to Sarrab, Elgamel and Aldabbas (2012), m-learning (mobile learning) is a subtype of e-learning (electronic learning). M-learning involves learners conduct their learning through wireless and digital mobile devices and technologies especially in the tertiary education (Traxler, 2007). Mobile learning has been defined as an effective learning approach in every sector nowadays (Bruck et al., 2012). The importance of mobile learning in education is it can work together from long distance and learners can learn it anywhere and anytime. In general, m-learning emphasis on the mobility of learning to learners strongly as the most important is learners could really get experiences and gain knowledge when learn something through their mobile devices (El-Hussien & Cronje, 2010).

1.5.5 Mobile Application

According to Technopedia (2006), the mobile application is an application software which is defined as 'app' in general. The mobile application is add-ons software that allows users to perform specific tasks on handheld devices-smartphones. The concept or idea of application software is similar to computer software, but computer software can only be installed in desktop or laptop and application software only can function on mobile device

(WebWise, 2012). The mobile application is a powerful platform for certain forms of learning where individualization of learning content with anytime and anywhere access is necessary.

1.5.6 Young Adults

Young adults refer people between 18 to 35 years of age (Petry, 2002). In this study, young adults between 18 to 35 years of age in Kota Samarahan, Sarawak are involved in the evaluation process.

1.6 Scope of the Study

Basically, the proposed mobile-based microlearning application consists of five (5) topics covered about marine conservation (National Geographic, 2010) which are as follows:

- Aware of your Carbon Footprint and Reduce Energy Consumption
- Make Safe and Sustainable Seafood Choices
- Reduce the use of Plastic Products
- Protect Our Beach
- Do Not Support Items that Exploit Marine Life

These topics covered about marine conservation are designed and developed in the form of infographics and short videos to make the mobile-based microlearning application works systematically. This is an Android-based mobile application and will be delivered in English. In short, this study focuses on these five (5) topics to raise the awareness of marine conservation among the young adults in Kota Samarahan, Sarawak through mobile-based microlearning application.

1.7 Conclusion

In the nutshell, the chapter mainly focused on the current situation is explained in the background section and the reason that this study is carried out is described in the section of problem statement. Apart from that, the main objective and specific objectives have also been established whereas the significance of the study is explained. Furthermore, the definition of terms that are used in this study also being listed and the scope of the study have also been explained. With the proper design and evaluation, the proposed mobile-based microlearning application might raise the awareness on marine conservation among the young adults.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter presents the discussion of the mobile-based microlearning application and marine conservation. The model related to the instructional design to produce a mobile-based microlearning application on marine conservation and findings from the previous research will be discussed in this study. The finding of past studies will serve as a guideline for the design, evaluation and producing an interactive mobile-based microlearning application for young adults. The sources of this chapter are typically from secondary data such as journals, thesis and many more.

2.1 Mobile-Based Microlearning Application

In this 21st of century, technology is considered as one of the most popular concerns topic. The handheld smartphones have become the fastest growing technology due to better design, ubiquitous access and many more. According to Malaysian Communications and Multimedia Commision (2018), the statistics shown that the number of mobiles used by the Malaysian exceeds the number of the Malaysian which is 42,400,000 and 31,38,992 respectively. This smartphone provides users with few valuable opportunities such as the learning process and personal control (Wong, 2012; Ally, 2009). Mobile learning has become an emerging tool for education system, and it is a new method of learning in contemporary education as it enables learners to learn at any place and any time (Seker, 2013). The researchers mentioned that self-learning plays a significant role in enhancing the knowledge of learners in the recent past and the mobile learning allows the learners to achieve more in learning process even without the direct assistance of an instructor (Gnana Singh, Leavline, &

Selvam, 2017). According to Sarrab, Aldabbas and Elgamel (2012), the overall learning experience of the learners can be enhanced by using the mobile learning. Moreover, there was a study shows that the percentage of students who own and use mobile device for learning raises from 58% to 77% from 2012 to 2014 (Chen, Seilhamer, & Bauer, 2015).

But there comes a problem in conventional education that lack of communication between one instructor and hundreds of learners in a big classroom. To overcome this problem, the researcher found in her research that mobile device can actually increase the interaction of teaching and learning process (Cobb, 2010). Then, the result of the research is 71% of learners reporting that they like it and would like to learn with using mobile device again. According to Corbeil and Valdes-Corbeil (2007), mobile learning can reduce the barriers of cultural communication between learners and instructors by adding some components or functionality within the mobile applications such as video, audio or text-to-speech components.

Kovachev et al. (2011) mentioned that microlearning focuses on short duration and informal learning activities when the learner is looking for the knowledge to solve a problem. The potential of microlearning is delivering contents in short learning sequences, small "chunks" of information with high level of interaction and instant feedback after each user action. This gives opportunities for learners to collaborate with people around. In the meanwhile, a mobile application named "One2Act Mobile Feedback" in Norway allows instructors get real-time feedback from the learners and reply customized feedback to the learners in a short time (Briggs, 2014). In addition, the use of interactive and attractive tools such as infographics, short videos and slideshows can draw and hold the attention of the learners easily (Drakidou, 2018). The microlearning was also tested on mobile devices (Wen & Zhang, 2015). In that particular study, the learners divided into an experimental and a control group and both groups of the learners reported that their motivation increased compared the conventional learning method after the end of the study. Besides, human brain has been found

to acquire and retain information more easily when the learning contents provided in short and small "chunks" (Cowan, 2001; Simon, 1974).

In this study, the mobile-based microlearning application was implemented for the purpose of raising the awareness on marine conservation to the young adults. Such mobile-based microlearning application usually is only accessible by Internet and allows everyone getting into it. According to Kumar (2018), microlearning has several advantages such as high engagement for learners, better retention of the concepts, and better information transfer to the field of the concepts learned. Hamdan, Din and Manaf (2012) also mentioned that mobile learning that can be carried out anytime and anywhere managed to reduce the use of classrooms and overcome the problem of limited time of teaching and teaching content materials. The microlearning application that was reviewed in this research share a similarity, which is short learning sequences. The reviewed system will be further discussed in the following.

2.2 Marine Conservation

The study of marine conservation had started long from decades ago in various forms. Marine conservation can be known as the protection and preservation of marine ecosystem through planned management. It is considered as the most persistent modern environmental concern and plays an important role in preventing global climate change. There are many organizations working on marine conservation worldwide such as World Wildlife Fund (WWF), Institute for Ocean Conservation Science, Whale and Dolphin Conservation Society (WDCS) and many more. Through the participation of the local citizens, the objective and mission of these organizations is to conserve and restore the coastal biodiversity and the marine ecosystems. The marine life research center, marine laboratory and rehabilitation centers are established by the organizations to train and educate public on marine conservation.