DESIGNING A PROGRAMMING MOBILE APPLICATION FOR NOVICE USERS: A PROTOTYPE

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Abstract: Mobile application or mobile apps has been a trending technology nowadays. This can lead to a new way of learning style. Learning process also becomes easier with the over-increasing development of education mobile apps. Novice programmers can learn programming easily with the development of programming mobile apps. A good programming mobile apps should not only focus on delivering the content but also on various aspect such as availability, usability, dependability, performance and functionality. Thus, a prototype on programming mobile apps has been designed to cater the needs of novice users. This paper will study the suitable method on system development that focus on activities and content arrangements based on the survey that has been done prior to the design .From the method chosen, a full system layout will be designed as a preliminary process before developing an effective programming mobile application.

Keywords: *programming, mobile apps , mobile learning, method, system development, system layout*

INTRODUCTION

Mobile learning is a new and trendy way to access learning process using personal electronic devices. This can be done using devices like your smartphone, laptop or tablet. The contents in the mobile learning application are across multiple contexts, through social and content interactions. Mobile learning application have become a highly trendy in the apps development industry. There are many company developing mobile apps in the market to serve the mobile learning purpose that can be used by teachers, students and trainers. With the increasing use of smartphones and tablets, the trend of mobile learning is going to expand exponentially in our daily life rutin (Riresh, 2019).

Nowadays, with the popularity of smart mobile devices among the young generation, it can be expected that educational applications that target these platforms should gain interest from students (Rau et al., 2008). Many kind and level of mobile learning applications for educational field are available such as for preschool, primary, secondary school and university level. There are variety types of mobile application for learning such like learning through games and combination of notes and games. As we all knows, the advantages using mobile learning application in education field are learners can learn from anywhere and anytime, the contents will be in various type of materials and learners can collaborate and discuss through online in large groups from all over the world (Cheon et al., 2012). The programming subject is also not left out in the world of mobile learning technology. Currently, there are various programming mobile applications on the market for those who wants to learn programming. In the early stage of teaching programming online, there are three strategies identified to improve students' programming online learning experiences by providing a virtual computer lab, create materials full of multimedia elements and creating a sense of community among students (Wang, 2011). By creating the virtual lab, problem on installiting the programming environment software can be avoided. Creating materials full of multimedia elements such as video and audio, will increase the students interest in learning it. Beside that, creating the community sense will allow the student to interact with each other easily. By providing discussion forums in a course management system, it will facilitate discussions on assigned programming topics, team interaction, and communication (McKelvey and Curran, 2012). Therefore, it is important

to create an online community to support online programming activities.

This study is going to focus on developing mobile applications for novice programmers. Therefore, we have to identify what are their needs. There are several perspectives on the characteristics and common delusions of novice programmers that should be considered (Soloway and Spohrer, 1989). They usually felt difficult to understand the concept and syntax of programming (Baist and Pamungkas, 2017). The novice programmer expect to learn from clear explanation with examples. Beside that, interactive presentation will also continue to generate interest in learning it.
Mobile application development process are different compared to normal desktop or laptop software development (Wasserman,2010). Availability, usability, dependability, performance and functionality are indentified as the system quality characteristics for selecting mobile applications (Sarrab et al., 2015). Therefore, learning mobile applications should be developed in a manner that is appropriate and has characteristics in interactive learning. This study focus on developing a suitable prototype programming mobile application for novice programmers. This prototype has been designed to fufilll and cater the novice programmer need, which is learning programming in an easy, simple and interactive way.

METHODOLOGY

Software development models are processes or methodologies used for the development of software or applications. There are many development model which has been developed like Evolutionary Prototyping Model; Spiral Method (SDM); Iterative and Incremental Method; Extreme programming (Agile development);Waterfall model; Prototype model; Rapid application development model and so on (Whitten and Bentley, 2007). All the models identify the various stages of the process and the order in which they are carried out (Sommerville, 2016).

For the purpose of this prototype development, few steps has been planned. For basic software development prosess, waterfall model has been applied to study and plan the overall mobile application process. Beside that, Agile methodology also will be applied during developing the mobile application development process and will be discussed in future research.

2.1 Waterfall Model

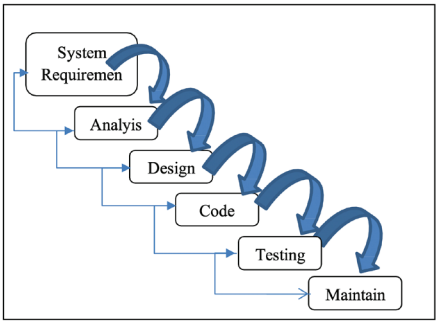

Fig. 1 Waterfall Model

The prototype in this study has been developed based on the waterfall model. In the Waterfall Model, there are six steps involve as shown in the figure above. Waterfall Model was introduce by Dr Winsson W. Royce. This model emphasizes the linear sequential phases in developing a software. Applying this model in software development gives a lot of advantages. This model will allow us to understand and focus on the requirement identified, plan our design early and beside that it also help us focus in our project milestone by phases.

The system requirement, analysis, design, coding, testing and maintainance are the six phases in Waterfall Model. The first stage, system analysis guide us to really understand our problem statement and requirement. In this stage, we undertand the problem statement that we would like to resolve which is developing an application that can used by novice programmer. In the analysis stage, to identified what are the special requirement needed, we preform the data collection and research. Detail explanation about the data collection will be elobrated in following section. Then, we planned our storyboard as in the design stage. We will start to implement the design from the storyboard in the coding stage and continue by testing the application and preform the maintainance.

2.2 Data Collection

A survey has been conducted to identify the suitability and preferences style for mobile programming application among the novice

programmer. The survey is done among the engineering students in UiTM Cawangan Pulau Pinang. In our previous paper, Studying the usability on various type of programming mobile application had explain detail about the result. As in this paper, the analysis will focus on the users preference on programming mobile application as it is the importance aspect when developing a prototype for it. Below are the questions asked on the survey based on the content and activity part:

Part : Content

Q1: What type programming content do you prefer? Q2: What style do you prefer for the content?
Q3: How do you prefer the content to be displayed?

Part : Activity

Q4: What type of activities do you prefer? Q5: What type of questions do you prefer?

PROTOTYPE DESIGN

From this study, we plan to come out with a new programming mobile application which is specially designed for novice users. We named it as EZ C++. EZ C++ is a programming mobile application which can be used by those who wish to learn C++. This apps consists of interactive notes, examples and activities which is suitable for novice programmers . Users can also try the C++ programming syntax by writing their own program in EZ C++. Figure 2 shows the logo of EZ C++ mobile apps.

Fig. 2 EZ C++ logo

Before we design the prototype layout, we have done a few survey. Based on our previous paper, "Studying the usability on various types of programming mobile applications", a summarization of the results on the respondents' preference for the content and activities in programming mobile applications has been identified.

Figure 3 below shows that the respondents prefer the content to be displayed by topics and consists of all elements such as text, graphics, audio and animated content. For the activities, the respondents prefer games compared to the conventional way. Activities on the implementation in programming is more preferable instead of theoretical questions.

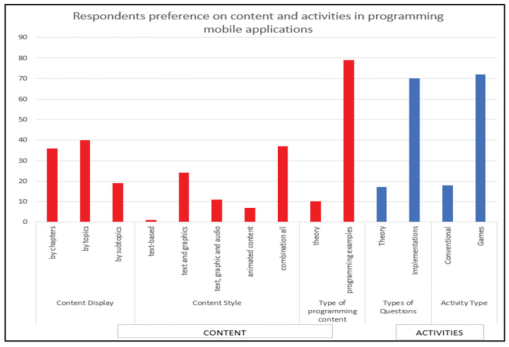

Fig. 3 Respondents' preference on the content and activities in programming mobile applications

From the result above, we have propose a suitable layout for EZ C++ mobile application prototype. Below figure shows the design for the prototype layout of EZ C++ mobile application. There will be seven interfaces in this prototype. The storyboard consists of nine interface layout of the EZ C++ mobile application.

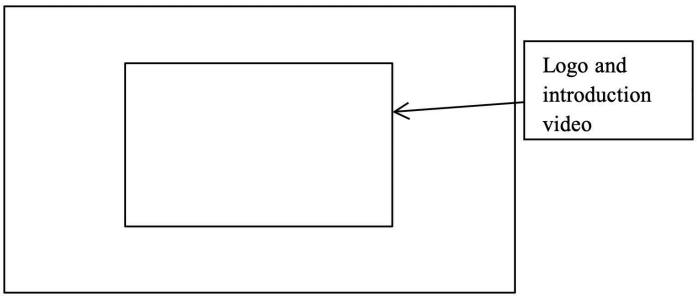

Fig. 4 Introduction Interface

Figure 4 above shows the first or introduction interface for the prototype EZ C++ application. In this interface, there will be a short video that display the logo and some information about this application. The next interface will be displayed once the video ends.

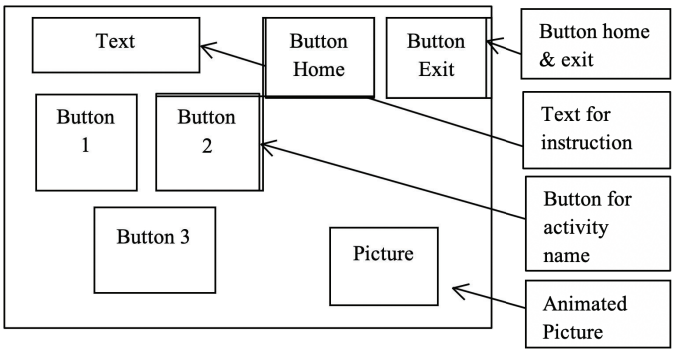

Fig. 5 Interface for select activity

The layout as in the figure 5 will appear after the introduction interface. This interface will consists of the list type of activity which are notes, example and game activity in button mode. Home and exit button also will be provided in the inteface.

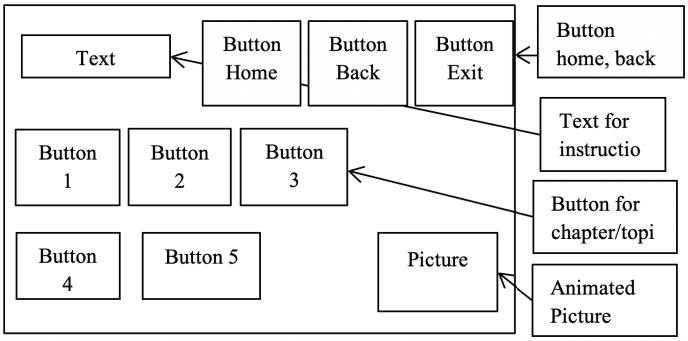

Fig. 6 Interface for select chapter or subtopic

Once user select the type of actity notes, interface as in figure 6 will be displayed. Here, user can select the chapter they want to go through by clicking the button provided. In this interface, we also provide home, back and exit button. The similar design interface will appear for selection of the subtopic.

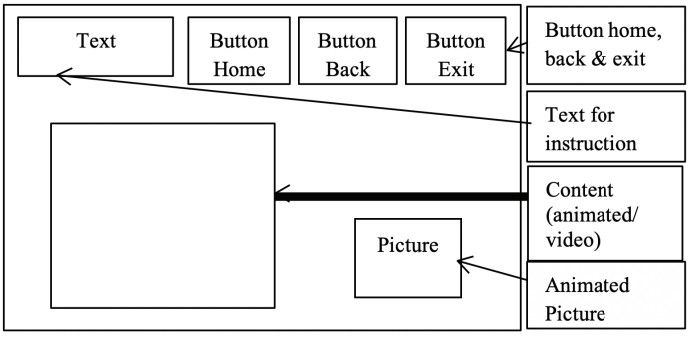

Fig. 7 Interface for display content by chapter, topic and example

Figure 7 shows the interface for display content by chapter, topic and example. All of the contents have the same layout. Various type of content will be provided such as in video mode, animated pictures and mindmap materials. As usual, we have home, back and exit button in this interface.

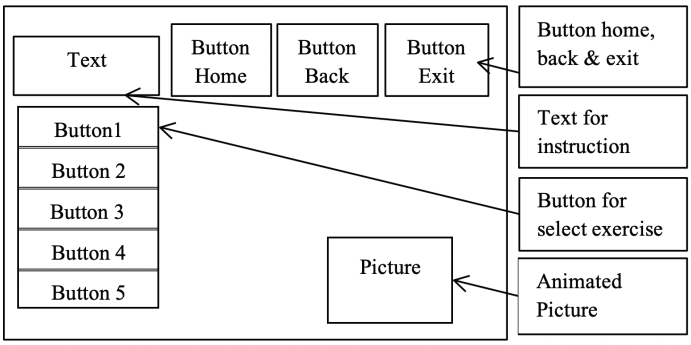

Fig. 8 Interface for select exercise questions by topic

Interface layout as in the figure above shows the list of exercise question by topic that can be selected. This interface will be displayed once user select game activity button from the interface select activity. Here, user can select the appropriate button to do exercise question by topic that they prefer. Similar to other interfaces, here we also provide the home , back and exit button.

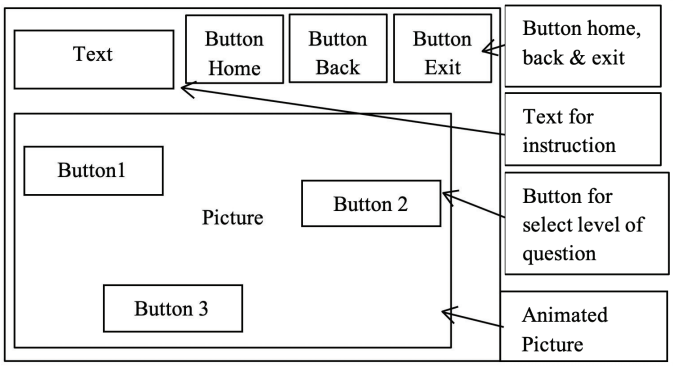

Fig.9 Interface for select level of exercise

Figure above shows the layout for interface level of exercise. Once the user select the topic from figure 8, this interface will be displayed. Here, the animated image will be displayed and on the image will shown the buttons that refer to the levels of question. Once user answer correctly, they can go to the next level of question. User have to play the exercise in sequence mode.

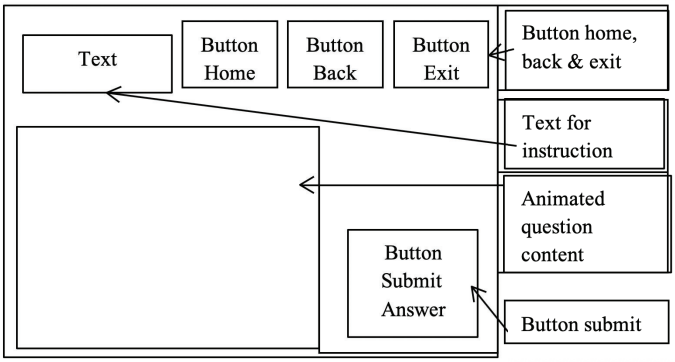

Fig. 10 Interface for display excerse question

The layout in figure 10 show the interface for display question based on the level selected from the previous interface. The question will be diplayed and space for the answer will be provided. After inserting the answer, user has to click on the sumbit answer button to sumbit their answer. An appropriate pop up image will appear based on correct or wrong answer. Various style of questions will be given such as match the answer, multiple answer question, fill in the blanks, and tick the correct answer.

CONCLUSION

The concept of mobile learning is getting very popular these days, as many school and universities are implementing it as an additional references and class activity. Various type of learning mobile application are famous among students, learners and trainers. Programming mobile application are also avalaible in the market especially for those who like to learn programming. In this paper, we focus on developing a prototype programming mobile application for novice programmer. Novice programmer usually prefer the application that is easy to use, can be understood easily and attractive. They prefer materials in various type that will enhance their interest to continue using the application. This study has design a prototype on programming

mobile application that will fullfil all these requirements.

ACKNOWLEDGEMENTS

This study is one of the third phase in our research grant ARAS. Our heartfelt gratitude to the Universiti Teknologi MARA (UiTM) for funded grant under iRAGS (600-RMI/DANA 5/3/ARAS(0173/2016).

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