DEVELOP A MOBILE LEARNING APPLICATION ON FOOD LABELS

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Bachelor of Science with Honours
(Cognitive Science)
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DEVELOPMENT OF A MOBILE LEARNING APPLICATION ON FOOD LABELS

TAN CHEE HONG

This project is submitted in partial fulfilment of the requirements for a Bachelor of Science with Honours (Cognitive Science)

Faculty of Cognitive Sciences and Human Development
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# TABLE OF CONTENTS

LIST OF TABLES ..............................................................................................................v

LIST OF FIGURES ...........................................................................................................vi

ABSTRACT .........................................................................................................................viii

CHAPTER ONE INTRODUCTION .....................................................................................1

CHAPTER TWO LITERATURE REVIEW .........................................................................5

CHAPTER THREE METHOD ...............................................................................................9

CHAPTER FOUR RESULTS ..............................................................................................14

CHAPTER FIVE CONCLUSION .......................................................................................29

REFERENCES ..................................................................................................................31

APPENDIX A TASK FOR THE USABILITY EVALUATION ........................................34
LIST OF TABLES

Table 1 Feedback from the respondents of the usability evaluation ........................................ 22
Table 2 Observations made during the usability evaluation ...................................................... 22
LIST OF FIGURES

Figure 1 Instructional Design Plan.................................................................9
Figure 2 Examples of the ways messages will be delivered..........................11
Figure 3 Homepage of the mobile learning application (initial version)........14
Figure 4 First step in understanding food labels (initial version)..................15
Figure 5 Second step in understanding food labels (initial version).............15
Figure 6 Third step in understanding food labels (initial version)................16
Figure 7 Fourth step in understanding food labels (initial version).............16
Figure 8 First page of “More tips” (initial version).....................................17
Figure 9 Second page of “More tips” (initial version)..................................17
Figure 10 First question in the quiz (initial version).................................18
Figure 11 Second question in the quiz (initial version)................................18
Figure 12 Third question in the quiz (initial version)...................................18
Figure 13 Fourth question in the quiz (initial version)...............................19
Figure 14 Fifth question in the quiz (initial version).....................................19
Figure 15 Sixth question in the quiz (initial version)....................................19
Figure 16 Seventh question in the quiz (initial version)..............................20
Figure 17 Eighth question in the quiz (initial version)..............................20
Figure 18 Correct answer to the question (initial version)...........................21
Figure 19 Wrong answer to the question (initial version)............................21
Figure 20 Homepage with new background (revised version)......................23
Figure 21 First step in “How to read your food labels” with new background (revised version)..............................24
Figure 22 First extra information in “More tips” with new background (revised version)..............................24
Figure 23 The first question in “Quiz” with new background (revised version)..............................25
Figure 24 “Next” icon removed (revised version)........................................25
Figure 25 “Quiz” with “Next” icon removed (revised version)..........................26
Figure 26 First tips with added graphical image (revised version)......................26
Figure 27 Second tips with added graphical image (revised version)...................27
Figure 28 Third tips with added graphical image (revised version).....................27
Figure 29 Forth tips with added graphical image (revised version)....................28
ABSTRACT

The main purpose of this study is to develop a learning mobile application on food labels based on the instructional design plan proposed by Morrison Ross and Kemp. Mobile application is chosen as the learning tool for this study because the population of people owning a mobile device is increasing rapidly. Learning can be conducted anywhere and everywhere using a mobile device. This mobile application shows learners the four basic steps in understanding food labels. More information are shown as well as quizzes at the end of the learning process. This learning application act as a very important tool for consumers when they are purchasing or consuming any food products. This is especially important for consumers with special diet such as patients with diabetes or high blood pressure.

Keyword: learning, mobile application, food labels
ABSTRAK


Kata kunci: pembelajaran, aplikasi mudah alih, label makanan
CHAPTER 1
INTRODUCTION

The purpose of this study is to develop a learning mobile application on food labelling. This chapter mainly relates the background of the study, motivation behind the study, research objectives, research question, significance of study and scope of study.

Background of the Study

Before smartphones are introduced, mobile phones are used for calling and sending texts only. Now, with the development of mobile applications, a smart phone is not only a device for communication but also a multifunctional device that enables its user to learn, earn and have fun (Clark, n.d.).

In 2008, Apple introduced the App Store and since then users are able to access the whole marketplace of apps (Lin, 2014). In the same year, after a few months the App Store was introduced, Google launched the first Android smart phone which is HTC Dream Android Market. Apple hit one billion app downloads quickly in 2009 and Android too after a year (Lin, 2014). The market of mobile applications is growing rapidly in the beginning of the new millennium (Clark, n.d.). Besides, anyone can develop a new application for the App Store or Android Market because application development companies are not restricted to one single manufacturer (Lin, 2014). Unlike the conventional programming environment of standard mobile phones, smart phones’ operating systems are open to the development of third-party software (Clark, n.d.).

As the usage of mobile devices is getting more and more common, it has now become more powerful, portable and convenient for users in their daily lives. This rapid growth in mobile devices has brought e-learning towards a new era (Huang, Hwang & Chang, 2010). The interest level on mobile learning has increased dramatically followed by the new devices with enhanced capabilities (Jones, 2011). Mobile learning (or m-learning) is a type of
educational interaction delivered through mobile technology and can be accessed from any location at convenience of a student (7 THINGS YOU SHOULD KNOW ABOUT MOBILE APPS for LEARNING, 2010). Mobile learning is an innovative design that can enable users to study learning contents conveniently and also interacting with others collaboratively whenever and wherever they want. Mobile learning application will become important for users with hand-held mobile devices (Huang, Hwang & Chang, 2010).

Food safety includes actions taken to ensure that all food is as safe as possible. Food safety policies as well as actions are important and needed to cover the whole food chain from production to consumption (World Health Organization, n.d.). One of the aspects in food safety is food labeling. Food labeling on a product is important for users to choose the best value for their health and it is also one of the most powerful tools consumers have (Shroff, 2009). Knowledge on how to read food labels is important as consumers can compare foods and find the foods that have the nutrition value that they need (LaBarbera, 2012).

Motivation of the study

Mobile learning has risen to become one of the most popular tools nowadays. One of the reasons for this is that the popularity of people owning mobile devices is increasing rapidly (Nerc, n.d.). The main difference between mobile learning and other types of learning system is that mobile devices enable instant access to knowledge, databases and various valuable education applications (Nerc, n.d.).

There are many food safety mobile applications available now in the market, such as ‘Is my food safe?’ and ‘Food Safety’ (Google Play). However there are only minimal ones related to food labeling, especially related to food labeling in Malaysia. Therefore, it is important to create a mobile learning application on food labeling in Malaysia. This mobile application will be very useful for every Malaysian consumer whenever they are purchasing or consuming any food product.
Research Objectives

Main Objective

- To create a mobile learning application on food safety

Specific Objectives

- To design and develop a mobile learning application for consumers
- To evaluate the usability of this learning system

Research Question

How to develop an effective mobile learning application on food safety (food labeling)?

Significance of the Study

Practical implications

1 - This study can introduce the most popular learning tool nowadays, the mobile learning application to the users. There might be some limitations on this, such as connectivity and screen size. (Marpadga, 2014). Besides, there are people who cannot afford to buy a smartphone. However, mobile application would be the best tool on learning food labeling because of its mobility and accessibility. Users can learn anytime and anywhere and it is very convenient for them (Marpadga, 2014).

2 – Besides, this study can also contributes to create awareness of the importance of food labeling among the food consumers. This mobile application would also be able to increase the consumers’ knowledge. This is very important as “make effective use of nutrition information on food labels” is one of the key messages in the Malaysian Dietary Guidelines published by the Nutrition Division of Ministry of Health Malaysia (2010).
Scope of the Study

This research focuses on the correct ways of learning how to read and understand food labeling. This is an Android-based mobile application and will be delivered in English.
CHAPTER 2

LITERATURE REVIEW

This chapter is about the review of literatures which are related to the study. These include mobile devices, mobile learning, food labeling and existing mobile applications on food safety.

Mobile devices

Any handheld computer can be a mobile device. Mobile devices are designed to be very portable and usually fit in the palm. Mobile devices are powerful as they can even perform similar tasks like a computer (What is a mobile device, n.d.). As also mentioned in “Mobile Devices”, a mobile device mostly equipped with a display screen and input method and usually has operating systems which can run applications and this enables mobile devices to be used as media players, gaming devices, navigators and many more (n.d.). Androids and Apple (iOS) are few of the popular operating systems available now (Mobile Devices, n.d.).

According to Rowinski, the starting of mobile devices is to turn hand phones into essentially powerful pocket PCs. To achieve this, challenges such as the size of the data and connectivity issues have to be overcome (2014). Engineers worked over the past seven years to reduce the sizes of the devices and to increase the speed of the devices while software developers developed systems and apps to make hand phone to a device that can perform everything (Rowinski, 2014).

According to Ausick (2014), the average amount of time Americans spent using a personal mobile device has overtaken the average amount of time they spent in front of a television set. The average amount of time an American spent on TV is unchanged since the last nine months which is two hours and 48 minutes per day. However, the time for an average American spent on personal mobile devices is even more which is two hours and 57 minutes a day.
According to Page (2014), the current report claims that the number of active mobile devices is more than the population of humans across the globe. According to the report, devices such as tablets, smartphones and mobile phones are increasing five times than the human population at a rate of about two people in every second (Page, 2014).

**Mobile Learning**

Nowadays, mobile learning is very popular. Mobile learning uses applications that contain educational material and were designed particularly for the purposes of learning. Mobile learning also includes the use of mobile devices to reach educational goals, such as field trips, projects, research and etc. (Nerc, n.d.). On the other hand, mobile learning can also be defined as the concept of transforming knowledge through mobile devices (Seker, 2013).

One of the biggest advantages of mobile learning is its convenience and can be access easily. Mobile learning enables learners to learn at any place and any time (Seker, 2013). Learners can choose to focus on content they want to learn during their free time as every learner has different ways of understanding or-styles to learn. Learners can now learn in their own strategies with mobile learning at their own step (Marpadga, 2014). Mobile learning also provides collaborative learning as learners which located at different places can get in touch with each other to discuss and also learn (Marladga, 2014). This gives opportunities for learners to collaborate with their peers, learn teamwork, solve problems and organize projects (Nerc, n.d.).

Nevertheless, there are some limitations on mobile learning as well. The first one is the connectivity issues. Learners might have difficulties uploading and downloading data because of poor mobile network signals (Marpadga, 2014). Also mentioned by Marpadga that small screen size might strain the eyes of the learner over long period of time and information provided can be limited too due to size constraints (2014).
Food Label

Food label is a nutrition label that displays the list of the level of nutrient(s) contained in a particular food. Food labels are used to provide factual information about the nutritional content of a food product (Regulation of Nutrition Labeling & Claims in Malaysia, n.d.). Nutrition labeling on food is important to help consumers in practicing healthy diet. It also assists consumers in choosing better food when planning their daily meals (Tee, n.d.).

According to the American Heart Association (2014), one can make healthier choices by knowing how to read and understand food labels. As many consumers are curious about using the information on food labels more effectively and easily, several skills are recommended for consumers. For instance, consumers should first check on the serving size stated on the label as this influences the number of calories and all the nutrients amounts listed (U.S. Food and Drug Administration, n.d.). It is important for people with health conditions, such as high blood pressure or high cholesterol to know how to read food labels as they have to follow a special diet (Nutrition Facts: An interactive guide to food labels, 2012).

Health Minister of Malaysia, Datuk Seri Dr Subramaniam mentioned that one of the good habits to reduce the consumption of salt is to read and understand food labels. According to Dr. Subramaniam, consuming too much salt not only raises blood pressure but also increases the chance of getting heart attack and stroke (5.8 million adults in Malaysia, 2014). Knowing the serving size of a food product and eat within the recommended size helps in body weight control and can prevents many chronic illness associated to obesity (Ding, 2013). Ambak et al. (2014) stated that obese adults in Malaysia read and understand food labels but they did not focus on macronutrients related to their health condition.

Existing Mobile Applications on Food Safety

There are several mobile applications on food safety in Google Playstore nowadays, such as “Is my food safe” and “Food safety”. “Is my food safe” is aimed to reduce the risk of
food poisoning in the kitchen. Some of the features for this application are such as providing safe internal cooking temperature for meats and quizzes on users’ knowledge of kitchen safety (Is My Food Safe, 2012). “Food safety” is an application that allows users to access food safety information easily. Features available are getting notifications of food alerts, food safety news and publications, downloading information about food safety and so on (Food Safety, 2014).

Meanwhile, “Food label X-ray Free” is a mobile application about food labeling, but it only focuses on chemical additives on the food labels. This application shows potentially harmful additives and their description by taking picture of the food label. (Food Label X-Ray Free, 2014).
CHAPTER THREE

METHOD

This chapter discusses on the methodologies used in developing the mobile learning application.

![Instructional Design Plan](http://etec.cltl.ubc.ca/510wiki/Web-Based_Strategies)

The figure shows the instructional design plan proposed by Morrison, Ross and Kemp which will be used to develop the mobile learning application. There are nine elements throughout the whole design plan. The nine elements are learner characteristics, instructional objectives, content sequencing, instructional strategies, designing the message, instructional delivery and evaluation instruments.
Instructional Problems

To create a learning system that educates users on how to read and understand food labels on food packaging.

Learner Characteristics

The targeted learners for this mobile learning application are young adults from the age group of 18 to 35 years. The minimum education requirement is SPM level with basic proficiency in English.

Task Analysis

Task analysis is to determine the learning content of the mobile application. The way to determine is by topic analysis. The topics listed are how to read a food label, other important information and components to be consumed less.

Instructional Objectives

A learning objective is what a learner will achieve after going through the mobile application and also describes the intended outcome of the instruction. The instructional objectives for this mobile learning application are:

1. Learners able to list down all the steps in reading a food label
2. Learners able to describe each step in reading a food label
3. Learners able to recognize other important information on a food label
4. Learners able to explain each other important information on a food label
5. Learners able to state that all the components in a food product that should be consume less
6. Learners able to clarify all the components in a food product that should be consume less
7. Learners able to apply all the learning content while purchasing a food product
8. Learners able to select the correct food products for themselves

Content Sequencing

The instructional content of the mobile learning application is sequenced using concept expertise sequencing. Learners will first learn about the basic steps of reading a food label then only learners will learn about other important information on a food label. Last, after manage to understand the food label; learners will have to identify components that should be consume less.

Instructional Strategies

Instructional strategies designs the ways of presenting the information. The instructional strategy for this learning system is by presenting information followed by giving quizzes to the learners at the end of the learning. This also acts as a self-assessment tool for the learners to improve their learning.

Designing the Message

This stage is where pattern of words and pictures are created to communicate. Contrasts, alignment, repetition and proximity are important in designing instructional messages. Some examples of the way the instructional messages will be delivered are shown below:

![Figure 2. Examples of the ways messages will be delivered.](image)
Development of Mobile Application

This is where all the parts are put together. This mobile application will be created by “Invision”. “Invision” is a DIY mobile application builder software. This software does not require any programming skills to create a mobile application. The mobile application is created in “Invision” by uploading all the images for interfaces in the application.

Interfaces will be designed using Microsoft Word. Tools in Microsoft Word such as “Insert Shapes”, “Insert Pictures” and “Word Art” are mostly used.

After the interfaces of each page are created, they will be screen shot using Paint and saved to JPEG image file.

After uploading all the images on to “Invision”, “Hotspots” function is used to link each page to each page. Certain areas can be selected to act as “Hotspots” to certain page.

There are different types of gestures available such as tapping, double tapping and swiping.

Evaluation Instruments

Co-operative evaluation method proposed by Monk, Wright, Haber and Davenport is used to examine the usability of this mobile application. Designer and users collaborated to identify usability issues and their solutions.

The first step in co-operative evaluation is to recruit users. 5 students from University Malaysia Sarawak were selected to participate in this evaluation.

Next, tasks for the respondents were selected and written down. Common tasks to test the features of the mobile application were chosen. After making sure that the prototype is ready to support the tasks and ensuring that recording facilities are available and functioning, the evaluation started.

Evaluation is conducted by observing the users when they were carrying out the tasks given. Notes and comments are made throughout the observation.