Edutainment App on Malaysia

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ABSTRACT

The idea of designing content that educates as well as entertains and the rapid growth of development of Android applications contributed to the author's decision to develop this app. It is an edutainment app that contains facts and general knowledge about Malaysia which will help students in their Geography and History subjects. It acts as the supplementary material to the text books that students are currently using right now. The application can help to improve students' method of study. Instead of reading a boring, thick text books, they can learn or gain the knowledge through an interactive mobile apps. The study focus on how to design an interactive mobile app which will make the students, particularly or foreign tourists to learn about Malaysia.

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ABBREVIATIONS AND NOMECLATURES

HCI:	Human Computer Interaction
PACMAD:	People at the Centre of Mobile Application Development
iOS:	iPhone Operating System
SDK:	Software Development Kit
XML:	Extensible Markup Language

CHAPTER 1

INTRODUCTION

1. INTRODUCTION

1.1. Background of Study

Traditionally, students learn by using text book. However, due to the fact that the text book is not interesting with lots of words and only few graphics such as pictures, students are not interested to read it. With rapid growth of technology, interactive learning is the new trend. The most popular trend nowadays is the mobile apps, particularly, Android apps.

Android has experienced a rapid growth in their market. This is due to the increase of Android-based smartphone and tablet user around the world. Based on statistics from Google Report, by the end of 2012, there are 1.32 billion smartphone users all over the world. From that 1.32 billion, Android has the highest market share of 48%. 18% of Android users are from age 13-17. 64% of usage from users of age 13-17 are playing games. Edutainment app on Malaysia is an Android application which uses the concept of edutainment (education and entertainment). This application contains facts and general knowledge of Malaysia which could be useful for the secondary school students for their Geography and History subject.

1.2. Problem Statement

Chatfield (2012), stated that the text books which students currently using are not interested and appealing at all. Lots of contents in the text books are full of words which confuse the students. Due to that problem, they become bored and not interested to read the books. McCrum (2012) mentioned that text books, reference books and other reading materials for supplement to the text books are not attractive and most of them are thick and heavy.

1.3. Objective

The objective of this study is to develop an interactive mobile application that act as a supplementary material to the text books. To develop an interactive mobile application, the concept of edutainment will be used in the application. Besides that,

the concept of usability is important in developing mobile application. There are several discipline that designers should follow in developing the application in order to make the application more interesting and interactive.

1.4. Scope of Study

The study focusing on how to develop an interactive Android app. The study includes the behavior of the interface and the interaction between the users and the system. All the facts and information that will be put as the content in the application are related to Malaysia only. However, for the prototype purpose, the facts and the information for the content are related to Perak state only. The application is targeted to the secondary school students, specifically to lower form students as the application could be useful for them on their History and Geography subjects.

CHAPTER 2

LITERATURE REVIEW

2. LITERATURE REVIEW

2.1. Edutainment

Edutainment is the methodology of using teaching methods in the form of a game in order to attract students and to make the most of the interactive feature of games so as to help with their education (Wang, Tan, Song, 2007). The idea of edutainment is that to educate as well as to entertain the users. Edutainment is the current trend where traditional learning through reading the text books is not effective anymore. The text books are full with words which are hard to understand and not appealing at all.

Human cannot live without education and human also like to play games. Games attract so many students because of its character of interest and interactive, which the usual education are lack on. Combining game and education on the points of different knowledge and character of subjects, using the method of game to teach difficult contents in order to excite the students' enthusiasm and creative is the main design principle (Deng, 2003). By combining game with education, it creates an interactive application that can attract students' interest resulting them to learn more on the subject matter.

According to White (2003), there are four types of edutainment. There are location-based edutainment which are either participatory such as playing as first person shooter or spectator such as exploring museums and zoos. The next type of edutainment is edutainment by purpose and content such as to improve skills and give experience. Thirdly, it is edutainment by target group like same age or same interest. Lastly, it is edutainment by type of media such as edutainment on television, computer edutainment and edutainment on internet.

The advantage of using edutainment is that it mobile and accessible everywhere. According to Altzman, 2007, he stated that people can easily fetch the content of the subjects through edutainment application.

2.2. Element of Games in Edutainment

Miesenberger et al. (2008) stated that games enable the player to acquire motor skills, improve memory, visualization and problem solving. Playing games offers the learner a completely free medium of making mistakes and provides them with a range of attempts which are assisting in embedding the information into the learners' memory permanently (Prensky, 2006). Prensky (2006) also mentioned that due to increase usage of new technology, it enables them to accomplish multiple tasks at the same time, grasp wide types of information and speed up the decision making process. This is also supported by Twidale et al. (2008) in their studies which have been conducted on informal learning in human-human computer interaction (HHCI). In conclusion and in addition to pleasure and challenge that the gamers experience, playing games may stimulate the users to enhance their participation and contribute towards the achievement of educational objectives (Susi et al., 2007).

2.3. Edutainment as Supplementary to Curriculum

Despite being able to attract students' interest in learning, current curriculum in learning and teaching process should be maintained. According to Zin and Zain (2010), edutainment should only be used to supplement curriculum. The use of edutainment could sometimes become misguided. Parents tend to use edutainment applications as substitute for parenting while teachers overuse edutainment as substitute for teaching. Because of that, students become dependent on teachers and parents for their learning. Their ability in learning to learn decreases (Golinkoff, Hirsh-Pasek, & Singer, 2006). They have lack in motivation to learn.

2.4. Designing Interactive Application

In designing the application, the aspect that need to be concern of is the interface. The interface of a system or an application includes the icons, buttons, text fields and the layout arrangement. According to Wong et al. (2012), it is important that the interface designers give thoughts on the overall hierarchical menus, icons design, and its screen and display layout arrangement. It is important because the interface of a system or an application shows the first impressions to the users. If the interface is arranged and display nicely, it shows good impressions to the users and vice versa.

The discipline of the design of the interface is related to the concept of HCI. The philosophy of HCI is to ease the use of applications, systems, or machines for users. If it is easy to use, it follows the rule of HCI. The key in designing is to focus less on technology and engineering, and far more on the humanities and the design arts (Sommerer, 2005). Instead of using lots of buttons with complicated functions and explanations in the applications, systems, or machines for users, using simple interface is more pleasing and more attractive. The basic idea is to create an interface which feels more human rather than robotic. Instead of using long sentences for explanation, use simple sentence that is easy to understand by users of different ages.

The usefulness of an application depends on its utility and usability. Nielsen (1993) defines utility as the ability of a system to meet the needs of the user while usability as a quality attribute that assesses how easy user interfaces are to use. If an application provides both utility and usability, then the application is considered useful and vice versa.

The five attributes of usability described by Nielsen (1993) are:

> *"Efficiency: Resources expended in relation to the accuracy and completeness with which users achieve goals.*
> *Satisfaction: Freedom from discomfort, and positive attitudes towards the use of the product.*
> *Learnability: The system should be easy to learn so that the user can rapidly start getting work done with the system.*
> *Memorability: The system should be easy to remember so that the casual user is able to return to the system after some period of not having used it without having to learn everything all over again.*
> *Errors: The system should have a low error rate, so that users make few errors during the use of the system and that if they do make errors they can easily recover from them."*

However, this attributes explained by Nielsen is relevant for traditional desktop applications. The growth of mobile devices has presented new usability challenges that are difficult to model using traditional models of usability. Zhang and Adipat (2005) define five limitations for mobile applications. There are:

"Mobile Context: When using mobile applications the user may also be interacting with nearby people, objects and environmental elements which may distract their attention.

Connectivity: Connectivity is often slow and unreliable on mobile devices. This will impact the performance of mobile applications that utilize these features.

Small Screen Size: The amount of information that can be displayed is limited.

Different Display Resolution: The resolution of mobile devices is reduced from that of desktop computers resulting in lower quality images.

Limited Processing Capability and Power: In order to provide portability, mobile devices often contain less processing capability and power. This will limit the type of applications that are suitable for mobile devices.

Data Entry Methods: The input methods available for mobile devices are different from those for desktop computers and require a certain level of proficiency. This problem increases the likelihood of erroneous input and decreases the rate of data entry."

Because of that, PACMAD model was introduced to address the limitations. There are seven attributes in PACMAD usability model. There are:

"Effectiveness is the ability of a user to complete a task in a specified context. Effectiveness is measured by evaluating whether or not participants can complete a set of specified tasks.

Efficiency is the ability of the user to complete their task with speed and accuracy. It relates with the productivity of a user while using the application. Efficiency can be measured such as by using the time to complete a given task, or the number of keystrokes required to complete a given task.

Satisfaction is the perceived level of comfort and pleasantness afforded to the user through the use of the software. This is reflected in the attitudes of the user towards the software. Questionnaires and other qualitative techniques are typically used to measure a user's attitudes towards the application.

Learnability is the ease with which a user can gain proficiency with an application. It typically reflects how long it takes a person to be able to use the application effectively.

Memorability is the ability of a user to retain how to use an application effectively. The application might not be used on a regular basis and sometimes may only be used irregularly. It is therefore necessary for users to remember how to use the application without the need to relearn it after a period of inactivity.

Users should make few errors during the use of a system and that if they do make errors they should be able to easily recover from them. The error rate of users may be used to infer the simplicity of a system. By understanding the nature of these errors it is possible to prevent these errors from occurring in future versions of the application.

Users of mobile applications may be performing additional tasks, such as walking, while using the mobile device. Cognitive load refers to the amount of cognitive processing required by the user to use the application. In a mobile context users will often be performing a second action."

Based from the usability model above, it can be concluded that in order to design an effective mobile application, the content of the application should suit the physical of the smartphones. For example, the information displayed on a page in the application should not be too much as the user often do other things while using the phone. If there is too much information, user will lose the focus on the application. Besides that, the application should be easy to use as it can satisfy the user.

2.5. Related Works

There are two applications that are similar to the project. Both of them are mobile applications.

2.5.1. Malaysia – All About

This app is developed by Helder Rocha for an iOS (iPhone Operating System) smartphones. It contains the history of Malaysia and the locations of some of the important places in Malaysia. Besides that, there are photos of the beautiful places in Malaysia. Despite that, the application is focused more on travel. There are only little amount of information regarding the history of Malaysia.

2.5.2. Country Facts Malaysia

This app is developed by Foundero for both iOS and Android. It contains some facts regarding Malaysia including history, geography, culture and people in Malaysia. This app, however, is just displaying images and information without applying the concept of edutainment.

CHAPTER 3

METHODOLOGY

3. METHODOLOGY

This chapter explains about the stages that has been and will be taken throughout the whole project. This chapter also defines the study plan and the proposed architecture for the project.

3.1. Information Gathering

All the required information are gathered during this stage. In this stage, the problem statement, objectives and the scope of the study are defined. Also, thorough literature review are conducted to investigate on what researches have done related to the field of study. Key terms, studies and theoretical framework that supported the topic of the study are gathered. Besides that, the tools required for the development of the application are identified here. Once the tools are identified, self-learning are required in order to familiar oneself with the tools.

3.2. Stages in Application Development

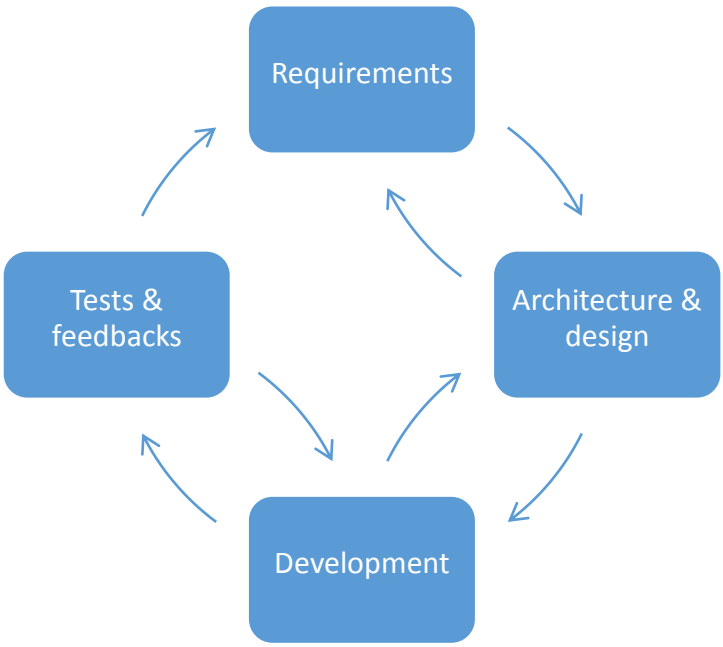


FIGURE 3.1. Stages in application development

The model for the development methodology is based on the agile development model. This model does not build an entire system at once. It develops incrementally.

3.2.1. Requirements

This is the first stage in the application development. In this phase, functions and operation of the intended application will be defined.

3.2.2. Architecture & design

In this phase, the system will be design in terms of the behavior of the system and the system interface based on the requirements from the requirement phase. Besides, the architecture of the system will be determine here. If there are some functions or methods that need to be added, the phase will go back to requirement phase in order to determine the added functions.

3.2.3. Development

Eclipse will be used to develop the application with the help of Android Software Development Kit (SDK). This tool will be used to code each and every part of the application. It uses Java and Extensible Markup Language (XML) language. If there are new features that need to be added, the behavior of the system needs to be changed. Thus, the phase can go back to architecture and design phase in order to define the behavior of the new added features.

Once the development is finished, the phase will go to tests and feedbacks phase.

3.2.4. Tests & feedbacks

A prototype created during the system development phase will be tested in this stage. There will be lots of bugs on the system and application will be crashed during the testing. The prototype then will be tested on user interface testing and user acceptance testing. In user interface testing, the behavior of the interface, such as the buttons will be tested whether if functions properly or not. For the user acceptance testing, it tests whether the prototype is user friendly and easy to use or not. If the prototype fail to pass this tests and has

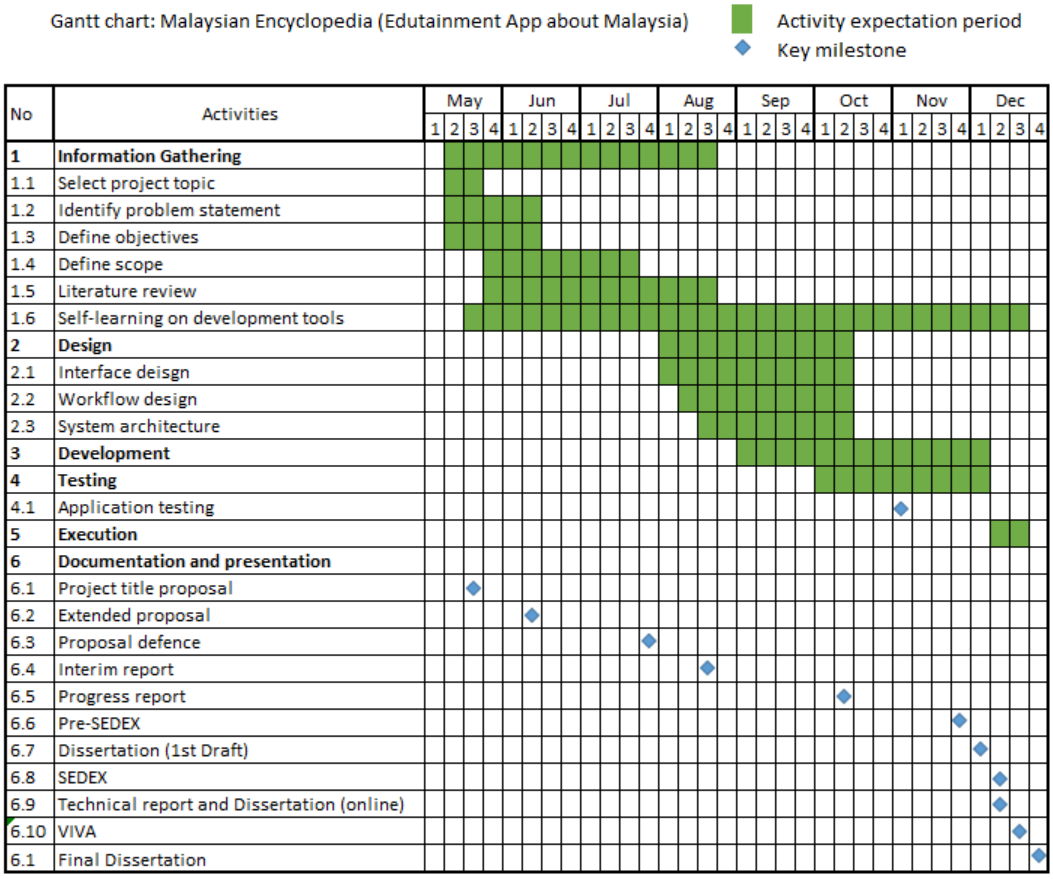
lots of bugs in it, the process flow will go back to system development phase where some changes need to be amend and updated prototype will be created to be tested again. If there are some new requirements needed from the feedbacks, new requirements need to be defined in the requirement phase.

3.3. Documentation and Presentation

Throughout the period of the study, some of the documentation are needed to be submitted and presented as to update the progress of the study, to defend the topic selection and to present the final product from the study.

3.4. Study Plan

TABLE 3.1 Study plan for Final Year Project



3.5. System Architecture

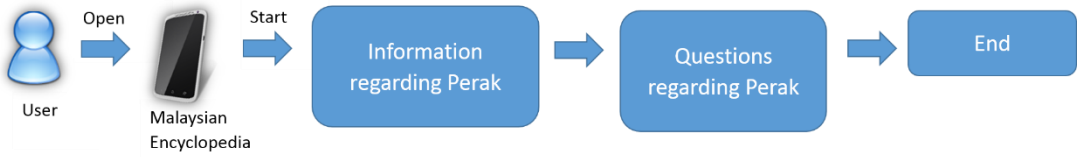


FIGURE 3.2 System architecture

Based on the figure 3.2 above, when user open the application, the user will be shown the information regarding Perak. After that, there will be assessment regarding the topic that have been shown. This is because through assessment, user can remember the information easily.

CHAPTER 4

RESULTS AND DISCUSSION

4. RESULTS AND DISCUSSION

This chapter explains about the current project implementation. In section 4.1, the results and findings from the previous research will be explained. In section 4.2, the design of the interface will be explain the interface. Section 4.3 shows the prototype and section 4.4 describe the system evaluation

4.1. Research findings

Based from the literature review of the previous research, there are about three main points related in designing an edutainment mobile application.

Firstly, the element of games is vital in delivering the content to the user. Studies have been conducted and shown that through games, users will repeatedly correcting their mistakes until the correct answer permanently stored in their brains. By using this method in delivering knowledge or facts to the user, they can remember the facts or the information correctly.

Secondly, edutainment should be used as the major methods of learning. Based on the research conducted by Zin and Zain in 2010, by using edutainment as the main method in teaching and learning process, students are not independent in learning. They will be dependent on teachers or parents to help them in learning.

Lastly, there are some limitations in designing the usability of a mobile application. By using the new PACMAD usability model, there are some additions to the attributes of a usability application.

4.2. Interface

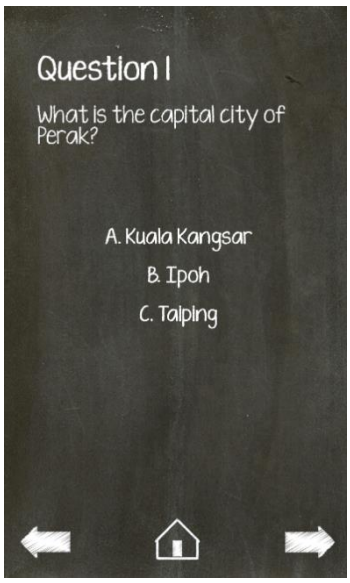


FIGURE 4.1 Sample of a question

FIGURE 4.2 A correct answer

Based on figure 4.1, this is the simple of the question during the assessment. User will be given three choice of answer. If the user answer the question correctly, there will be a tick symbol indicating that the answer is correct as shown in figure 4.2. Then, an additional information related to the question will be shown which will help the user remember it if the same question come out again.

4.3. Prototype

Experiments have been done to test whether the app can be run or not. Trial run has been done on the app using the built in emulator inside the Eclipse software. The app will be installed into the emulator. It acts as the application has been installed into a real Android based smartphone.

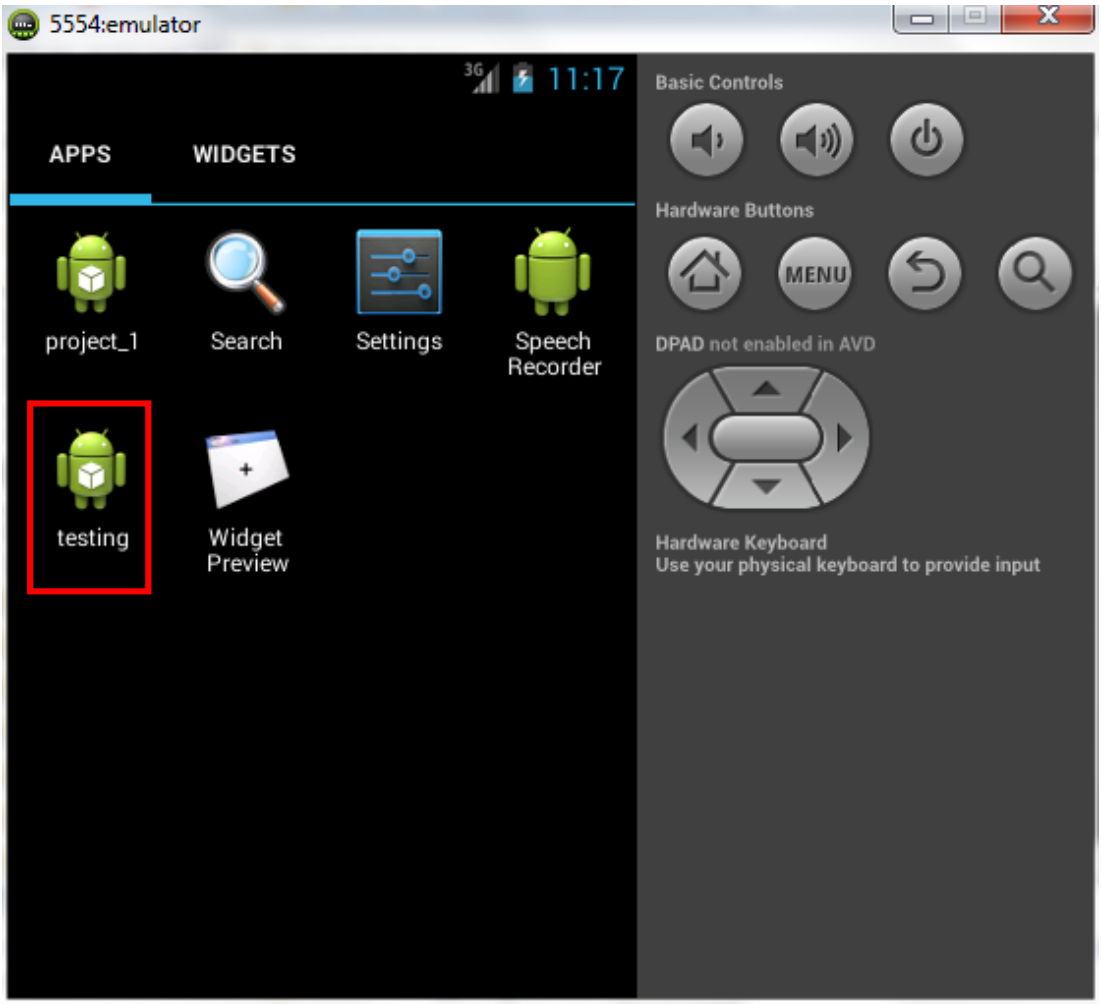


FIGURE 4.3 App on the emulator

Figure above shows that the app called ‘testing’ has been installed into the emulator. To run the app, simply click on the ‘testing’ icon.

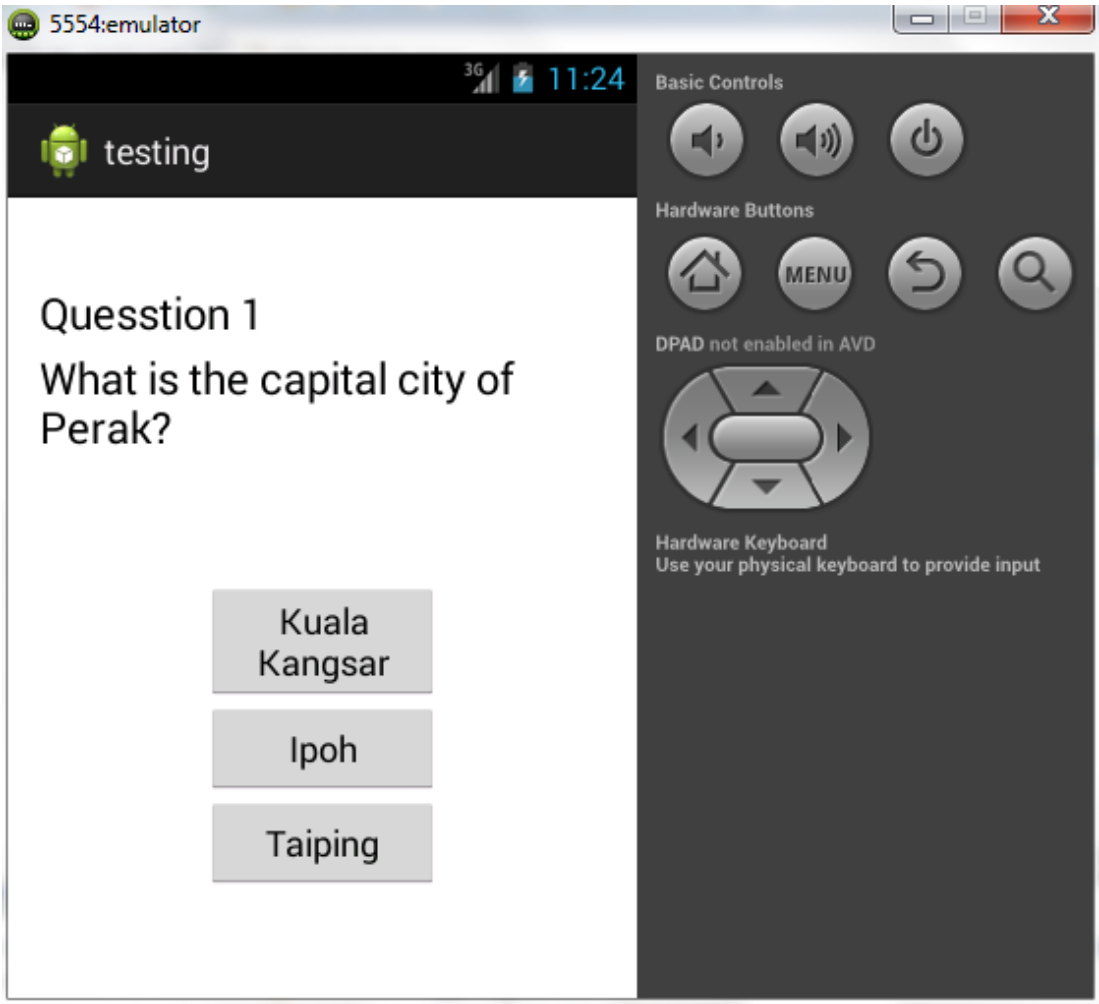


FIGURE 4.4 Sample of a question in the emulator

This is the sample of question on the assessment in the emulator.

4.4. System Evaluation

System evaluation have been done to the target user which is the lower form students of secondary schools. The evaluation that have been done is the user acceptance testing. There are six questions for them to answer after using the application. There are about ten respondents from the questions. The answer for the question is ranging from strongly agree to strongly disagree.

Question 1: The system is easy to use

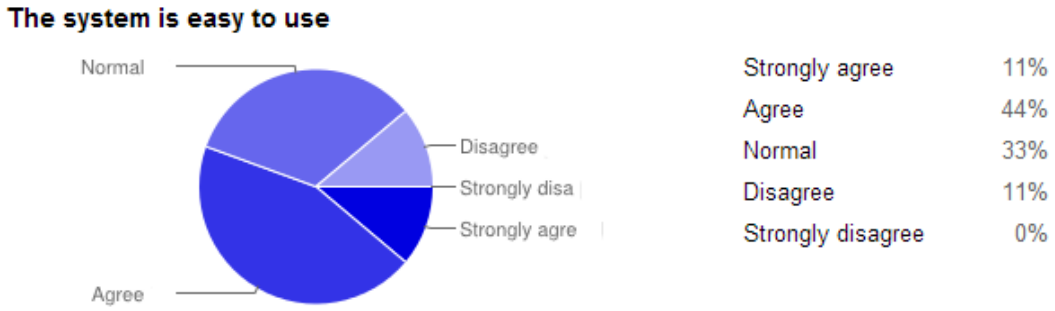


FIGURE 4.5: Question 1 responds

Based from the responds, majority of them (44%) agree that the system is easy to use. It is then followed by normal (33%), strongly agree and disagree (both 11%) and strongly disagree (0%). From this data, most of the respondents happy that the system is easy to use. Thus, it suits the concept of usability which has been explained in literature review section 2.4. When the system is easy to use, users satisfy in using the application.

Question 2: The application is enjoyable as compared to text books or reference books

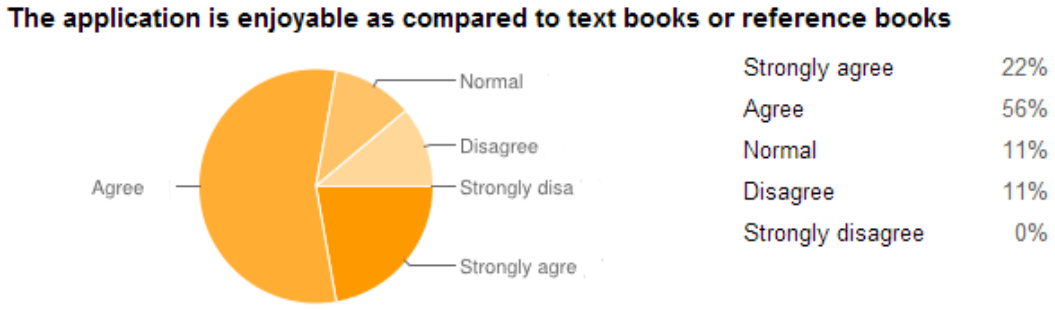


FIGURE 4.6: Question 2 responds

From the figure above, 56% agree with the statement followed by 22% of strongly agree. 11% of the respondents are both normal and disagree with the statement while there is no one strongly disagree with the statement. Based from the responds, more than one third of the respondents like the application. They agree that this application is more fun compared to the traditional text books or reference books. Thanks to the concept of edutainment, the application is fun to use.

Question 3: The information displayed is easy to understand

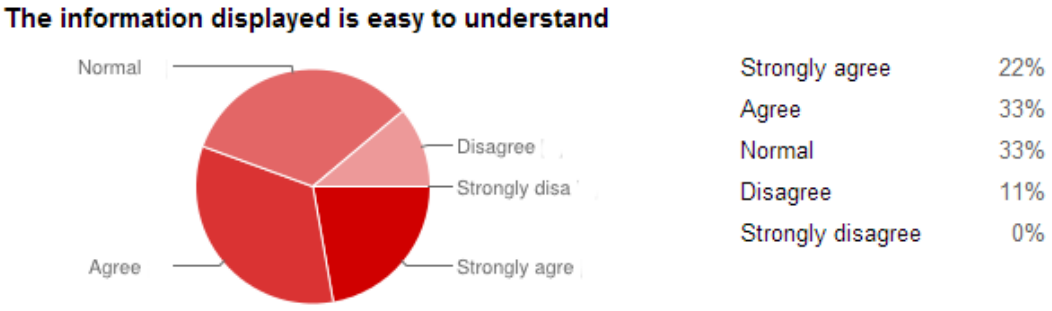


FIGURE 4.7: Question 3 responds

33% of the respondents are both agree and normal to the statement. 22% of respondents strongly agree followed by 11% of disagree and 0% of strongly disagree. Based form the responds, most of them responds with positive remark to the statement. Most of them easy to understand the information shown in the application. By following the concept of usability, the information showed to the user can be easily understand to the users.

Question 4: The question on the assessment help better understanding on the topic

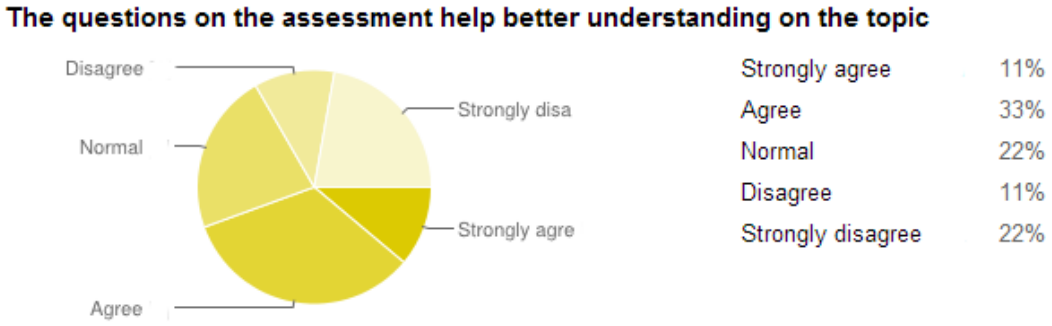


FIGURE 4.8: Question 4 responds

Based from the response, 33% are agree with the statement followed by strongly disagree and normal with both 22%. Both 11% of respondents disagree and strongly agree with the statement. From this response, there are some of them feel like the question is not good helpful enough for their understanding on the topic. Perhaps, different type of questions could be asked on the assessment.

Question 5: The application is engaging and interesting

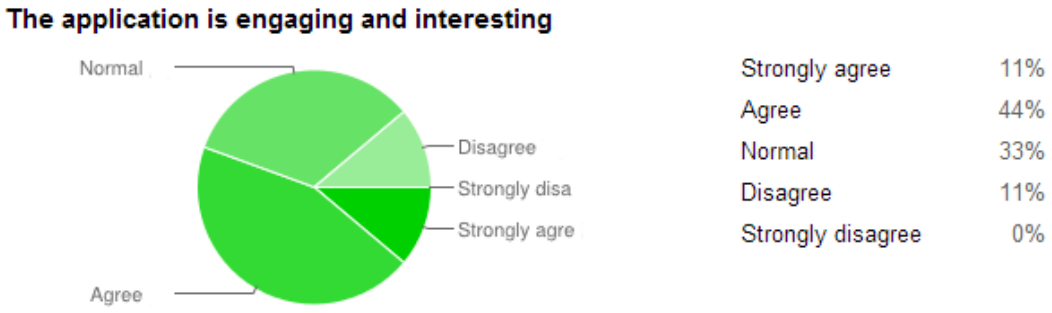


FIGURE 4.9: Question 5 responds

From the responds above, 44% agree that this application is interesting followed by 33% reacted normal towards the statement. Both 11% of the response are strongly agree and disagree. More than half of the respondents reacted positively towards the application. They are interested in using the application. Besides that, the application is able to engage with the user.

Question 6: There should be more application similar to this

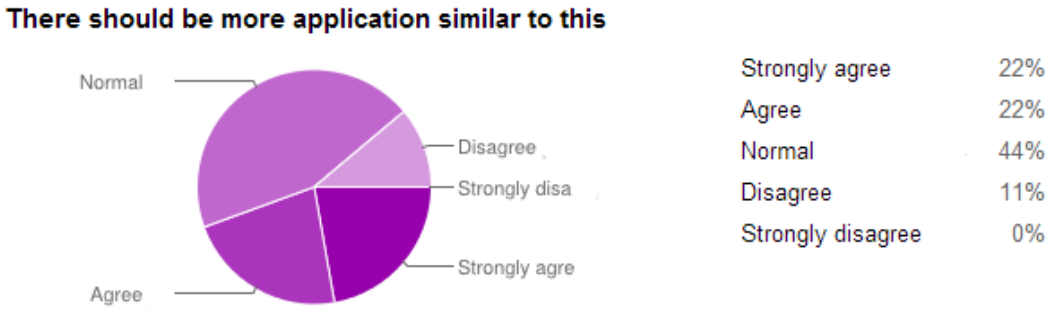


FIGURE 4.10: Question 6 responds

From the response above, 44% of respondents reacted normal towards the statement while both 22% are agree and strongly agree respectively. 11% of respondents disagree with the statement. Based from the response, the awareness on edutainment mobile application is still low. Only few respondents feel like there should be more edutainment application for the users.

CHAPTER 5

CONCLUSION

5. CONCLUSION

5.1. Relevancy to the Objectives

Based on literature review chapter 2 section 2.4, under designing interactive application, there are several concept or attributes of usability which are important when designing a mobile application. By designing a mobile application which follow the concept of usability, the application will be easy to use, hence it satisfy the user. That is the main idea on an interactive application.

5.2. Suggested Future Works for Continuation

The next stages of the application is to include all states in Malaysia. As of now, only Perak state is used for prototype purpose. Also, the application could be expand to another mobile operating system, which is iOS.

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