Mobile Application Technology

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ABSTRACT

Mobile technology plays significant role in current education trend for children. For every child who growing up nowadays, mobile technologies such as mobile phones and laptop create a bridge over the educational gap that teachers left behind, the way the children have become more independent to learn things for the future. The difficulty of bridging the technology and life has been one of the major factors for children to catch up with current lifestyle. The current study of industry shows that rising demand for IT workers going unmet by the educational system. This phenomenon derived from the fact that the field of IT changes rapidly while Malaysia is still ranked low based on the IT literacy rate. Early exposure of the latest trends of mobile technology is needed to inculcate the IT lifestyle in Malaysia as well as to increase the number of IT literate citizens. This project aims to develop a mobile application that educates children the latest trend of mobile technology. The target research for the project focuses on building a rich mobile multimedia content that bridges young minds with the world of mobile technology. Tool that are used to develop the prototype are Apple Xcode with Apple iOS Software Development Kit and The New Ipad with the combination of Waterfall and Iterative software development life cycle (SDLC). The prototype result will be a mobile application made for iPad with two modules focusing on the mobile technology education and Windows Phone specifically. By releasing the application to public soon, hopefully it can be a great kick-start for the future young technologist.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Technology plays a huge role for education purposes for each and every level of educations. The usage of computers, projector, audio and visual material have already been used familiarly in education and it is proven to be a good platform to give a good impact in today's education. While mobile technology is moving forward rapidly, education can become so much easy and flexible to get. The awareness of getting up to date with the technology need to be cultivated for the future young generation. This research project is to develop a new mobile application to youngsters, based on iOS by Apple Inc. This application will focus on bridging the world of latest and advance technology to pre-school students. With rich content and multimedia animation, children will explore a new exciting experience of learning the latest trends of technology.

1.2 Problem Statement

Electronic devices and communication technology has evolved and continue to do so over the years. With the advancement of technology nowadays, future seems to be so unpredictable. We may change the way our future generations learn to a new with more efficient way. The challenge left is for us to keep update with the latest trend of

technology as well as bringing a benefit to the future generation. The new era of mobile application reflects the flexibility of current generation to connect and learn, and it has been used for all kind of purposes whether for gaming, educational and entertainment.

1.3 Problem Identification

Latest study has shows that Malaysia is ranked at 140th based on literacy of the citizens in the world. Not only that, Malaysia is also ranked 150th based on IT literacy of the citizens. This shows that Malaysia has low rate of IT literacy compared to other nations in the world. However, Malaysia is keep improving from time to time with vast improvement on its education system.

Current early education only limited to books and graphical reading. There is also usage of technology material such as computer, audio and visuals that help them to learn about alphabet and numbers. While giving them the exposure of the latest trends of technology, using the text and graphical reading is not very feasible. This is because the nature of technology itself is hard to understand unless you are exposed directly to the technological advancement. A lot of read and exposure need to be taken by the student to get them prepared to face the latest trend of technology.

Primary schools now are equipped with computer lab for the students to learn more about multimedia and technology. However, the question is still remains unanswered: ‘do the same methods from primary schools can be applied to pre-schools for earlier learning experience? Results of a research revealed that younger children viewed pages for

significantly shorter periods of time when compared to the older children. These differences are attributable to the child's reading ability (M.I. Hamzah, 2009).

Aside from the children itself, parents are having dilemma of exposing their kids to the world of technology. Even with right tools but without proper way of exposing kids to the technology, it can be easily affects the children in a negative way. There are a lot of parenting tools made to track children's behavior away from any negative activities of using technologies

1.4 Significant of the Project

With the technological advancement, students are required to utilize all technological advancement to increase effectiveness as well as the interactivity of learning itself. Activities that use tactile, visual and auditory grasp the children's interest. The activities and information is internalized and the children have fun. Through the use of mobile application, learning can be more flexible and full of excitement. It should be used in pre-school education as it offers a direct connection with the learning environment and also a very fun way of learning. While investing in computer and bigger hardware require more cost, mobile application that can be opened using tablet and phone seems to be more practical for the specific age.

1.5 Objective and Scope

Several objectives has been determined by the author and listed as following:

- To research on the latest trend of technology and the pattern of improvement
- To develop mobile application that educates children the latest trend of mobile technology

1.6 Relevancy of the Project

With the advancement of technology introduced to the world day by day, the awareness of utilizing the latest technology should also be cultivated from the beginning. We have seen how same module applied to mathematics and science such as Kumon method and much more. Now it is the time for Malaysia to go even further by cultivating the awareness of utilizing technology. A recent study shows that the number of IT literate people in Malaysia is increasing tremendously giving a spacious room of improvement to IT industry in Malaysia.

With the additional support from government, we can also see that the government is moving the same page with the community by moving forward to utilize technological advancement of what the world are having now. There are a lot of programs organized and supported by the government such as ICONapps and Developer Conference are all focusing on the same page; mobile development for getting better community (Bernama, 2011).

Since the day smart school was implemented, citizens as well as the students accept the technological change with arms wide open. Now we can see almost every school owns minimum of one computer lab. Most of the academic syllabuses are translated to digital medium, allowing students to open their computer and do the same as a textbook does but with better experience.

Growing war of tablets and smart phones also contributed to the relevancy of this project. This research project, which will be focusing on mobile phone, contributes to the flexibility and mobility of education in Malaysia.

1.7 Feasibility of the Project within the Scope and Time Frame

The author has been given two semesters of his final year, which he needs to accomplish in creating the mobile application. That is equivalent to approximately eight to nine months of time frame. The first half of the time frames will be focusing on the following parts:

- Identifying the need for the application that has to be created
- Clarifying the problem statement and scope of the project research
- Understanding the nature and latest trend of technology
- Carry out research to understand the nature of education for pre-school student
- Come out with the most feasible design and process flow for the system
- Redefining scope and functionalities of the system
- Acquiring hardware and relevant parts of the development of the application
- Drafting for the user interface and multimedia animation

The second half of the time frame will emphasis on the following parts which are:

- Application development
- Getting the application published to the Apple Appstore

CHAPTER 2

2.0 Literature Review

Computer technology plays significant role in current education trend for children. For every child who growing up nowadays, computers and technologies create a bridge over the educational gap that teachers left behind, the way the children have become more independent to learn things for the future. With the advancement of technologies, the learning curve of children can be made faster as well as helping them to get an overview of the latest trend of technology that they will be using in the future.

Results of a research revealed that younger children viewed pages for significantly shorter periods of time when compared to older children. These differences are attributable to the child's reading ability. Giving them a new experience of learning with rich and involving the children can facilitate the educational learning curve to a faster and more effective.

One of the challenges facing for us to get our new generation ready to accept the new trend of technology itself is the norm of the technology itself as it is moving so fast as not many of us can keep up with the latest trend of technology. Creating a mobile application with rich content and a constant update will create the early sense enthusiast of learning technology in an interactive way.

2.1 Technological Integration

With the high speed of technology development and more drastic global competition, the technology scopes of a product or services have becoming much wider and its product lifestyle has becoming shorter quickly. Recently, a huge war-of-geek occurred between several top technological-based companies offering the world the best of their invention. Microsoft has came out with the new Microsoft Surface Tablets claiming that the product will be the 'iPad killer'. Apple, however still claimed that they owns the best tablet in the world; The New Ipad. Meanwhile, Samsung also came out with the new tablet to add up the spice of the war. With all of these happening within a week, the author can deduce that new inventions of technology hit the market offering the world a better solution quickly but with shorter lifespan. Technological integration is one of the most effective ways to keep in line with the latest trend of technological advancement (Wei & Wang, 2008). In keeping the fundamental of technological integration on track, Seongwoo (2007) has proposed a technology entropy tree, which illustrates the hierarchical relationship between the previous and successor technologies.

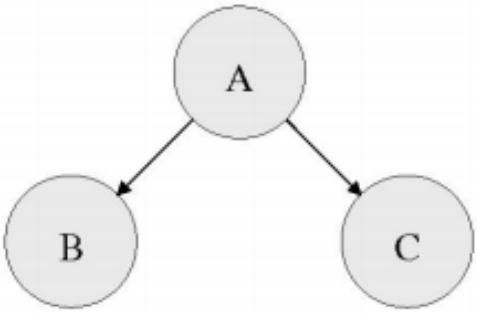

Figure 2.1 Technology Entropy Tree

The technology entropy tree is a useful framework for describing the relationship between previous and successor technologies. Basically it is composed of three

components: previous technology, successor and relation arrows. The basic scheme is shown in Figure 1. This theory provides a feasible strategy for long-term survivability in extremely dynamic technological environment. It also provides insight for measuring and predicting the amount of flexibility and survivability of a specific technology.

Wei and Wang (2008) have proposed a process called Technological Integration Process. It is a process that combines kinds of technologies to produce new product, manufacturing process and also to analyze how to implement Technological Integration.

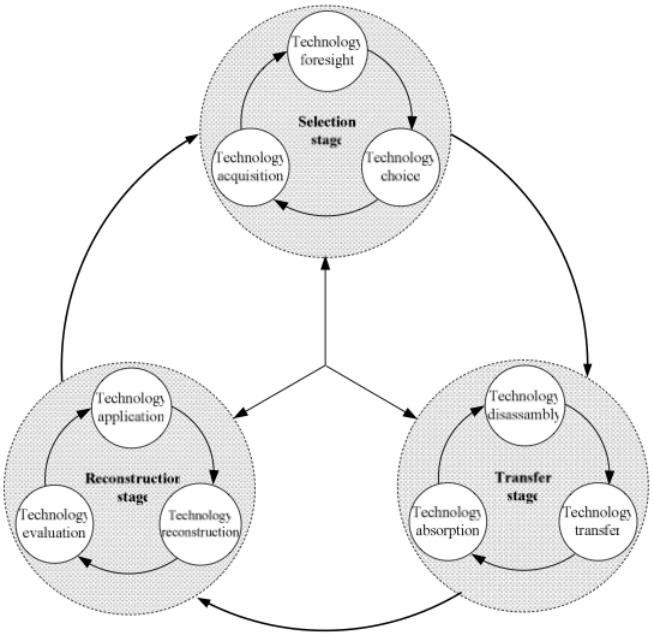

Figure 1.2 The model of TI Process

A complete TI process can be concluded into three important stages such as technology choice, technology transfer and technology reconstruction. These three parts can be subdivided as referring to Figure 2. According to Wei et al., this process can be a strong support for the strategy making and provide a detail operation approach of technological integration for firms to practice. However, there are some limits and lacks in this approach. First is because the TI is a complex and non-linear process so the sequential

nine processed in the model could not disclose the in-depth characteristics. Second, in different stages, contains and effects are not the same, but the model did not give the detailed analysis. A lot more researches need to be done to improve this model for the future betterment.

2.2 Theories of Multimedia Learning

According to a study done by Zuraini Hanim and Wan Fatimah (2011), learning theory describes on how people learn new things. Designing a mobile learning application should involve principle of learning in order to access whether the application reflects and compatible with the learners. There are a few theories that have been considered and reviewed further below:

2.2.1 Cognitive Theory of Multimedia Learning

Mayer (1996) stated that, meaningful learning experience happens when the students mentally construct coherent knowledge representation. This representation is based on the cognitive theory of multimedia learning and several principles derived from it. Research in cognitive psychology has shown that humans possess separate information processing for visually and audio represented material. Based on this fact, the cognitive theory of multimedia learning is developed.

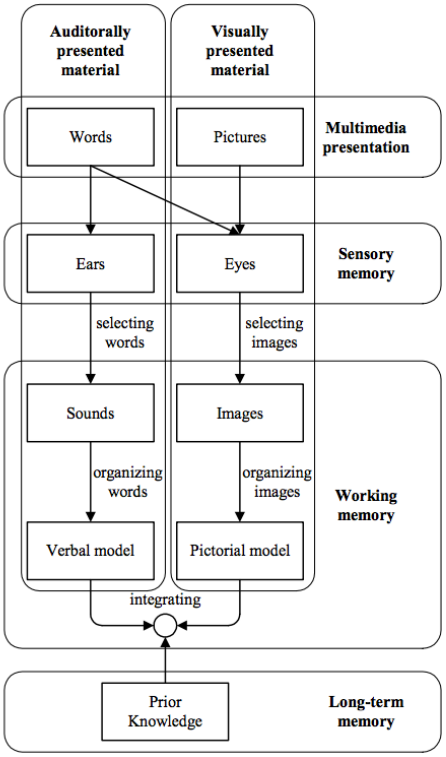

Figure 2.3 Cognitive theory of multimedia learning

According to Djurovic (2010), multimedia-learning principles devised from cognitive theory of multimedia learning are:

- Coherence principle (people learn better when extraneous material is excluded)
- Signaling principle (people learn better when cues that highlight the organization of the essential material are added)
- Redundancy principle (people learn better from graphic and narration without added printed text)
- Spatial contiguity principle (people learn better when corresponding words and picture are near each other)
- Temporal contiguity principle (people learn better when corresponding word and pictures are presented simultaneously)

Figure 3 summarizes the cognitive theory of multimedia learning. Audio and visual enters via the ears and eyes for the process of integration prior knowledge. The learner

selects some of the images for further processing in he visual channel, organizes the images into a cause-and-effects chain, and integrates it with the verbal material and prior knowledge. According to this theory, the cognitive process of integrating is most likely to occur when the learner has corresponding pictorial and verbal representations in working memory at the same time. Instructional conditions that promote these processes are most likely to result in better understanding learning. This theory predicts that multimedia presentations are more likely to lead to meaningful learning than the single-medium presentations. (Djurovic, 2010)

2.2.2 Van Hiele Model

This model of geometric thinking resulted from the doctoral work of Dina van Hiele-Geldof and Piere van Hiele at the University of Utrecht in Netherlands (Crowley, 1987). The theory was made to overcome the problems in learning geometry and shapes. There are five levels in the van Hiele model, which are:

- Visualization: The students view the figures by the overview
- Analysis: Students are able to identify attributes of the figures
- Informal deduction: Students need to give their own assumption
- Deduction level: Students will understand theories and make use of it
- Rigor: Students will compare theories and distinguish the attributes

2.2.3 Persuasive Technology

Persuasive technology is also one of the theories used in the learning of multimedia. According to (Arifah , Wahab, & Ibrahim, 2012), persuasive technology is defined as technology that is intended to change attitudes or behaviors of the users through persuasion and social influence with the use of computer and media. There are three

types of persuasion: interpersonal persuasion, computer-mediated persuasion and human-computer persuasion as shown in the figure.

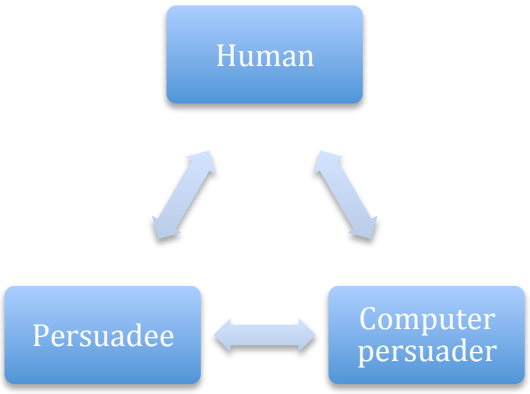

Figure 2.2 Three Types of Persuasion

Interpersonal persuasion refers to persuasion from human to human by using a verbal and non-verbal communication. Computer-mediated persuasion denotes the use of technology such as computer to persuade people. Meanwhile, human-computer persuasion involves the persuasion through human-computer interaction. The overlapping of human-computer technology in persuading people is also known as 'captology'. Captology refers to the use of computers and persuasion is overlapped. It is a study of computer as persuasive that focus on the design, research and analysis of changing people's attitudes and behaviors.

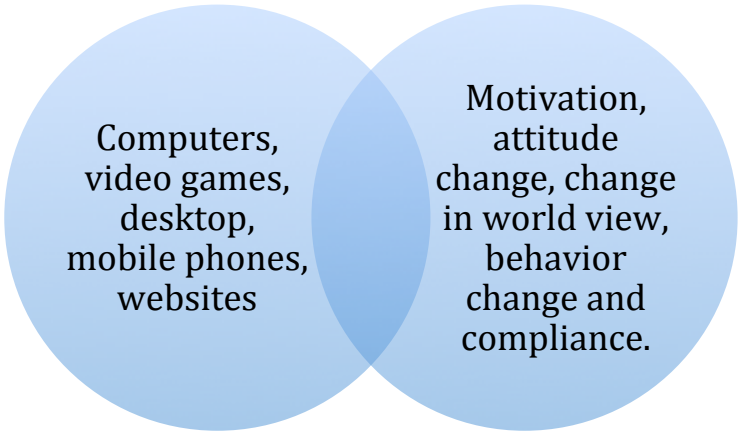

Figure 2.3 The Area of Captology

In captology, teaching as persuasion metaphor recognizes that learning involves more than integrating new knowledge and it involves the intention to change one's belief. Therefore, it also puts the responsibility for change on the learner, not the teacher.

In education using persuasion technology, there are three ways where computer can change people's lives.

- Persuasive technology can make it easier for people to do things by making things easier, either by giving people shortcuts to complicated process or by reminding them that it is time to exercise.
- Persuasive technology can provides an experience, allowing people to explore the cause and effects relationships
- They can create relationships, either with the people or with the program.

In designing persuasive technology, there are 8 steps that should be considered. Since this study attempts to develop a mobile application on educating kids the latest trends of information and technology through persuasive method, persuasive design steps were considered as a guideline for the study (Yusoff, Zulkifli, & Faisal Mohamed, 2011). The steps are as follows.

Steps	**Description**
Step 1	Choose a simple behavior
Step 2	Choose a receptive audience
Step 3	Find what is preventing the target behavior
Step 4	Choose an appropriate technology channel
Step 5	Find relevant examples of persuasive technology

Step 6	Imitate successful examples
Step 7	Test and iterate quickly
Step 8	Expand on success

Table 1: 4 The Area of Captology

2.3 Children and its acceptance

Biologically, child is generally a human between the stages of birth and puberty. In this specific research project, a specific target market is to the children, which lies between ages of 5-7. In educational institution, this specific group of children are undergoing pre-school. This is the phase where children develop their own creativity in exploring the real world. This is also one of the most important phases in their life that can help to shape what the future will be.

Born after 2000, this generation is often called Generation Z. They are born to be with complete technology. They were born with computers, mobile phones, gaming devices MP3 players and the ubiquitous Internet (Mueller, 2010). Members of Generation Z have exposed to the world digitally. They are also exposed well to the social world, technically via Internet. Social networking sites, instant messaging ruins the real life conversation that we used to for early generation. This generation also referred to have multitasking skills (Matthews, 2008). This is also contributed by the technology, which enables them to get the work done faster. Any action that tends to make improvements for the betterment of this generation must act according to their trends and settings. This is to

make sure that they are comfortable with the changes and facilitate the improvements. (Pengfei, 2010)

2.4 Mobile Learning

Mobile learning is fundamentally a term that refers e learning conducted over mobile device such as smart phones and tablets (Nadia Abdul Wahab, 2010). It is a method for mobile education using computer and Internet technology through mobile devices. Nimish Radia (2012) has states that the main reasons why mobile application is so successful now are because of factors such as:

- Productivity (on-the-go email, cloud-based document, travel-based services)
- Utility services (navigation, communication, alerts, expenses)
- Entertainment (games, music, video)
- Information gathering (web browsing)
- Social network

Mobile learning is considered to overcome e learning problems such as the lack of infrastructure for accessing Internet. By using mobile learning, learning can happen everywhere and anytime. It is also the future of education and learning. Mobile learning enables you to learn from your mobile phones and tablets at lower cost with less equipment. Specific mobile application education for young generation should be designed and programmed with respect to their technological skills, learning capability and language proficiency. In order to maximize the use of mobile technology device for children, a notebook would not be appropriate. We need to simplify things so that mobile learning for the children can be made easily and effective.

Nadia, Aznoora and Mohamad Hafiz (2010) have developed a prototype of mobile application for learning and have outlined some of the findings such as the terminologies. Terminologies used in the application itself must be made easy to understand.

The choice of word used must be familiar to the user to improve understandability. Navigation also plays a big role in the prototype. Smooth navigation is needed to maintain the user experience each time the user use the application. Researchers also discovered that changing the color could improve the user experience to the application. They stated that red button is suitable for quit and delete option. (Nadia Abdul Wahab, 2010)

2.5 Examples of Existing Mobile Application for Education

Up to now, mobile education has been used widely and become trends. Android and Apple iOS leads the market with the most number of mobile educational applications. Following are the examples of mobile application for educational purpose:

2.5.1 Read Me Stories

Read Me Stories is a mobile application that helps children to practice reading. With appealing graphic and animation, this application looks promising in getting children's interest of reading books. The application acts as a mobile magazine of a series of storybooks and children can select any of the storybooks to start reading (8Interactive Limited, 2012).

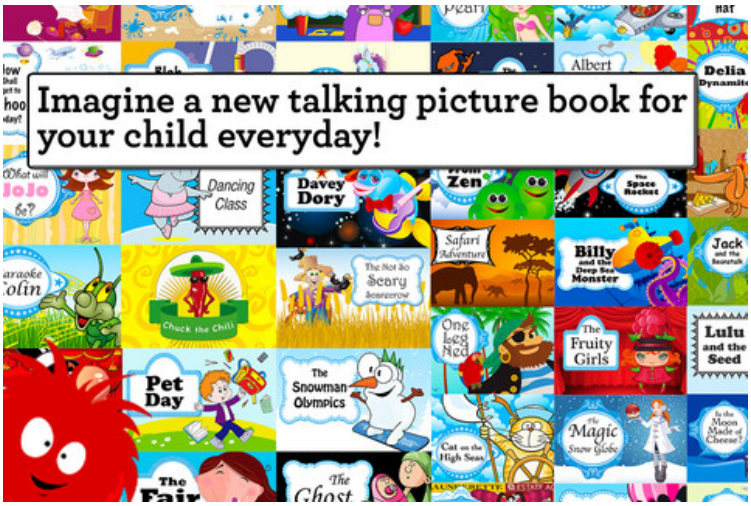

Figure 2.6 Main interface of Read Me Stories

One of the main drawbacks of this application is the availability of the storybooks, which is quite limited, and user need to purchase to buy more storybooks. Since this is a free application, there are always series of advertisement that promote in-app purchase and this requiring constant supervision from the parents to purchase another storybooks.

2.5.2 Today In History

Optimized only for Iphone, this application serves as a gateway of history of the world information the user want. The application was made based on the calendar interface for iPhone. The application provides simplicity of the user in getting information of selected date and also history based on current date (Manuel Zamora, 2012). The content of the app is static.

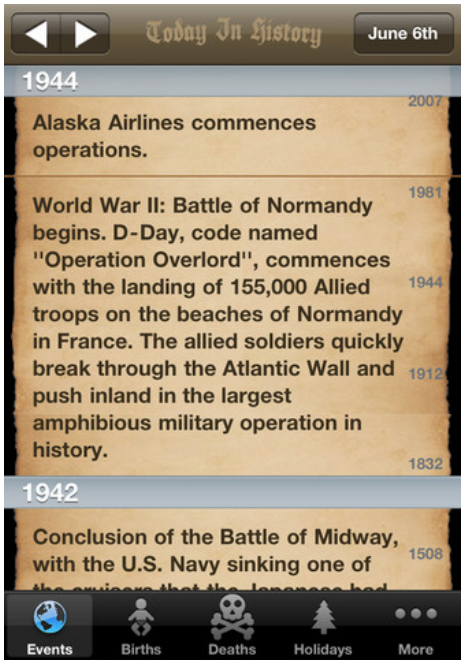

Figure 2.7 Main interface for Today In History

2.5.3 Salah 3D: Islamic Prayer

This is an iPad-optimized application made to educate children about the basic of muslim's prayer. With rich 3D content and animation, this application is one of the most interesting types of educational application by providing an immersing experience of the learning environment (AppPilot, 2012).

Figure 2.8 Interface of Salah 3D

The application is made for wide variety of users including adults and also kids due to its immersive application.

2.5.4 First Word App

An iPad optimized application that focus more on the latest technology. The content is yet general towards technology itself and it only has a module that is the alphabet. It is rich of multimedia and animation content to ensure that children are interested to learn. One of the disadvantages of this application is that there are a lot of advertisements that will distract the user to navigate with the application. So it is needs a proper maintenance for the parents to navigate the application. The content is also limited to the application of alphabet from A to Z.

2.6 IOS Development

In this section, the author will review on the IOS platform itself for the development and the advantage of using IOS as the main platform. IOS is a platform that developed by Apple Inc focuses on the creation of creative and multimedia contents for Apple Iphone and Ipad. Currently, there are more than 30 billion apps from the app store downloaded, making it one of the largest mobile appstore (Smith, 2012). With more than 650, 000 applications available, it is also 50, 000 more apps than Android and almost 550, 000 more application than Windows Phone.

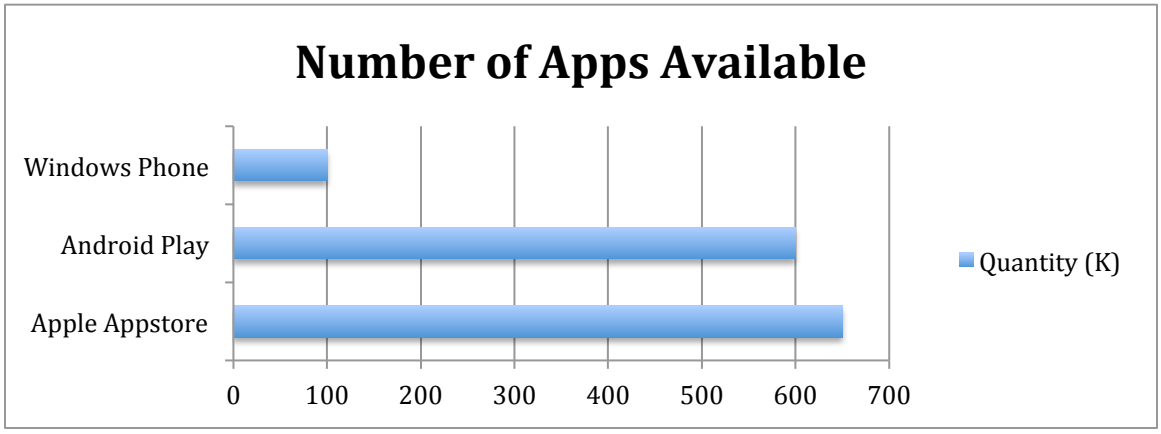

Figure 2.9 Number of apps available

In comparison with Apple IOS and Android, Apple IOS has a greater advantage in term of the development since it is easier to develop and better support. However, there is a fee that every developer must bear in order to become the developer. It is also easier because of low level of requirement in term of heterogeneity due to smaller range of product that Apple owns (Tracy, 2012). Other than that, it is pretty much similar based on the standards and requirements.

CHAPTER 3

3.0 Methodology

3.1 Research Methodology

Research methodologies represent technique that can be used to conduct research prior to developing a system or an application. It includes the type of data to be collected, the method of data collection, the number of sample in the population and other variables that can help to the research and development process. In this project, the author will be using qualitative and qualitative approach to gather research information and findings.

3.1.1 Methods of Data Collection

The research requires data collection from two sources, which are primary and secondary. Primary data is a term for data collected from source itself while secondary data is a term where the information is collected through physical research done in the real situation. Normally it can be done through survey, interview and observation.

3.1.2 Application development methodology

Planning for application development is crucial in getting the project done within the timeframe.

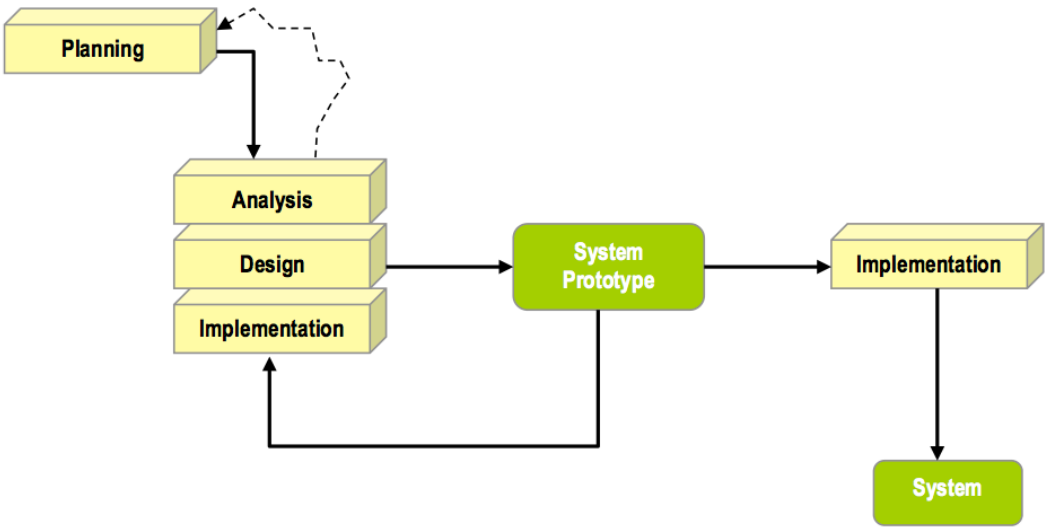

Figure 3.1 Application development

This methodology is usually used when the process is likely to be changed as the project proceeds or when the stakeholder has little idea of what system to be built. All the Analysis, Design, and Implementation phases performed at the same time and on each cycle in producing a *system prototype*. The cycle repeated continually based on the comments until the system prototype successfully meets the requirements. The last prototype will then be called the system. Prototyping development needs only initial basic analysis and design. Thus there is a possibility to revise the initial design decision and start all over again from the beginning. As for the advantage of using this model is that it can deliver system quickly to users, though it not exactly meeting the requirements. The processes are divided into four stages where it will be thoroughly followed by the author in order to make the project usable.

- **Planning – Data Gathering**

  The first stage is planning where the author finds the main reason why the system should be built as well as understanding its requirement. During this stage, it is necessary to be aware of the theory of the development of iOS application itself. It is important to know the capabilities of the devices to control an application that designed for pre-school students.

- **Analysis – Data Analysis**

  The activities such as problem identifying and predicting the potential problems of the project in the future are arise during this stage. The information gathered during planning stage is being analyzed therefore the literature review is done. During this stage, the author should identify the importance of iOS application in helping pre-school students to learn alphabet and numbers.

- **Design – System Development**

  The design phase determines how the application will works in the system environment. In this case, how the iOS mobile application helps in learning phase of pre-school students. On this stage, the illustration of the interface is done based on the findings received. To complete this part, Xcode running in the latest Mac Mountain Lion and iOS Software Development Kit is needed.

- **Implementation**

  The most resource phase of all is implementation where the application is built, tested and installed for the users to use. This stage has been done to a few of the target users in order to get more information as well as their opinion on what the author had been done

so far. Once the users satisfied with the prototype, the author will publish the application to the Apple Appstore and ready for download.

3.2 Project Activities

- **Thinking aloud**

  The method of thinking aloud allows us to understand how the users approach the system and what considerations the users keep in mind when using the system. During the test procedure the users are asked to verbalize and describe their thoughts, feelings while interacting with the system. The main advantage of this method is a better understanding of the user's thoughts and interaction with the android system.

- **Questionnaires**

  Questionnaires or survey are generally a common way to gather data and allow a quantitative analysis of results. The questionnaires that are well designed can gather information on both the overall performance of the system as well as information on specific components of the system.

- **Qualitative interviews**

  Although interviews may be different from questionnaires in the concept of their formality they should not be considered less important. Instead, they should be used in a better state that makes the best use of their strengths

3.3 Gantt Chart

The whole timeframe is crafted based on this Gantt chart

Detail Week	1	2	3	4	5	6	7	8	9	10	11	12
Research												
Progress Report												
Development Phase												
Dissertation												
Pre-EDX												
Viva												
Final Dissertation												

Table 2 Gantt chart for the timeframe of the research

3.4 Tools

3.4.1 Hardware

For this project, The New iPad or later version of it with iOS 6 pre-installed will be used as the devices that help pre-school students to learn and expose themselves to the latest trend of technology.

Figure 3.2 The New Ipad

This is because Apple Ipad is one of the best tablets in the world providing promising screen resolution for rich graphic content application. In the development phase, an iMac or MacbookPro will be use as a workstation before the demonstration.

3.4.2 Software

For the software, the author had chose Apple Xcode 4 with pre-installed iOS 6 SDK. It was released few months back with several new features such as improved Storyboard and much more. The new Apple Xcode allows the user to have a better development environment by having an improved platform to develop the application. Author will also be using graphical application such as Adobe Photoshop, Adobe After Effects and Adobe Illustrator to design and doing the animation.

CHAPTER 4

4.0 Results and Findings

A survey and questionnaires has been done to a specific group of students in Sekolah Kebangsaan Teluk Pial. 60 students have been selected from various classes to answer the survey. The objective of the survey is to know the rate of utilization of technology and the acceptance of current generation to the world of information and technology.

4.1 Results

A series of questionnaires in Bahasa Malaysia has been developed for this specific field. The questions are covering the technology utilization and awareness of people in using technology as follows:

- Student details (name and age)
- Rate of current technology used in school (computer lab)
- In a week, how often do you use computer lab?
- In a week, how often do you go to cybercafé?
- What is your usual activity in cybercafé?
- Do you have computer at home?
- Do your parents allow you to use smart phone?
- Do you have smart phone at home?

Rate of current technology used in school (computer lab)

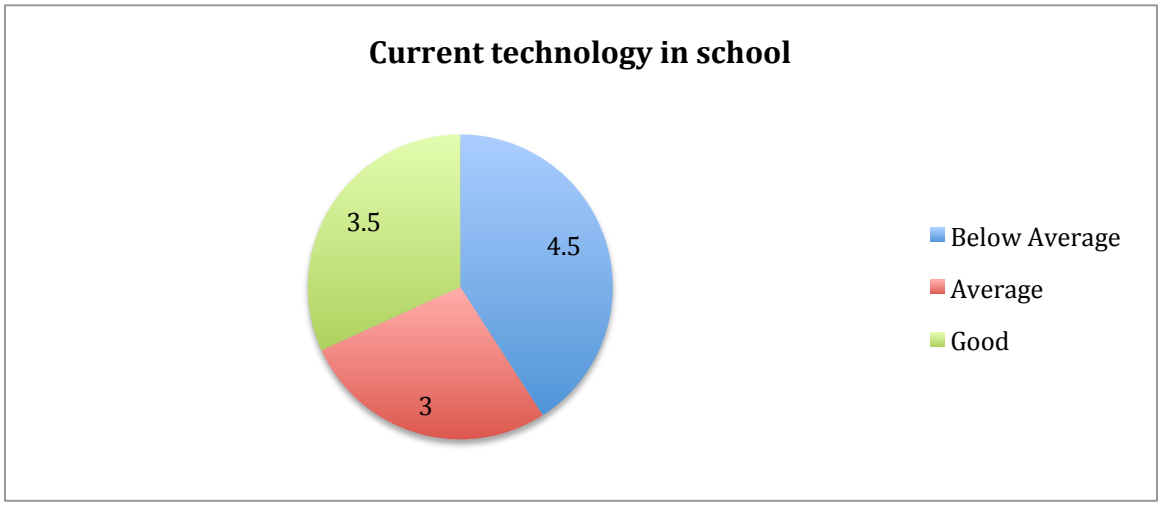

Figure 4.1 Rate of current technology in school

Frequency of students use computer lab in a week

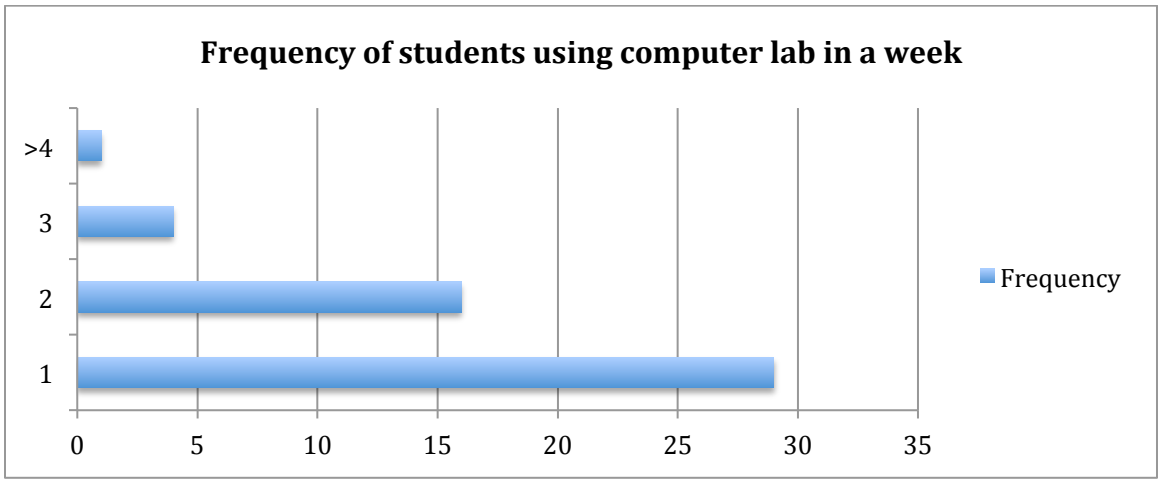

Figure 4.2 Frequency of students use computer lab in a week

Frequency of students goes to cybercafé in a week

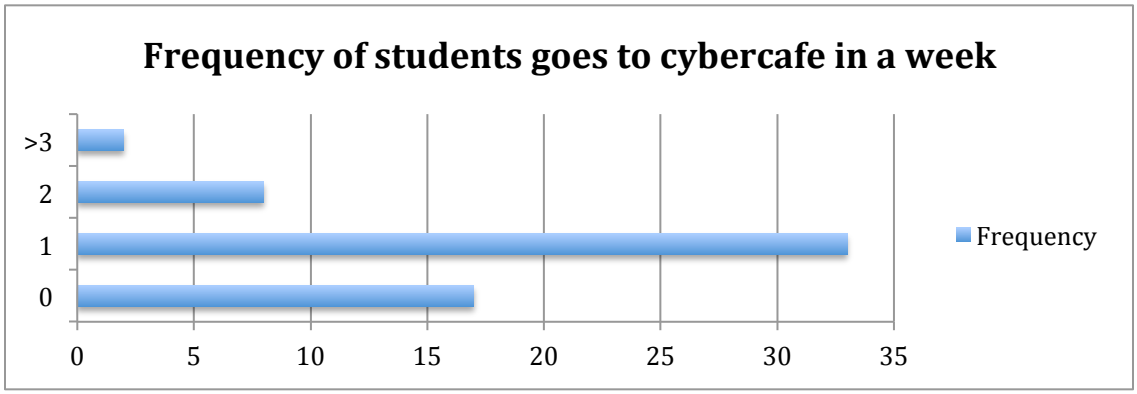

Figure 4.3 Frequency of students goes to cybercafé in a week

Activities in cybercafé

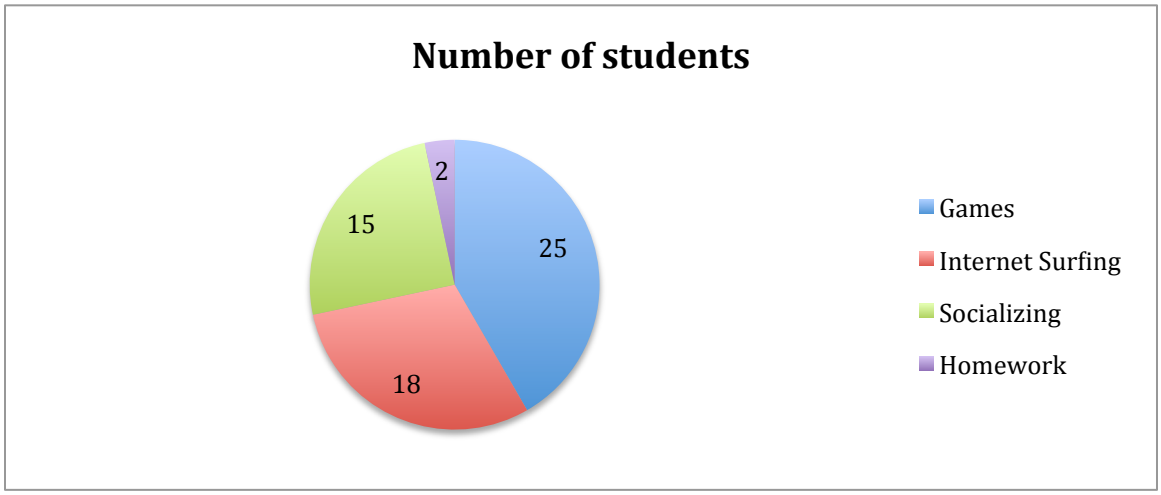

Figure 4.4 Activities of students in cybercafe

Number of students with phone and computer

Criteria	**Yes**	**No**
Owns a phone	18	42
Owns family computer	38	22

Table 3: Numbers of students with phones and computers

4.2 Findings

Based on the survey and questionnaires, it has been proved that most of the technology applied to the schools has been under-rated by the students itself. This is further contributed by several factors. The main factor found is the awareness cultivated from back home. Children have been thought to use computer earlier than previous generation. Comparing to the computer at their home and the computer lab, there are several differences and the major difference is the technology adopted in computer lab is quite old. This difference has made the students go for another solution such as cybercafé or just stay at their home. This generation is also shows the awareness of getting socialized through online medium such as Facebook and Twitter. While they do gaming and socializing for hobby, surfing Internet is another traits that we can take a full advantage on. However, there are some concerns that parents are afraid of such as the Internet misconduct and technology misuse. This issue has been brought long time ago but the solutions may have varied according to the time.

More than half of the students are able to use their family computer by supervision of their parents while there are some groups of students who really own a smartphone monitored by their parents. Significant number proves the technological utilization has started to be one of the trends to educate the young generation.

Being able to cater the problems and advantage, the application can works well based on proper planning and execution. It has been proven that the kids now has ready to move forward and be exposed further to the world of information and technology.

4.3 Discussion

Based on the Proposal Defense session, several issues have been brought to further attention and future improvement.

4.3.1 Sustainability plan

One of the main issues that have been brought is the sustainability plan, which focuses on the implementation of the project in the next few years. As the nature of technology that always keeps improving, a solid sustainability plan must be crafted to ensure the continuity of this project for the betterment to the community.

4.3.2 Sustaining children's attention in using the application

Another issue brought into attention is to sustain the children's attention of using the application. Since the nature of technology that is too much technical, a proper way of motivating the children must be done to ensure that it will attract children's attention to use the application. The initial plan of the application is to include rich content of multimedia and animation in the application but due to scalability of the project, a new way, which requires smaller scale that is by using persuasive technology.

4.3.3 Suitability of the application with the nature of technology that is always moving

Another problem stated during the Proposal Defense session was the suitability of the nature of technology that is always improving. Several solutions have been brought to the discussion. The main solution is to change the application to a standard online magazine,

which requires user to have a connection to access the content. This enables the application to have a constant updates for every new technology arrived. Another solution for this matter is to apply similar methods used by Angry Birds game application. The method use to updates the application is to have a series of season that requires user to update within a period of time. This has proven to be a more easier and effective way to solve this problem.

4.4 Application Design

4.4.1 Activity Diagram

Activity diagram is a graphical presentation of workflows of the application with proper actions and support of choices, iteration and concurrency. In this project, activity diagram is as follows

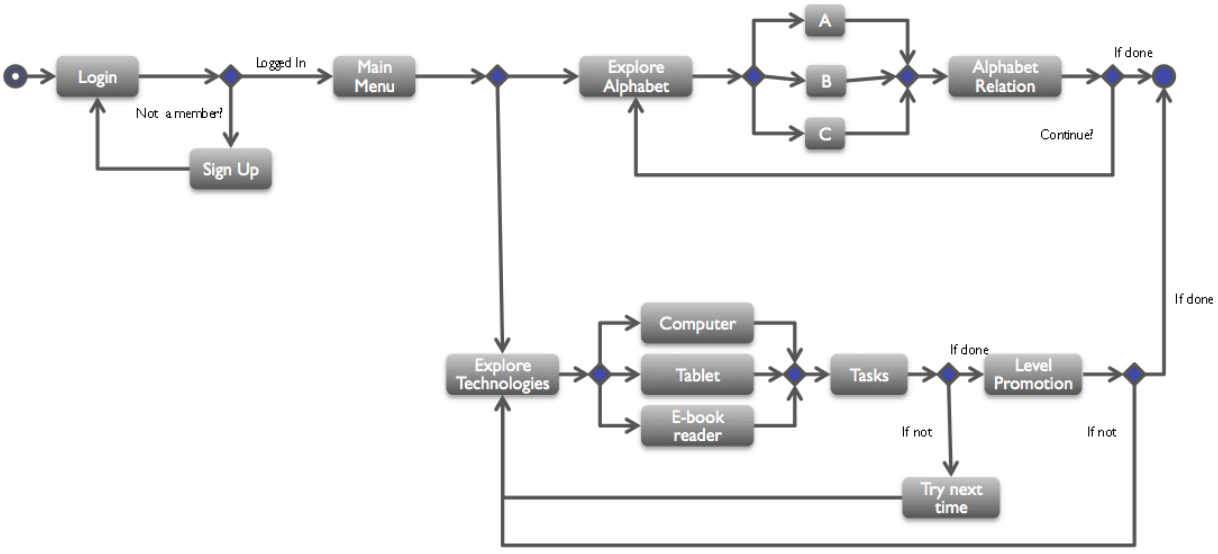

Figure 4.5 Activity Diagram

4.4.2 Application Wireframe

Application wireframe denotes the first sketch of the user interface application that was done after the results and data gathering. It serves as the first overview of the application and will be further developed during the next phase of project implementation.

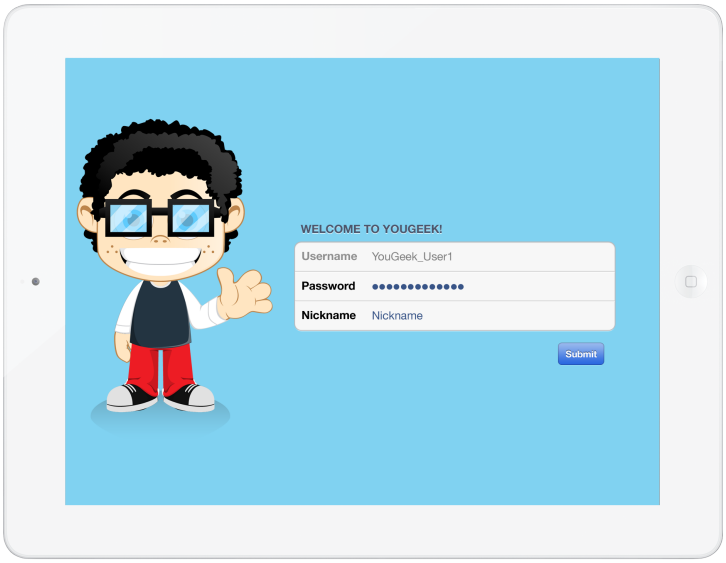

Figure 4.6 Login screen

When the user opens the application, a login form will appear with proper salutation. Clicking on the submit button will redirect the user to the main page of the application.

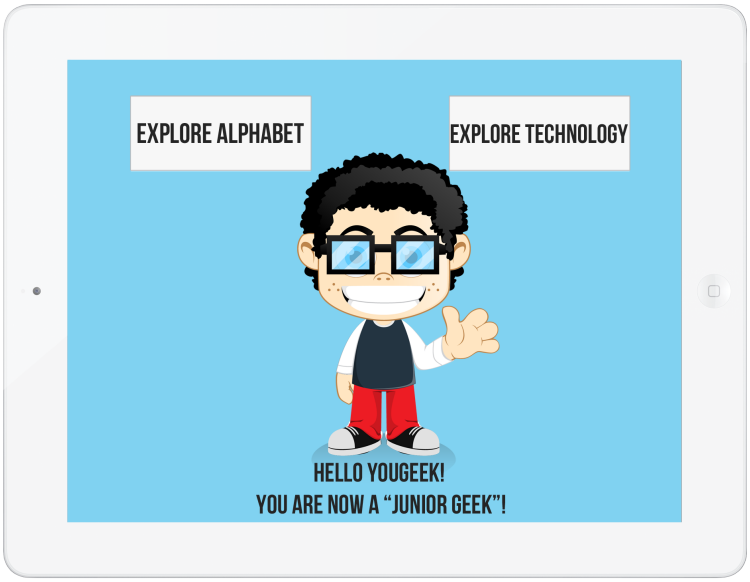

Figure 4.7 Main Menu

There are two main modules for the application; Explore Alphabet and Explore Technology. In Explore Alphabet, students can learn the alphabet with the introduction of the new technology available.

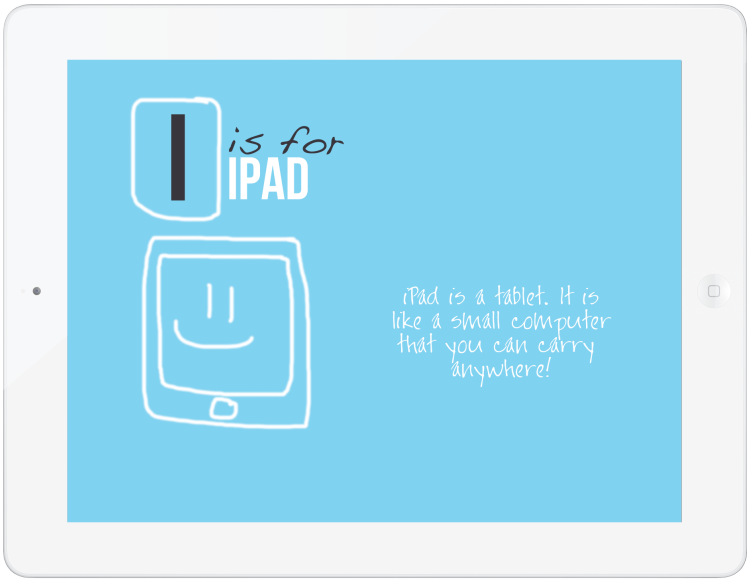

Figure 4.8 Explore Alphabet

In Explore Technology, a series of technological hardware will be introduced such as smart phone, Ipad, and much more. In this module, a specific simulation of the

application will be prompted that copy exactly the same user experience of using the hardware. There are a series of tasks with tutorial that teach the kids of how to utilize the technology for a good purpose.

Figure 4.9 Explore Technology interface

Every page of the application will be injected with the element of persuasive technology to increase the attractiveness of the kids to learn more about IT technology.

4.5 System Prototype

4.5.1 Main Page

The prototype's user interface begins with the main page showing the title of the prototype, which is "YouGeek" and a mascot. After a few seconds of loading, user now will be automatically redirect to the next page which contains the list of modules. In this specific project, the author has developed 2 modules namely "Alphabets" and "Devices". At the list of modules, the user can choose which module that they would like to study on and simply click on one of the modules.

Figure 4.10 Main Page of the application

4.5.2 Modules

There are two modules available for the application. The first one is the "Alphabets" which teach children the alphabet usage related to the mobile technology world. In

example, alphabet A will be represented by Apple, a leading technology based company in the world while alphabet B will be represented by Blackberry, one of the top mobile phones in the world. Extra information will also be added into the screen for the children to learn more about the subjects. In every of the subject, a link will be prompted for further learning experience. If the user clicked the link, a dedicated web browser will be opened with the specific link clicked. Clicking on the next button will bring the user to the next alphabet and it goes on until all alphabets are covered.

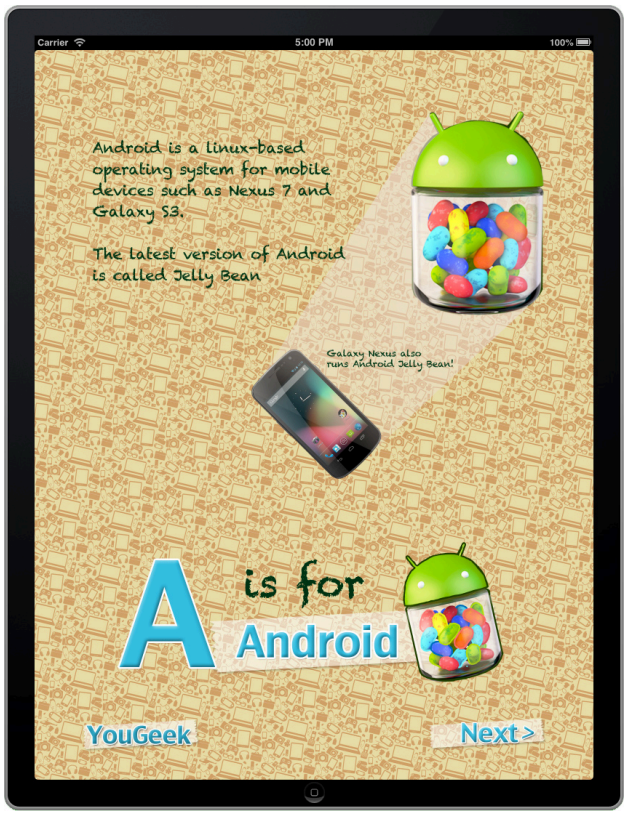

Figure 4.11 Module One - Alphabet

Second module resembles the devices that the user can use and experience. When the user clicked on the second module, a shelf-like interface will appears that simulate as a gallery

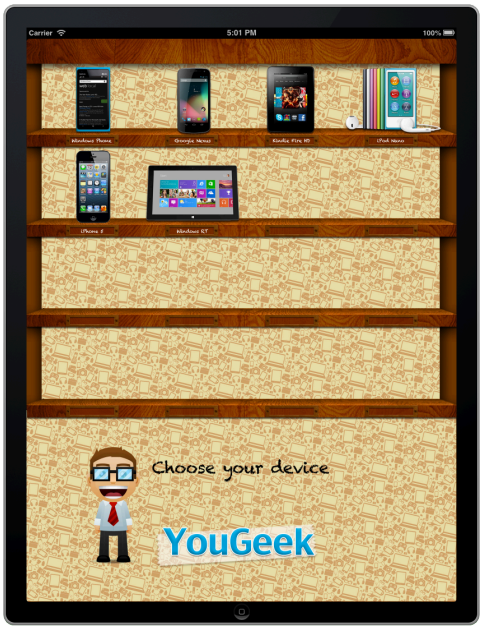

Figure 4.12 Module Two - Devices

In the gallery section, user can choose which mobile technology to choose and experience for. The interface of the selected technology can be further downloaded from the resources available on the Internet. When the user clicked Windows Phone, the additional information about Windows Phone including the basic functionalities and technology used as well.

Figure 4.13 Windows Phone Detail

Generally every piece of mobile technology will have the same module as Windows Phone. Basic functionalities will be added and notified to the user so that they will know the capabilities and the utilization of the specific device. Again, clicking on the specific device will bring the user to the details of the device.

Figure 4.14 Main layout of Windows Phone

In Windows Phone device, user can browse through every available menu inside. The main functionalities of Windows Phone are Message, Call, Camera, Calendar and People. In this application, the author has simulates the basic functionalities of the application so that the user can know and experience the feel of using the Windows Phone itself. Model used for this specific Windows Phone is Nokia N8. It is one of the latest mobile smart phones manufactured by Nokia with Windows Phone operating system inside.

Figure 4.15 Nokia N8

Help option will be available throughout the second modules as it gives better understanding and guidelines for the user. Every single Help module will be matched

with the modules to actually help the user to better navigate the specific mobile technology.

4.5.3 Navigation

The navigation through the application is simple as it uses a minimum number of buttons and is situated only at two positions. The left bottom side and right bottom side. The whole idea of the navigation is to give familiarity to the iOS user of the interface itself as well as meeting the standard of development in iOS.

At the left hand side, there will be a back/home button that will brings the user to the previous screen while right side will bring the user to the next screen. By having this menu, users can have clearer view of the navigation and increase familiarity in dealing with iOS application. The essence of this application is that it gives the user simplicity to learn and increase effectiveness of multitasking of the user. Trying to keep the user focus in the middle of the application while keeping the option at the bottom of the application. The distance between every button and option will ensure the effectiveness of the user when interacting with the application. Text used is clear yet fancy in way children can read it well with attractive presentation.

In addition, Help button is available to act as a manual for the users to assist them with navigations of the application. There are explanations on the use of each button and devices in the application for the users to better understand. Meanwhile, clicking Home button will simply means exit and the application will be terminated.

However, the navigation of the specific devices will simulate the true user experience and interface. Therefore, it depends so much on the developer of the specific technology in a way that gives direction of the technology. All buttons on the hardware will function as it is and interface will just look like one with the help of XML interface builder (XIB).

For each interface, an element of persuasiveness will be added to increase interactivity while keeping the user interested to learn more.

4.6 System Architecture

The system lies on a strong system architecture that includes several main platform. Application will first be hosted in Apple Appstore and then will be downloaded by the user through their iPad. For every update, Appstore will send the notification to the user to update to the latest version. At the same time, when the user want to update or add a new mobile technology device, the application will be connected to a server which will be doing XML parser. Specifically, SAX parser method will be used due to its capabilities. SAX Parser is an event-based parser and it is good for complex and long XML documents requirement. Simulating a mobile phone devices would really needs a long XML documents and it is also varies according to the developer. As for the web hosting, it will be host under DataKL Solutions Sdn. Bhd., a prominent web-hosting provider in Malaysia. With 10GB storage and over 50GB bandwidth, it is more than enough to support the basic needs for the system.

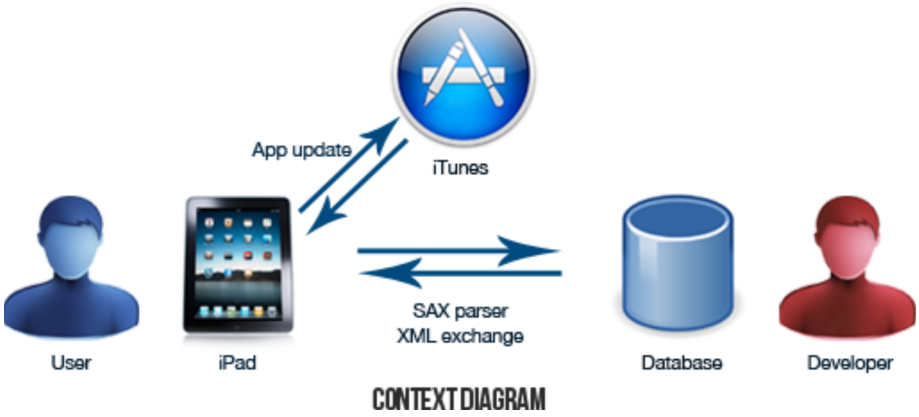

Figure 4.16 Context Diagram and System Architecture

4.7 Challenges faced when developing the prototype

After the process of designing the interface of Windows Phone interface from XIB to be used in the application, there are several challenges faced by the author when developing the prototype. The problems are listed as per below:

- **XML Limitation in getting similar experience**

There are some difficulties in duplicating similar interface of every single device available now. Most of the mobile technology developers came from different expertise while all of them are constantly generating a new interface with a lot more advance standard. Aside from that, mobile operating system varies in several point of view. The interface standards made by the developers are varies in term of user experience and much more. Problem lies in duplicating similar experience for all mobile phones technology available. One of the solution found regarding this area is to actually open it to the developers to develop interface by themselves. A website will be made to open it to the developers for sharing of the mobile phone interface resources. Hopefully by doing this, the development of the application in term of the readiness of mobile phone

technology will be made available faster. It will also allow user to have more virtual mobile phones developed by wide range of mobile developer.

- **Technical jargons as an interactive tool**

Aside from the technical challenges, technical jargons used in the application have to be easy to understand and are explained in a simple way. Since children don't really aware of the technical jargons, a much simpler English language needs to be use. Based on the recent test conducted, technical jargons can decrease interactivity of the user towards the application. Hence, several changes need to be made to the application prototype to ensure that it is easy to understand and explained in a generally accepted way.

CHAPTER 5

5.0 Conclusion

This project is an attempt to improve the future by inculcating the children with the awareness of the latest technology that is happening around the world. In order to understand the impact, we must first understand the nature of Generation Z and try to utilize what they have been passion into. From the analysis of the literature that has been done as well as the review of the previous related application, it is deduced that multimedia has played a significant role in the process of learning technology. The emergence of learning through simulation is also a key point of the project to ensure that the IT literature of Malaysians will increase.

This is a new and unique project that first implements the concept of learning through simulation of the mobile technology. Hence, there are a lot of things need to be improved to make it happen in term of the development of the user interface and sustainability of the project. This project has opened a broad way

Hopefully by the end of this project, more developers will come and put their effort in changing the world by using the latest trend of technology. In the nutshell, this project is developed to increase the awareness of the generation Z of the latest trends of mobile technology.

5.1 Future Recommendation

Currently, there are limitations to the application that has been developed due to the constraint of time, money and resources. In order to dully achieve the objective of this project, there are several recommendations that can be taken into account to enhance the prototype.

1. **Adding detailed animation and audio of the interface**

   Due to time constraint, the author has limited the amount of detail given to the specific user interface devices to only basic interface with less animation. This is to ensure full utilization of the main platform first before the next implementation is conducted.

2. **Adding more supported platform**

   Indeed iOS is one of the most advance mobile operating system provided by Apple Inc. However, it will be better if it can be reached by other platform as well. Porting it to the other platform such as Android and Windows Phone would be an extra advantage to increase reachability.

3. **A video that enhance learning and walkthrough of the specific devices for the help section.**

   The application developed can be improvised by adding another feature, which is the video explaining about the utilization of the mobile technology to the children in a static window in the application. This is to accommodate the different learning styles of each child that want another creative way of learning. Some might be able to understand the concept taught in the application just by going through it, but some might require a visual of a teacher explaining it to them just like the traditional method of teaching.

4. **Game-center and social media integration**

Another way to add interactivity of the application is by adding GameCentre integration and social media. With Game-Center integration, the user can challenge and show off their achievement in exploring the world of mobile technology. The integration of social media such as Facebook and Twitter will helps the user to make it interesting and will adds up the value and reachability of the application.

This project needs a continuous support from the developer and it needs to be spread wider to spread the cause. Collaboration with a mobile developer company is one of the good ways to ensure sustainability. Porting the application to another platform such as Android and Windows Phone will increase reachability and mobility. Changing the flexibility of the application to receive the new updates to match the nature of technology that is moving so fast is also denoted as one of the main attraction for this application.

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