BORANG PENGESAHAN STATUS TESIS

JUDUL: **LEARNING AND TEACHING QT PROGRAMMING USING IBOOK APPLICATION**

SESI PENGAJIAN: **SEMESTER II 2016/2017**
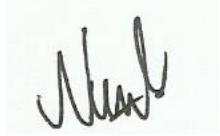
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Alamat tetap: AHMAD SHAARIZAN

No.14 Lorong 9 ss/1   SHAARANI

Bandat Tasek Mutiara

14120 Simpang Ampat,

Pulau Pinang

Tarikh: 30/8/2017   Tarikh: 30/8/2017

LEARNING AND TEACHING QT PROGRAMMING USING IBOOK
APPLICATION

NURUL NABILAH BINTI ZULKIFLI

This report is submitted in partial fulfillment of the requirement for the Bachelor of
Computer Science (Interactive Media) with Honors

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2017

DECLARATION

I hereby declare that this project report entitled

LEARNING AND TEACHING QT PROGRAMMING USING IBOOK APPLICATION

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT:_____DATE:_____30/8/2017_____

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I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of Computer Science (Interactive Media) with Honors

SUPERVISOR:_____DATE:_____30/8/2017_____

(AHMAD SHAARIZAN BIN SHAARANI)

DEDICATION

This thesis is specially dedicated to my beloved mom and dad, brothers who have support me from the beginning of my studies with all their effort.

Also, this thesis is dedicated to my supervisor, Mr Ahmad Shaarizan Shaarani and Mrs Maslita Abd Aziz, who has been a great second mom and dad to me and the person who give me a great source of motivation, comments and suggestion to make sure that the thesis is finish right on time.

Finally, this thesis is dedicated to all my beloved friends that always supported me, encouraged me, guide and inspired me throughout the entire process. I will always appreciate in what all they have done.

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ABSTRACT

Learning and Teaching Qt programming is an interactive book which the user is able to understand and knowing about Qt programming in details. As we all know learning process is not easy especially when learning a new chapter in degree level in Computer Science education. Today, teaching programming effectively in the universities or collages is such a big challenge. Student are not familiar with new syntax or language in programming with Qt. A method used to teach the course is not effective teaching and students lack of interest in studies.The main purpose of this project is to study the current undertsanding level of students for Qt in programming 2 subject, to develop iBook with features that canbe used to build a references material for students who learn Qt and to evaluate the effectiveness of the new approach in teaching and learning for FTMK students. However, the problem statement of this project is a method used to teach the course is not effective teaching. Slide show used in lecture only contains text base which make the students confront unfamiliar programming terms and students lack of interest will lead to absences of student in attedning classes. Besides, students can explore iBook features that can be used to build a reference materials. Project methodology that being used for this project is System Development Life Cycle (SDLC) which is describes the stages involved in an information system development project from initial feasibility study until completed application. SDLC is very much focusing on achieving goals while producing products that can be reviewed to see whether user requirements has been met or not. The result of this finding has been made that this "Learning and Teaching iBook is effective to student who learn Qt programming. As a conclusion, iBook will able to attract students interest by helping those students in learning process in a very enjoyable and relax way.

ABSTRAK

Pembelajaran dan Pengajaran Pengaturcaraan Qt adalah buku interaktif yang pengguna dapat memahami dan mengetahui mengenai pengaturcaraan Qt secara terperinci. Seperti yang kita semua tahu proses pembelajaran tidak mudah terutama ketika mempelajari bab baru dalam peringkat ijazah dalam pendidikan Sains Komputer. Hari ini, mengajar pengaturcaraan secara berkesan di universiti atau kolej adalah satu cabaran besar. Pelajar tidak biasa dengan sintaks atau bahasa baru dalam pengaturcaraan dengan Qt. Kaedah yang digunakan untuk mengajar kursus ini bukanlah pengajaran yang berkesan dan pelajar kurang minat dalam kajian. Tujuan utama projek ini adalah untuk mengkaji tahap pelajar semasa untuk Qt dalam pengaturcaraan 2 subjek, untuk membangunkan iBook dengan ciri-ciri yang boleh digunakan untuk Membina bahan rujukan untuk pelajar yang belajar Qt dan menilai keberkesanan pendekatan baru dalam pengajaran dan pembelajaran untuk pelajar FTMK. Walau bagaimanapun, penyataan masalah projek ini adalah kaedah yang digunakan untuk mengajar kursus ini bukan pengajaran yang berkesan. Pertunjukan slaid yang digunakan dalam kuliah hanya mengandungi teks asas yang membuat para pelajar menghadapi istilah pengaturcaraan yang tidak biasa dan kekurangan minat pelajar akan menyebabkan ketidakhadiran pelajar dalam kelas attedning. Selain itu, pelajar boleh meneroka ciri iBook yang boleh digunakan untuk membina bahan rujukan. Metodologi projek yang digunakan untuk projek ini adalah Kitaran Hidup Sistem Pembangunan (SDLC) yang menggambarkan tahap yang terlibat dalam projek pembangunan sistem maklumat dari kajian kebolehlaksanaan awal sehingga permohonan selesai. SDLC sangat tertumpu pada mencapai matlamat sambil menghasilkan produk yang boleh dikaji semula untuk melihat sama ada keperluan pengguna telah dipenuhi atau tidak. Hasil daripada penemuan ini telah dibuat bahawa "Pembelajaran dan Pengajaran iBook ini berkesan

kepada pelajar yang mempelajari pengaturcaraan Qt. Sebagai kesimpulan, iBook akan dapat menarik minat pelajar dengan membantu pelajar-pelajar dalam proses pembelajaran dengan cara yang sangat menyeronokkan dan santai.

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CHAPTER I

INTRODUCTION

1.1 Introduction

Nowdays, there are many ways to teach students in any higher education. One of teaching tools that can be used is iBook. iBooks brings visual richness to e-books that is read on an iPad. iBooks supports a wide range of dynamic content that can make the feelings as much like an apps as a book. That rich approach has amazing potential for book authors to exploit in ways that the standard e-book simply does not.

Apple describes iBooks Author as a tool for educators and smaller publishers to create their own books. Many aspects of a document may be edited in what you see is what you get (*WYSIWYG*) fashion, including text, fonts, colors, foreground and background images, interactive widgets, and charts. Besides, iBooks Author provides a powerful tool for teachers to use when curating instructional materials. Unlike many web-based resources, these materials can be organized into a book-like format while still incorporating interactive features, such as hyperlink, video clips, presentation, 3-D

objects, and photo galleries. Thus, iBooks Author is designed to make quick use of materials you already have, including text documents, spreadsheet, and presentations.

The main purpose of this project is to investigate the effectiveness of the new approach in teaching and learning Qt programming using iBook application for Fakulti Teknologi Maklumat dan Komunikasi (FTMK) students. Other than that, students can explore iBook features that can be used to build a reference materials. Project methodology that being used for this project is System Development Life Cycle (SDLC) which is describes the stages involved in an information system development project from initial feasibility study until completed application. SDLC is very much focusing on achieving goals while producing products that can be reviewed to see whether user requirements has been met or not. Last but not least, hopefully iBook will able to attract students interest by helping those students in learning process in a very enjoyable and relax way.

1.2 Project Background

iBooks Author is a free of charge e-book authoring application developed by Apple Inc. iBook Author is an app that allows anyone to create beautiful iBook textbooks exclusively for iPad and Mac. With galleries, video, interactive diagrams, 3D object, mathematical expressions, and more, iBooks bring content to life in ways the printed page never could.

With iBook, texts are coming alive in ways that engage students and teachers alike. On the other side, iBook can make studying more effective than ever. This method can attract the students to learn more about the subjects especially student in first year bachelor students in FTMK.

The main purpose of this project is to study the current understanding level of Qt in Programming 2 subject. Besides, the student can explore the iBook features that can be used to build a reference materials for students.

1.3 Problem Statement

Learning process is not easy especially when learning a new chapter in degree level in Computer Science education. Today, teaching programming effectively in the universities or collages is such a big challenge. Student are not familiar with new syntax or language in programming with Qt . However, students find it difficult to understand the course.

There are some factors that contribute to the above problems such as teaching methods and course delivery and materials. A method used to teach the course is not effective teaching. Teaching material in term of presentation slides used in lecture only contains text base which make the students confront unfamiliar programming terms and are required to visualize the processes that happen in the computer memory. Most of lecturers are facing problem on gaining students interest on the subjects. Lack of interest will lead to absences of student in attedning classes. thus, lecturers will usually try new approasch to become more appealing and gain student attentions.

1.4 Objective

The main objectives of this project are:

1. To study the current understanding level of students for Qt in programming 2 subject.
2. To develop iBook with the features that can be used to build a references material for students who learn Qt.
3. To evaluate the usability of the new approach in teaching and learning Qt for FTMK students.

1.5 Scope

Scope of the project will focus on target user and content or modules. The target user for this application is Diploma second year student in FTMK to make they understand about Qt programming.

For content or module, This Qt programming will be created using iBook. Then, the learning book will have various of interaction so that it is easier to the application runs using android.

1.6 Project Significance

This application will help student to understand more about Qt programming in learning process. Additional interactions through this application will improve the attractive of the existing videos/learning book. So, the attraction from the student about this subject can be improved when using this application. As the results, this application will enhance the lecturer task to teach their students about Qt programming.

1.7 Expected Output

The expected outcome from this project is an iBooks application of Learning and Teaching of Programming in Qt for FTMK students in second semester. The iBook application will assists students to easily understand and more interested with the course as provides a full-screen experience of an interactive pictures, widgets, diagrams, videos, games and others. As a result, the Qt iBook be able to attract students interest by helping those students in learning process in a very enjoyable and relax way of learning yet the iPad can be carry and used anywhere.

1.8 Conclusion

This chapter explains overview about the iBook application which can attract the student to learn more about Qt programming with fun and effective. In the project background, there is an explanation what the project about, the main purpose of the project and the benefit of the project. There are details explanation about the problem students understandable and student's concentration. The objective for this project are stated. Then in the scope section, explain about target user and contents of this project. The expected results have been decided. Moreover, this project will help the students to study this Qt Programming easily using iBook. Lastly, iBook application are easily to understand, have many interactive and students are attracted to learn more about this Qt Programming.
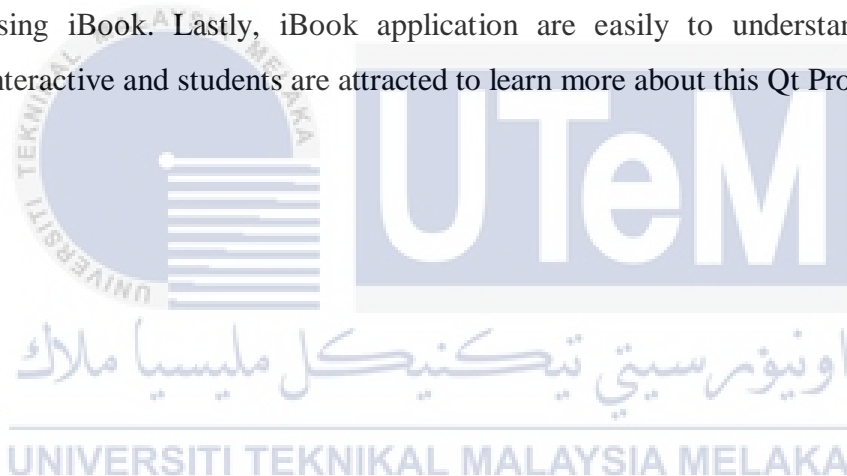
CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

In this chapter will explain about the literature review and project methodology. The comparison will be made among the existing project. The information about the existing system has been studied. The data on this literature review is collected from journal. This section also explains the methods that have been used in developing this project. Project requirement list such as software and hardware are also available.

2.2 Domain

This project aimed to blur the line between user's reality and books fiction world. Interactive book is an innovative product that allows users to read a book on-line and express their views about the literature. This is done by adding annotations at certain points in the iBook (Shafiq ur Rehman.,2015).

According to Brendan, Sean and Sinead (2016), through iBook framework, users can use digital media as a key medium for student learning. Besides, the development of ICT skills is identified as a central element. This is to ensure that students become active learners during lessons and outside lessons. iPad facilitated proved that visual and audio feedback to students give impact on learning placement enjoy their reading experience with interesting interactive design patterns technique that enhance the compatibility and maturity. Thus, user also can enjoy their animated picture and videos related to the topic.

What is mobile learning?

According to Jose Bidarra et al (2014), mobile learning as learning that is supported by a portable or mobile device. This mobile device encourages learning through its ease of access to information, the ability to easily move and its ability to manage very diverse contents such as text, image, audio, video, animation etc. As we shall see, mobile devices have unique features that interest us, namely, in terms of interaction and exploration modes in instructional processes. However, the iPad and other tablets are still recent in the marketplace, so research of its use in education is scarce and shallow.

What is eBook?

eBook is an electronic book that can have a simple format such as a text in PDF. However, there are currently more advanced standards, such as EPUB3 (universal) or iBooks 2 (Apple), that can integrate multimedia components. Ideally, an ebook should have sufficient quality for current devices with their high-resolution displays, and be

compatible with a wide variety with a wide variety of reader apps, and if necessary allowing the conversation to other formats.

One benefit of these ebooks for students is for example the possibility of being able to select any word that they do not understand and find immediately its definition. Another potential use refers to the capability to have simultaneously several students accessing the same book and thus share learning experiences. More specifically they can communicate and share files, having opportunities to communicate in the context of group work even if accessing from different locations. The ebook can also contain test, allowing students to make their self assessment.

An economic advantage refers to financial aspects, currently the cost of textbooks represents a high expense for students and their families. The introduction of electronic books contributes to reducing these costs effectively. Furthermore, it is also expected the emergence of cheaper mobile devices, which is happening in counties such as China and India. Altogether, the widespread use of ebooks will also benefit the environment by reducing paper consumption, bearing in mind that a device may store thousands of ebooks (Jose Bidarra et al,2014).

2.3 Existing System

According to Shafq ur Rehman (2015), in iBook: An Interactive Book System, the main objective of developing iBook is to serves people with all the functionalities provided in a book store. Therefore, this interactive online book website will help its user to read the book online and perform certain operations.

The interactive book also is a platform will provide an on-spot discussion for people who can point out and discuss the views of an author of book. Moreover, the same idea applies to the discussion forums where professionals try to help the new bees regarding technicalities of a subject.

In this project, the existing systems have been evaluated to get an overview for designing our system.

i.   Qt Programming for Beginners.

Qt programming for beginners is a video tutorial through Youtube Channel that teaches ftmk students how to create an application using Qt. Based on Figure 2.1 below, shows step by step how to use Qt software and create new project to build an application. Students will be able to learn, if the students constantly doing the coding through this software. If the student does not get the information during the video play, can rewind back the video.

Figure 2.1 Screenshot of Qt programming tutorial using video
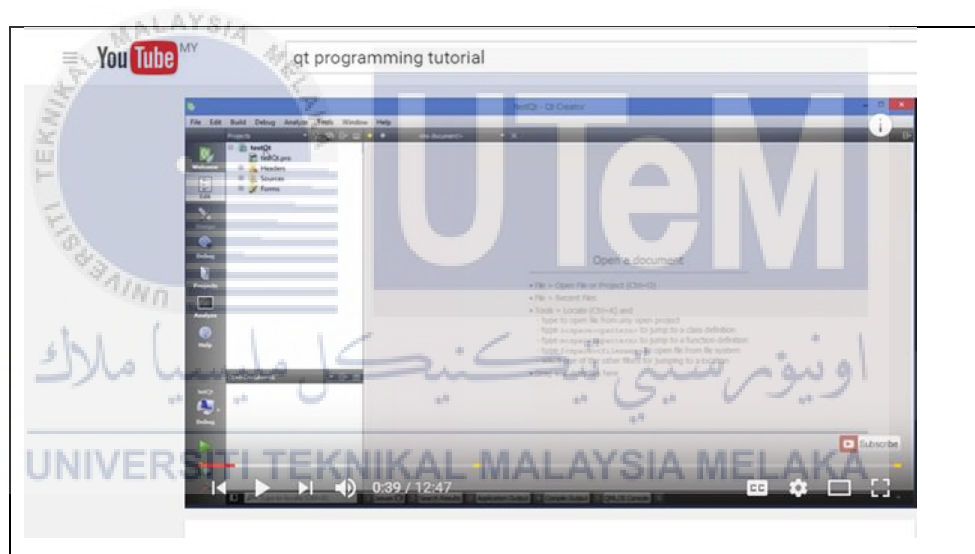
ii.   Basic Qt programming tutorial through website

Basic Qt prog ramming tutorial is learning through website. This website is suitable for beginner to start learning about Qt. Besides, there is a lot a picture as a tutorial that can guide the students. Based on Figure 2.2 below, it shows the definition of Qt and how the tutorial will explain.

Figure 2.2 Screenshot of Qt programming tutorial using website
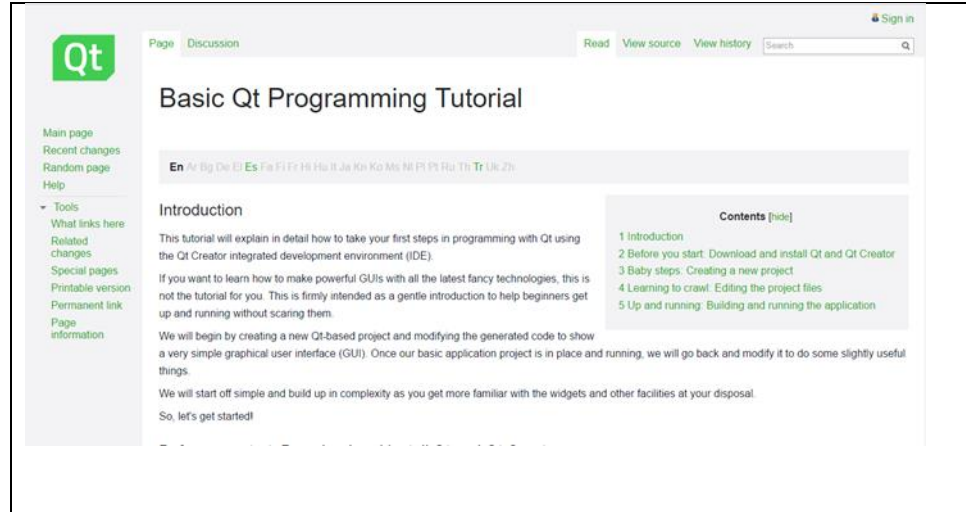
Figure 2.3 Screenshot of Qt programming tutorial using website
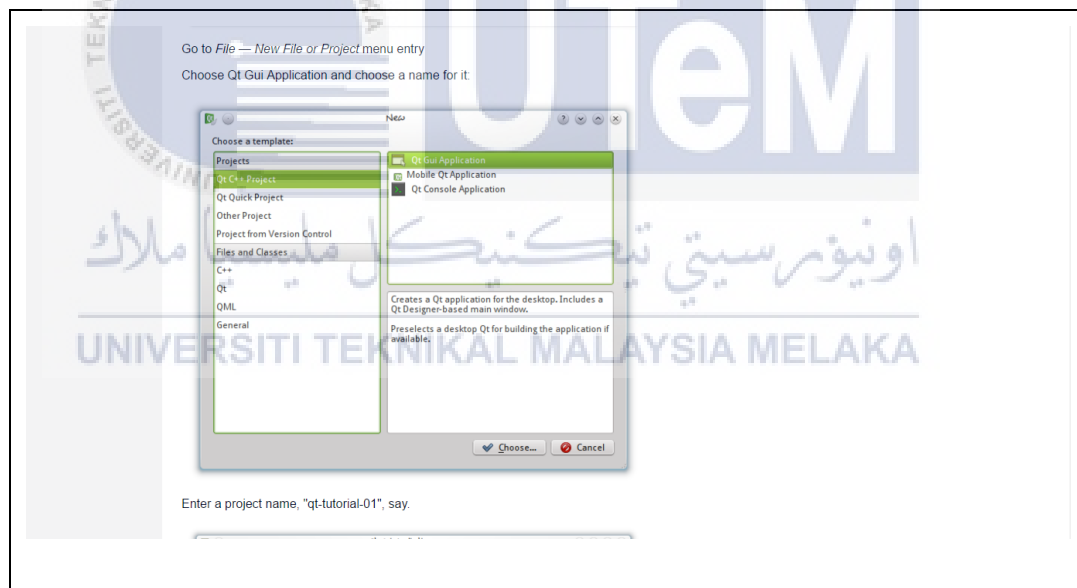
Figure 2.4 Screenshot of Qt programming tutorial using website
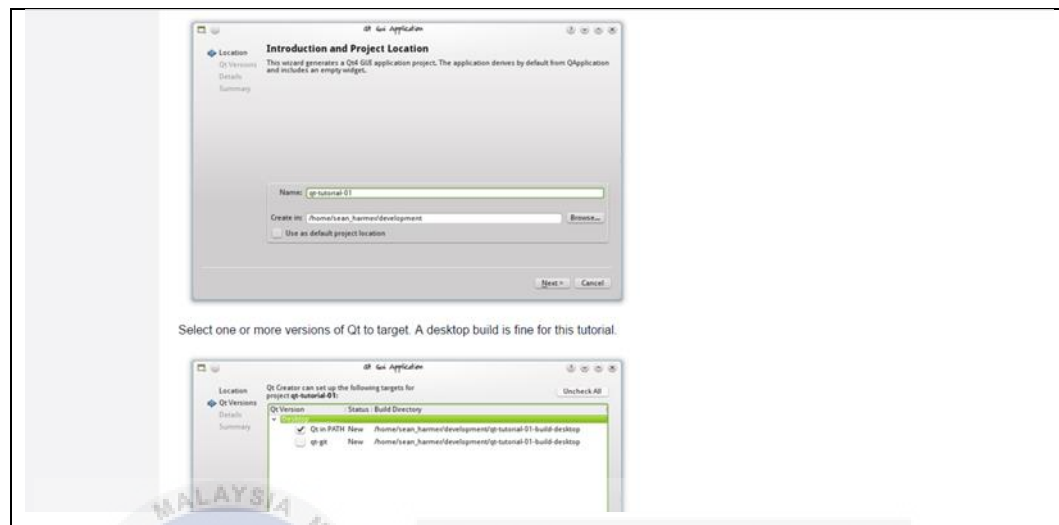
Figure 2.3 and 2.4, the setup for the first-time user in this software. The picture is shown step by step to make sure the students clearly understand how it will becomes.

iii) **C++ Programming Application**

C++ programming is learning through application. This application make is easier to student to learn programming everywhere and anytime. This C++ programming app enables you to carry C++ programming Tutorials in your android phone. It contains about 140 programs, many FAQ's & Important Exam Questions.

This application also has a very simple user interface and the contents can be easily understood by the users. This will definitely help students for preparing interviews, test and in many more ways.

Figure 2.5 Screenshot Qt programming tutorial using application
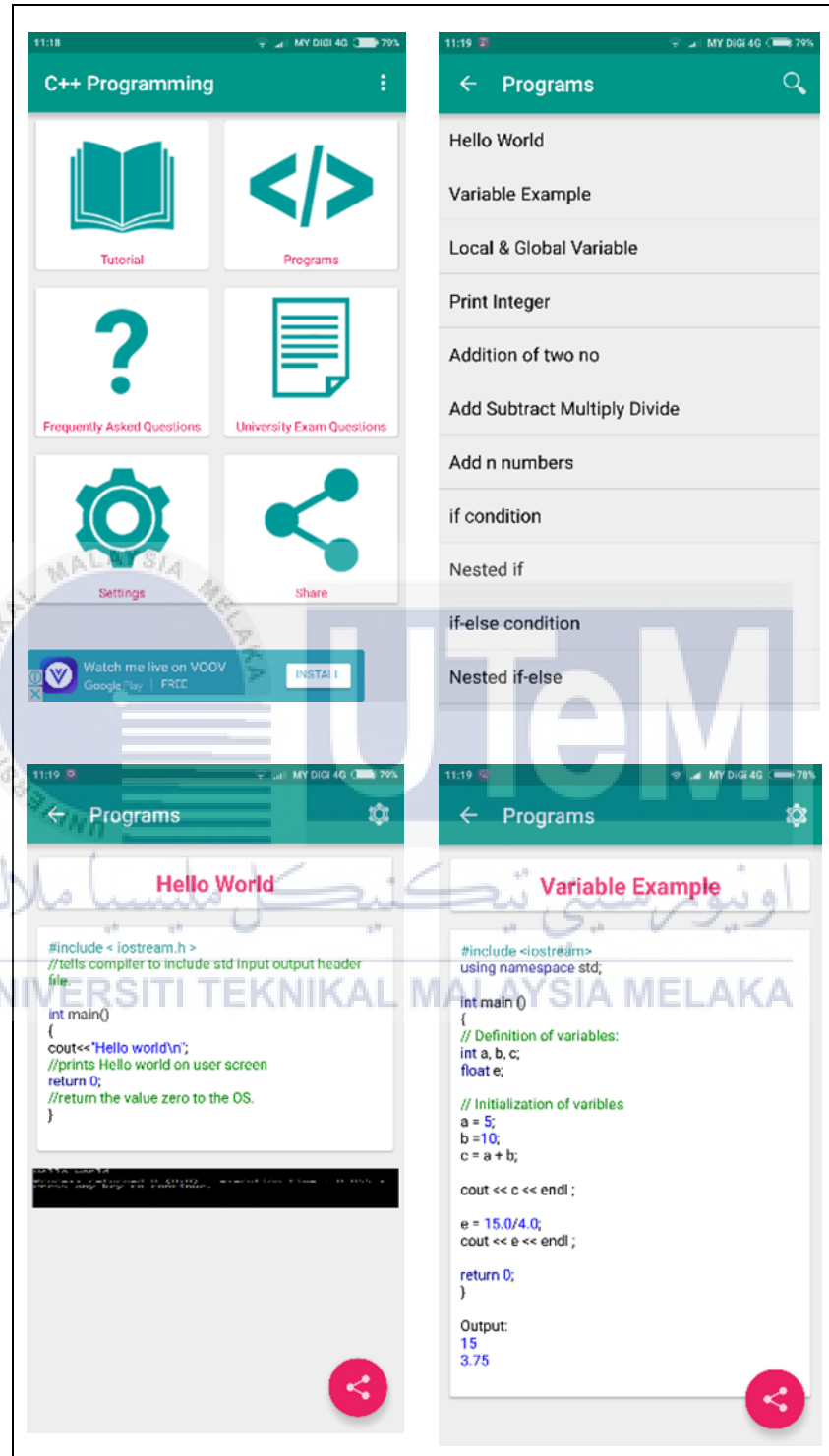
2.3.1 Comparison of Existing System

The purpose of the comparison existing system is to analyze the differences of those systems on the term advantage and disadvantage of the application. Table 2.1 shows the comparison of existing system and is explained with details below.

Table 2.1 Comparison of existing system

Application	Qt Programming for Beginners (video)	Basic Qt programming tutorial through website	C++ Programming Application	Learning and Teaching Qt Programming using iBook
Image	No	No	No	Yes
Video	Yes	No	No	Yes
audio	No	No	No	Yes
Interactive features	No	No	No	Yes
Syllabus	Yes	Yes	Yes	Yes
Colorful	No	No	Yes	Yes

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2.4 Project Methodology

There are few method that can be used as a project methodology to develop the interactive book. It depends on the suitability and functional of the designs and project for the learning content. There are few model that can be used as a guideline, for example Waterfall Model. Waterfall Model is a sequential design process which is used in software development process and it seen as flowing steadily downwards. Besides, prototyping model also is a development method where it built, tested and reworked until it becomes a complete system and can be developed well.

Various models for such a systematic design have been proposed, but most are suitable are System Development Life Cycle (SDLC) model, which is a commonly used approach and is a great deal of planning.

Selected methodology to complete this study is based on SDLC because software development is a complicated procedures that requires a great deal of planning, analysis, design, implementation and maintenance and support. SDLC is very much focusing on achieving goals while producing products that can be reviewed to see whether user requirements has been met or not.

Figure 2.6 System Development Life Cycle (SDLC)
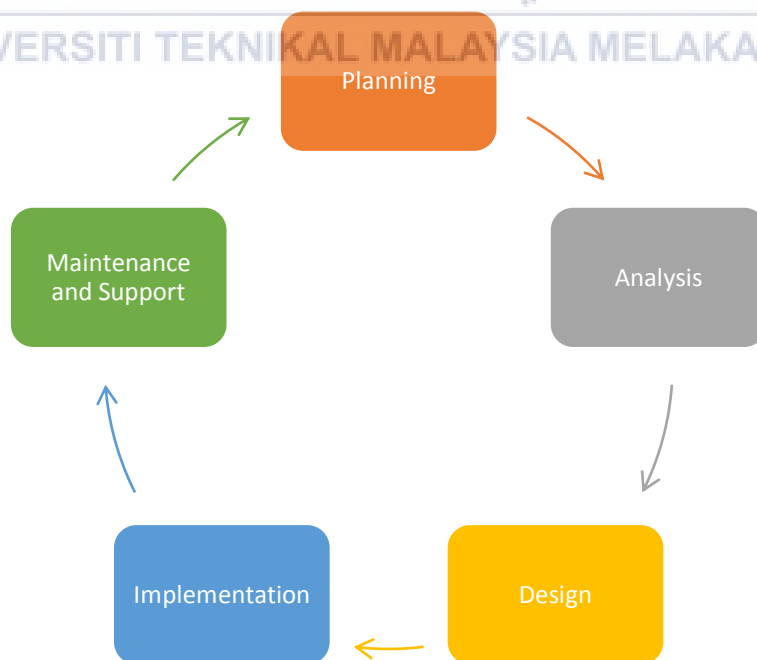
Table 2.2 SDLC Phase Description

PHASE	DESCRIPTION
PLANNING	The Planning phase is the process of defining is to learn and is the foudation for all the other phases of instructional design. Thus, research for programming of Qt content.
ANALYSIS	The Analysis phase is to define the problem statements that occur and locate the opportunities of the project. Besides, it is also explained of alternative systems and justification of iBooks.
DESIGN	The Design phase is to design the prototype which is prepare the assets which is design the tempate of iBook. Browse the high resolution image to make more interactive and interface and layout designing to attracted te students attention.
IMPLEMENTATION	The Implementation phase is the process of installing project in the real world context to the user.
MAINTENANCE AND SUPPORT	The Maintenance and Support phase is a new version or release of software with associated updates to documentation, training and support of iBook.

2.5 Project Requirement

A requirement for iBook application here refers to hardware or software tools used during the period of this application is developing for the purpose of development and project management. Software and hardware requirements needed for this development are listed below.

2.5.1 Software Requirement

This product will be build using:

- iBook Author
- To design an iBook
- Qt Programming Software
- To learn step by step this about this programming
- Adobe Photoshop CS6 and Adobe Illustrator CS6
- To edit, design and trace images.

2.5.2 Hardware Requirement

This product will be build using:

- Personal Laptop
  This laptop is used for the product development.
- Brand : ASUS
- Processor: Intel Core i5
- RAM: 4.00 Gb
- System Type: 64-Bit Operating System
- Operating System: Windows 10

- MacBook
  This device is used to create iBook
- Brand: Apple
- Operating System: iOS
- Model: Mac Pc

- iPad/iPhone
- Brand: Apple
- Operating System: iOS
- Model: iPad Mini/ iPhone 5S

2.6 Project Schedule and Milestones

This topic will discuss about the task allocation to developed Learning and Teaching QT programming using an Interactive Book Application, the planning for the task is start from system analysis to maintenance and need several months to complete it. (Refer Appendices)

2.7 Conclusion

In conclusion, the review of literature review, existing system, hardware and software requirement that related to this project is being explained. New project to be developed must show something that existing system did not apply. Besides, this chapter also explained about project methodology development the used in this project. This is important to make sure the development process is going well.

In next chapter, will be talk about analysis of the project. The methodology explained in chapter two is elaborated in chapter three.
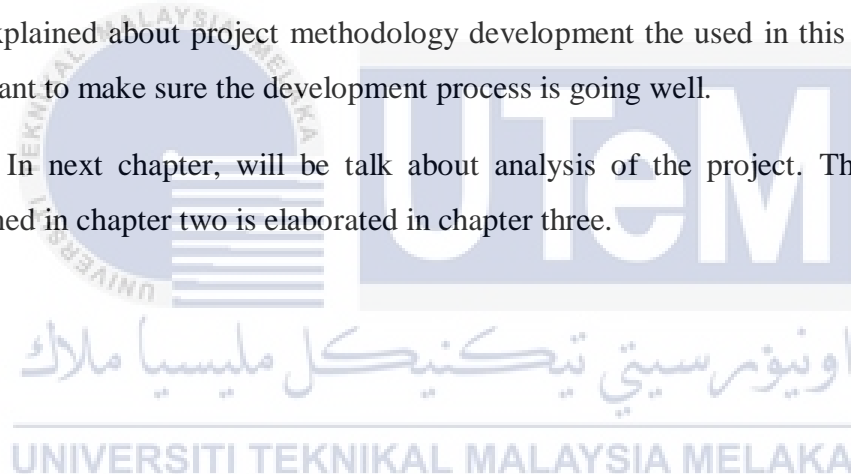
CHAPTER III
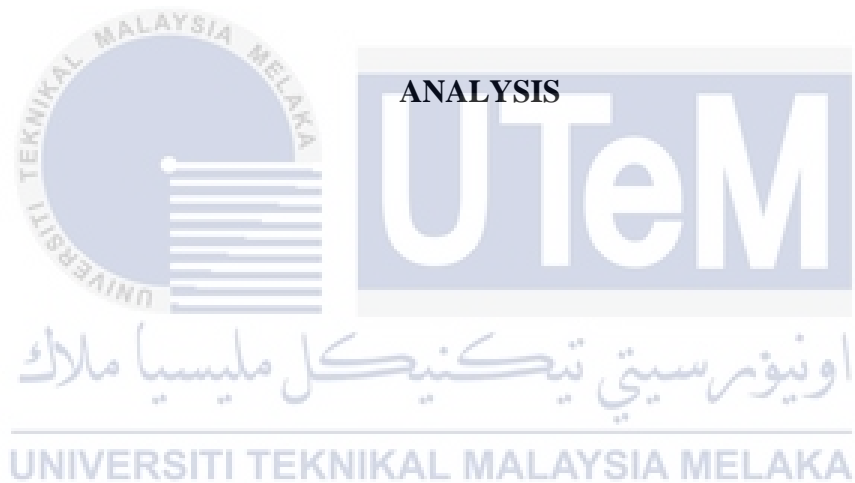
ANALYSIS

3.1 Introduction

In this chapter, it will discuss about the method that occurs in analysis stage. In in this analysis chapter it provides an idea of the whole method associated in the analysis stage. According to the requirement analysis, the system must be describing more details in return to the current scenario analysis, requirement analysis, software analysis, hardware analysis, and project schedule and milestone.

The purpose of analysis stage is to identify or examine of the elements and structure based on interpretation. Besides, it is important stage to choose which elements are more acceptable and how the elements is implements. Thus, the data and information fact will be extract from the material such as website, online journals and books.

In order to develop this project, firstly to identify the necessary of the software, hardware and user. In this project requirements are iBook Author, Qt programming Software, Adobe Photoshop CS6 and Adobe Illustrator CS6. The hardware requirement are laptop, Mac, iPad and iPhone.

The important of this stage is to resolve which elements should do and how to create that elements become more function. The data and facts information are extract from sources such as books, website and others. These specifics is are known information where it is used to construct the evaluation between the sources.

3.1 Current Scenario Analysis

In this section, it shows the progress of the elements potential results by comparing with existing application. Although the data and information has been gain during analysis due to strength and weakness, the suitable data and elements will include in the project. Thus, this project will go as it planned.

3.2 Requirement Analysis

Requirement analysis is to determining the user expectations to build a new or modified the product. To achieved this goal, requirement analysis need to involves in communication to determine specific feature, expectations and development process.

3.2.1 Project Requirement – Analysis of the system to be developed

a) Need Analysis

In order to provide need analysis, have to develop at least 3 reading material and its functional requirement to complete the system. The functional requirements are relating with reading items that information needed. Need analysis is a process of describing the problems of system and it come out the solution to these problems.

b) User Analysis

The objective of the user analysis stage are determining the multimedia elements needed to be used in this Learning and Teaching Qt Programming Using an iBook application. The reading materials such as books, slide presentation and website display material is no more helpful in certain circumstances. This analysis must be finalized to figure the flow of the reading item and need to fulfil the user's requirement.

c) Technical Analysis

Technically, this iBook application is design using iBook Author. All the elements in that iBook are design using Adobe Illustrator and Adobe Photoshop. This iBook Application will be functional when the user using iPad or iPhone to test it. The interactive elements involve are image, video, text and picture.

d) Resources Analysis

This resources analysis is to analyze the available resources of the content of the iBook Application. The developer will find out the characteristic based on several product of iBook Application and Qt programming book/website. For this project, the references sources that had been referred on Qt programming is Qt Programming references book in Diploma of FTMK students. This references book contains all the step or tutorial about Qt Programming.

e) Requirement Gathering

Nowadays students like to learn something new and they love to something interactive which content sound, video and image. This kind of learning can attract more students to love programming. According to Shafiq ur Rahman (2015), iBook is an online web-based application which is designed so that the user can access the application easily. Moreover, iBook more clear and useful information regarding a particular subject will come into highlight and more people can benefit from it.

3.2.2 Software Requirement

To develop this product, iBook Author is needed as Adobe Photoshop, Adobe Illustrator, Bookry Widget and Qt programming software. The computer or gadget with iBook application was chosen to display the product.

3.2.3 Hardware Requirement

Firstly, to test the product development, Personal laptop with Window 10, MacBook, iPad and iPhone are needed. This hardware are used in order to compatible with the software that we are going to used.

3.2.4 Others Requirement

Others requirement to be used in this product development is Qt programming reference book. This book shows step by step how to using Qt programming software and few examples coding are needed.

3.3 Project Schedule and Milestone

These milestones will show the actions that involved during the progress of this project.

Table 3.1: Project Milestone

Activities	Start Date	End Date	Result
Planning	Week 1	Week 2	Project requirement based on project planning
Analysis	Week 3	Week 4	Analyze the requirement to implement in the product.
Design	Week 5	Week 8	Design background, icons and user interface.
Implementation	Week 9	Week 11	Testing the overall product.
Maintenance and Support	Week 12	Week 14	Fix the problem issue and improve the product.

3.4 Conclusion

In conclusion, every project will have different methodologies to make the project successful and working well. Moreover, this chapter explained about hardware, software and others requirement are playing an important role in order to developing the product of project requirement. Thus, software requirement also is very important and it may be affected if the system does not support the product.

In the next chapter, an analysis about the product will explain the system architecture, preliminary design and user interface.

CHAPTER IV

DESIGN

4.1 Introduction

This chapter will explain about the design stage of the project. Design stage play an important role involving in exposing the product to the users. The design of the interface is the main key point and first impression to user whether the user want to continue interacting with it or leave the interactive book. Design is defined as a process and developing a plan for a new product. The preliminary design and the input design are included in this chapter.

4.2 System Architecture (except video/animation)

System architecture is a conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. Figure below shows cover page of interactive book of Learning and Teaching Qt programming.

Figure 4.1 Cover page of Interactive Book Qt programming
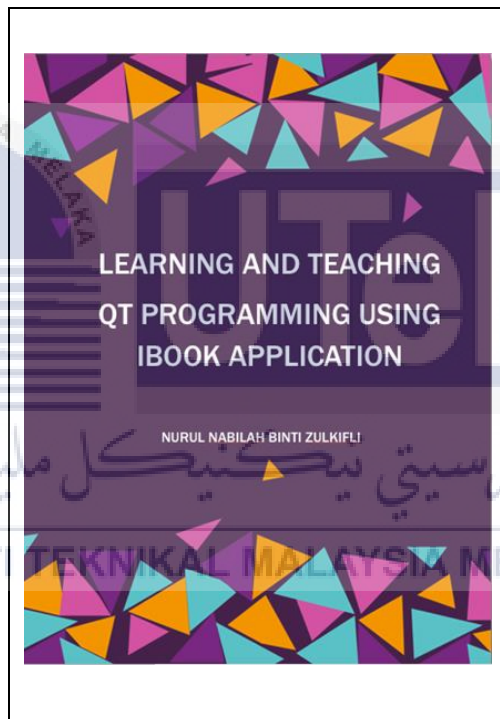
4.2.1 Preliminary Design

Preliminary design also known as theoretical design which is the first phase of the design phase. In this phase, it shows overall design ideas that has been decided. Throughout this phase, it will produce a higher-level design product. In this project, the preliminary design is divided into few parts which are main content, concept design, color design and storyboard.

4.2.2 Storyboard Design

The storyboard of this project was created to keep the development process in track. The storyboard will also ensure that all requirement will become smooth. The storyboard as shown below.

Figure 4.2 Storyboard of iBook
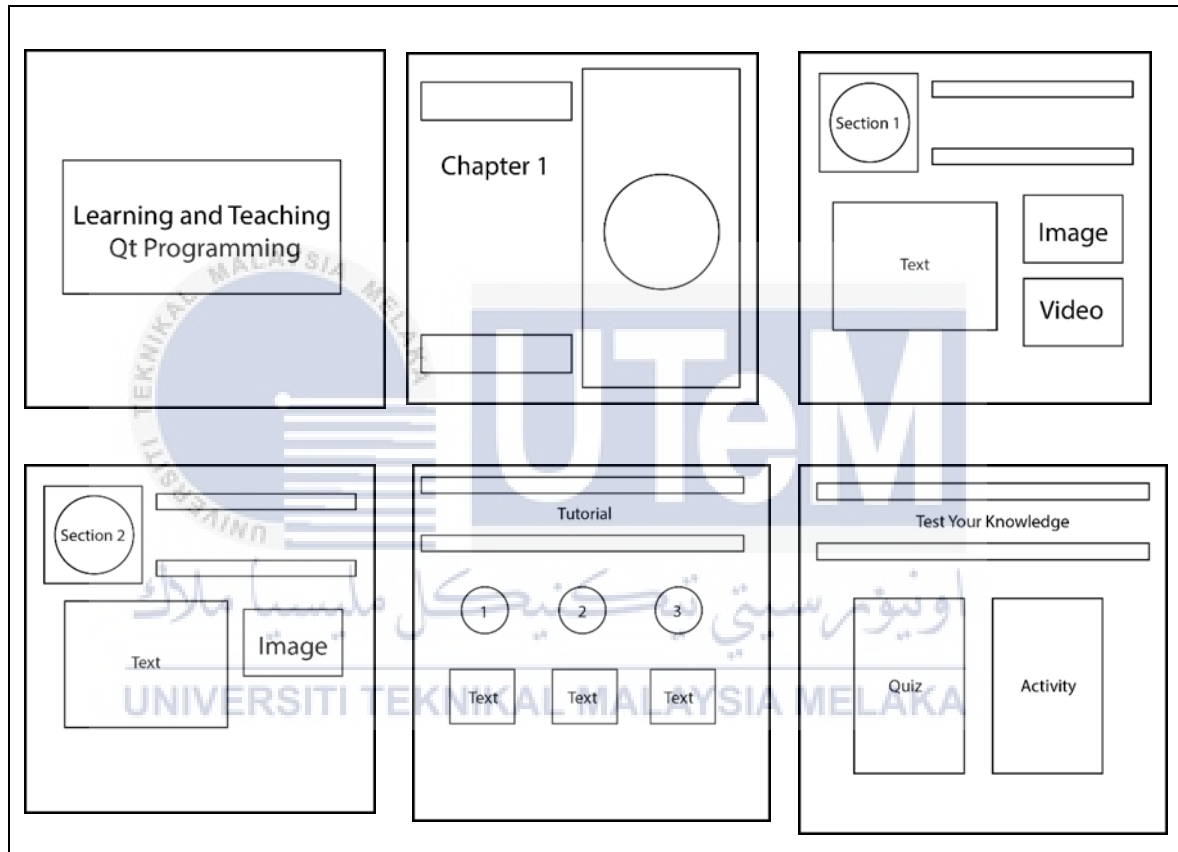
4.3. User Interface Design (except video/animation)

i. Navigation Design

The navigation design of this interactive book was develop to user to use iBook on the right track. Navigation design will also make sure that all requirement and

elements of this application is totally acknowledged. These application of interactive book consist of module which is a book that briefly explain about How Qt Programming works. Other than that, there is quiz module and some activities. Figure below shows the navigational design of the application interactive book.

Figure 4.3 Navigation design
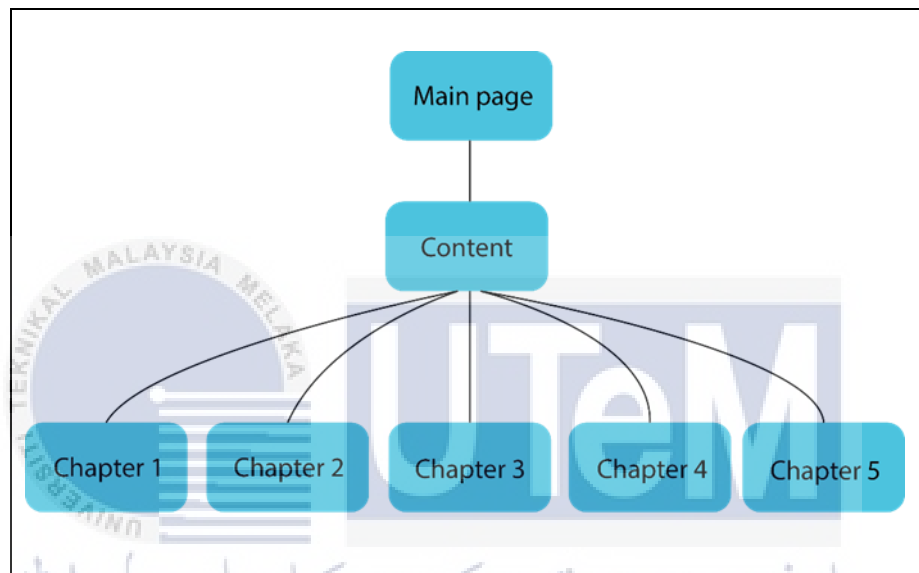
ii. Input Design

Design is very important things in growth process of an application. Moreover, design can attract the user to stay and learn this interactive book. In this interactive book, all the element need to be designed before the development process begin. The elements that need to be designed is the objects, interactive buttons and background interface. Thus, this will improve the user experience. There is an icon that has been chosen to become the main icon of each chapter in this interactive book. Figure below shows the icon that has been created. This icon created using vector-based in Adobe Illustrator.

Figure 4.4 Screenshot cover page for each chapter

4.4 Conclusion

In conclusion, analysis phase is one of the important phases to develop a product. The details of design have been developed as it explained above. The raw of multimedia elements are included which is text, graphics, audio, video and content. All the elements and source are in the iBook Author which act as platform of this project. Arranging the content of the iBook Author also are called as designing phase.

In the next chapter, topic that will be discussed is implementation phase. Implementation will be focused on how the element in implement in iBook to make it engaging and interesting.
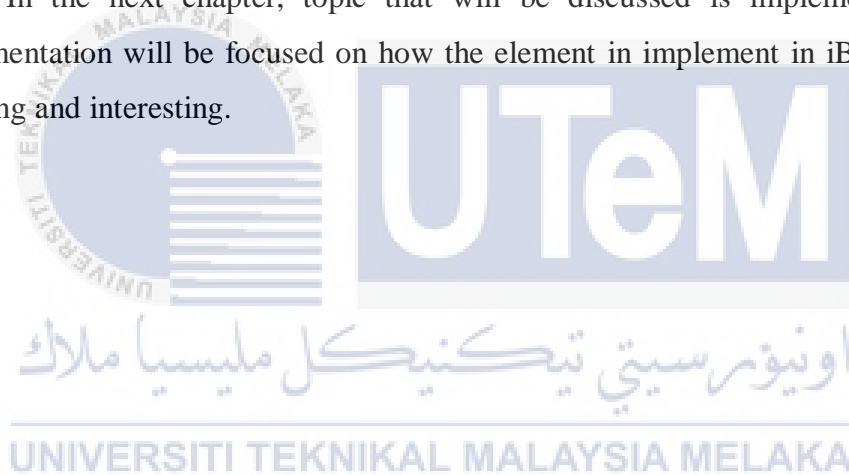
CHAPTER V

IMPLEMENTATION

5.1 Introduction

Based on the earlier chapter, the design architecture, design stage and all the multimedia elements are required in developing of "Learning and Teaching Qt Programming using iBook application". This project has been discussed, created and planned according to the right path to make it works. In this stage, the design is being improved to make it suitable to certain user. All the multimedia element such as texts, audio, images and video are included in the production.

In this chapter, will discussed about media creation, media integration, product structure management and implementation status to ensure the product is implement.

5.2 Media Creation

To make the product more interesting, all basic multimedia elements were used. These multimedia elements were created to attracted the user and to generate fascinating environment. Below is list of multimedia elements:

- Production of text
- Production of graphic
- Production of audio
- Production of video

5.2.1 Production of Texts

In every part of development of interactive book, there are several type of text was used to create the interactive book become more captivating and attractive. By using interactive elements such as style, font and color, the interactive book literally becomes more enjoyable and easily to understand.

In this interactive book, the font that being chosen and used is Lucida Sans Unicode. This is because these fonts are suitable to all type of screen view and it can attract the user attention. Thus, this font are not formal and not difficult to read. Moreover, each chapter used different type of fonts depends on the component. Size of fonts is 20 to 60 pt.

5.2.2Production of Graphics

Figure 5.1 Adobe Illustrator icon

Graphics is a pictorial representation of data and information. Graphics were divided in two main types which are bitmap and vector. In this project, all the images are designed using Adobe Illustrator CS6. The image below are designed using Adobe Illustrator CS6.

Figure 5.2 Icon for chapter
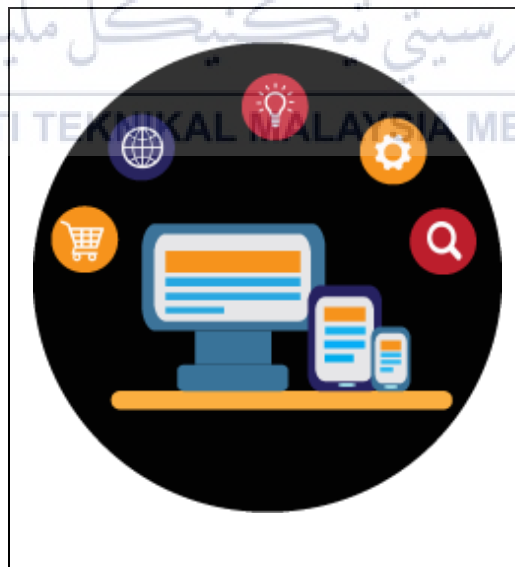
5.2.3 Production of Audio

Audio is a sound that has been captured and can be played back. Adding a sound could attract the user attention. The image below shows the timeline of recording voice to add in the iBook Author.

Figure 5.3 Audio recording voices
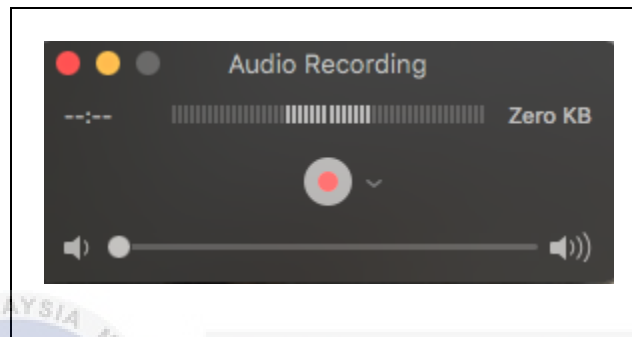
5.2.4 Production of Video

In this interactive book, there will include a video in introduction. This video will be an overview about the "Learning and Teaching Qt Programming using iBook application". By using software application, iMovie is chosen to edit and develop the video.

Figure 5.4 Timeline of iMovie
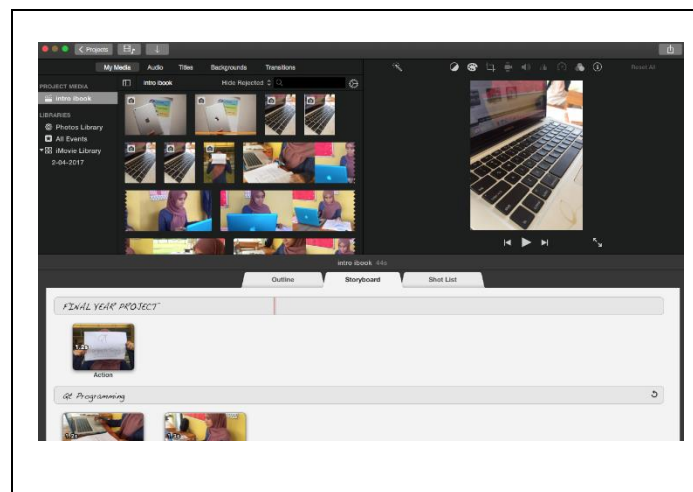
5.3 Media Integration

The integration of this system is made of various types of software tools such as designing of graphic image using Adobe Illustrator. Next, for adding sound using Sound application in Mac while production of video using iMovie application. Afterward, the whole multimedia features will be move in iBook Author to be included as content. After completing the process, this interactive book can be preview only using iPad, iPhone and iBook application.

5.4 Product Configuration Management

iBook Author is an application that is used to make interactive book. This software can be run only in Apple Product. All the interactive elements and learning object are inserted in the iBook Author that provided in this application. These features are to attract the student to learn more about Qt programming.

5.5 Implementation Status

Implementation status describes the progress of development for Learning and Teaching Qt programing using iBook application. Below are detailed descriptions of the application.

Table 5.1 Progress of development of iBook

Chapter	Duration	Status
Chapter 1 - Design Background - Design theme	2 weeks	Complete
Chapter 2 - Design icon for chapter's cover page - Insert video	2 weeks	Complete
Chapter 3 - Create interactive tutorial - Design theme	12 days	Complete
Chapter 4 - Insert voices - Design theme	10 days	Complete
Chapter 5 - Create interactive tutorial - Design theme	1 weeks	Complete

5.6 Conclusion

In this chapter, it is focusing on describing implementation stage that consist step by step in order to develop interactive book. Design phase helps to reduce the problem to occurs in implementation. This would be easier when the design stage that have been created is being successive. Everything was discussed in this phase to develop an iBook.

The next chapter would be the documentation on testing. The topics included are test plan and test implementation. It is used to evaluate the project usability and to get feedback from the user.

CHAPTER VII

TESTING

6.1 Introduction

Testing is a phase where some investigation is made to find out the product is successful or not. In this chapter, it will explain about the result and all the activity involved in testing phase. The testing plan is applied to carry on the testing process. The survey has been conducted to collect the data. There are four main ideas in the testing stage which is test plan, test strategy, test implementation and test result and analysis.

6.2 Test Plan

There are specific details regarding the product will be discussed in the test plan. Test plan is the beginning planning for testing stage of the interactive book. The aim of testing planning is to evaluate the effectiveness of the new approach in teaching and learning Qt for FTMK students.

6.2.1 Test User

This project testing is required user from students in Diploma year 2 of FTMK, UTeM to evaluate the effectiveness of the new approach in learning of Qt Programming. This testing managed to get 17 respondents from the students. This testing also has no limitation by gender or age at the time of testing.

6.2.2 Test Environment

This evaluation was being test using conventional method and direct survey with questionnaire after the user use the iBook project. Students were given an iPad to explore and operate the product by themselves. After the students finished exploring, student will be given questionnaire to evaluate the effectiveness learning using iBook.

For experts, the testing will be done by giving the expert iPad to discover and test the function of each interactivity. After the experts finished exploring, the experts will be given questionnaire to evaluate to the sequence of learning content is same as syllabus and the tutorial is deliver very clear.

6.2.3 Test Schedule

To proceed and organize with survey testing, a schedule has been made in order to meet and interview with the user. While appointment also has been made with the

expert in Qt programming which is lecturer in FTMK, UTeM to test the sequence of syllabus and tutorial presentation.

Table 6.1 Test schedule

Date	Time	Place
3 august 2017	11 am	FTMK
4 august 2017	3 pm	Cafe
6 august 2017	11 am	FTMK

6.3 Test Strategy

The test will be held in Fakulti Teknologi Maklumat dan Komunikasi (FTMK) in UTeM with the user. The testing process is carry out by using two ways which conventional method and iBook method. The students will learn using conventional method first then using iBook method. With iBook method by showing them the interactive book and let them test and explore how the functionality of iBook. Moreover, they will explore about the content and interactivity. After finishing the viewing, the user are given a form of questionnaire to answer based on the objective of this project to the effectiveness of new approach in teaching and learning Qt Programming.

6.4 Test Implementation

Test implementation for this project describe about how the testing is occurred and organizes while the result will show the outcome and feedback due to testing process.

6.4.1 Test Description

In this questionnaire are mainly use a Linear Scale method that shows a flexible close answer of user. The questionnaires are divided by two types which is for user and expert. The Linear Scale were divided into 5 classes:

Table 6.2 Value of linear scale method

1	2	3	4	5
Strongly Disagree	Disagree	Agree	Very Agree	Strongly Agree

This questionnaire was divided into 2 users:

a) User Questionnaire

For user questionnaire consist of 15 questions which are based on Linear Scale method. The question is being asked such as the usefulness and the ease of use of iBook. It is also included the user's opinion and improvement of iBook in future. (Refer Appendix).

b) Expert Questionnaire

For this expert part consist of 9 questions about the arrangement, content and syllabus, interface of interactive book, color and video that use in content. Expert also should give an opinion to improve the iBook and make it more advance.

6.4.2 Test Data

Students are given 15 questions to be rated. Expert are given 9 questions to be rated. Example of question is attached in Appendices section. Data is collected using online survey with Linear Scale method. Linear Scale method is used to define user's satisfaction on the project for questionnaire. Scale 1 represent strongly disagree and scale 5 represent strong agree.

6.5 Test Result and Analysis

Mean answer of students based on usefulness and ease of use
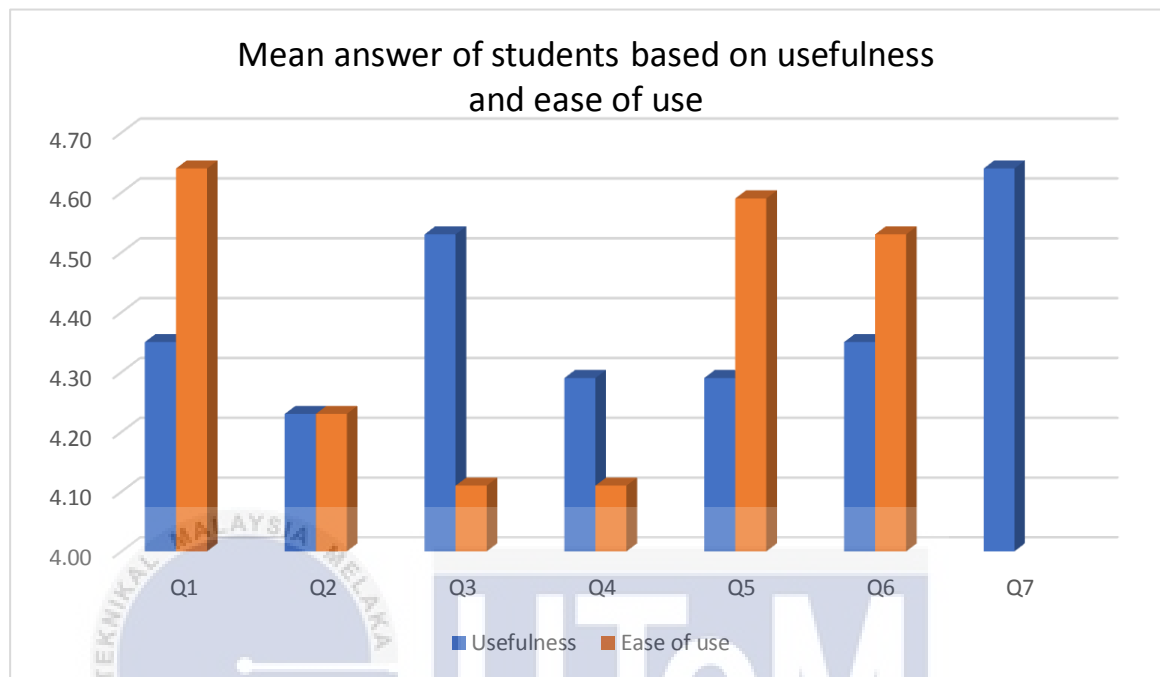
Graph 6.1 Mean answer of student based on usefulness and ease of use

Test result and analysis will validate the weakness of this product in order to improve the effectiveness of this learning tool. All data gathered will be processed and combined into graph form. Thus, an analysis is completed to conclude whether this product has met the proposed objectives as a learning tool. Based on graph above, shows that the mean answer of students based on usefulness and ease of use in iBook. However, this project is accomplishment and most of the respondent mean is more than 4.

6.5.1 Part A of Questionnaire

Figure 6.1: Pie chart of Gender
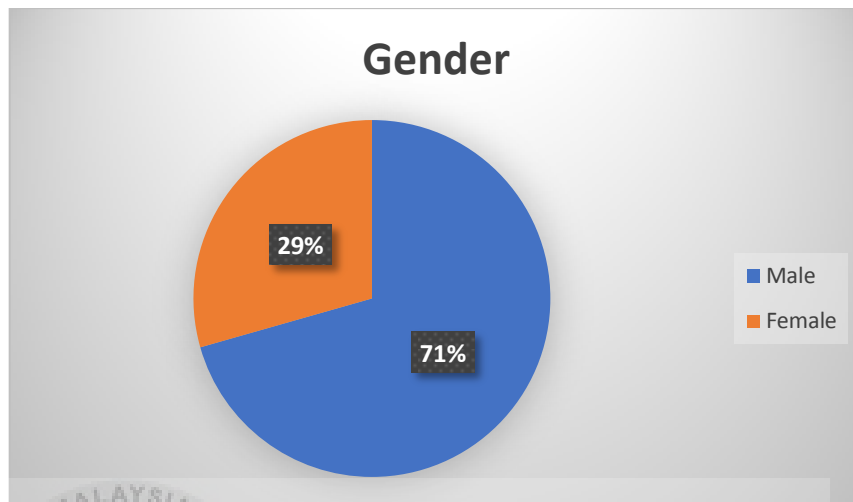
The figure above shows that male respondent 71% (12) more than female respondent 29% (5).

Figure 6.2 Pie chart of using iBook

The figure above shows that 53%(9) student have use iBook before compare to 47%(8) student who never use iBook before.
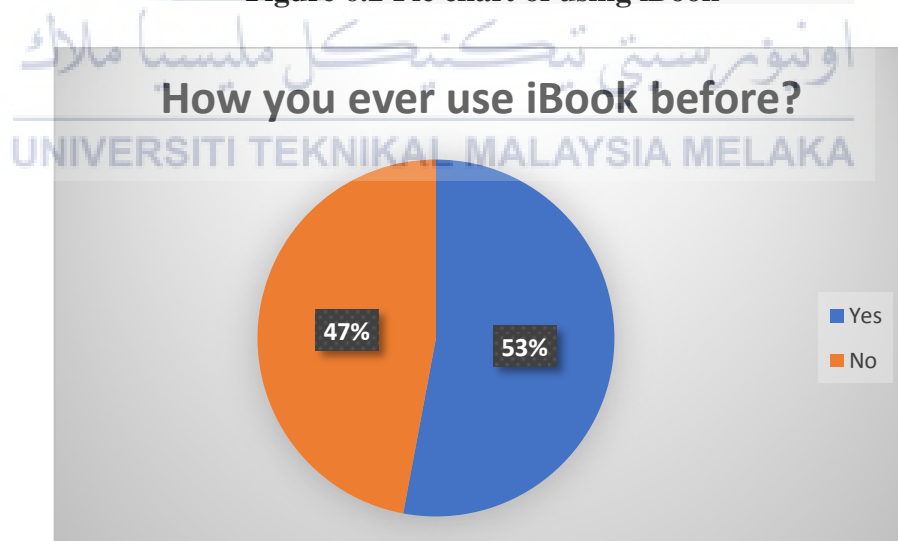
6.5.2 Part B of Questionnaire

The table shows the usefulness of the Learning and teaching Qt programming iBook between scales 1 to 5. Most of the respondents are satisfies with the iBook. The student choose scale 4 to 5 to describe their agreement on the iBook.

Table 6.3 iBook Usefulness

No	Usefulness	Mean	1	2	3	4	5
1	Tutorial delivery very clear	4.35	0% 0	0% 0	0% 0	64.7% 11	35.3% 6
2	The diagram concept is easy to remember	4.23	0% 0	0% 0	5.9% 1	64.7% 11	29.4% 5
3	The activities provided is very interactive	4.53	0% 0	0% 0	0% 0	47.1% 8	52.9% 9
4	Learning materials are prepared accordance with the prescribed syllabus	4.29	0% 0	0% 0	11.8% 2	47.1% 8	41.2% 7
5	The activities template is easy to use	4.29	0% 0	5.9% 1	0% 0	52.9% 9	41.2% 7
6	Interactive tutorial easily to understand	4.35	0% 0	0% 0	5.9% 1	52.9% 9	41.2% 7
7	iBook is more fun and interesting	4.64	0% 0	0% 0	5.9% 1	23.5% 4	70.6% 12

6.5.3 Part C of Questionnaire

The table shows the ease of use of the Learning and teaching Qt programming iBook between scales 1 to 5. Most of the respondents are satisfies with the iBook. The student choose scale 3 to 5 to describe their agreement on the iBook.

Table 6.4 Ease of Use

No	Ease of Use	Mean	1	2	3	4	5
1	Learn using iBook is more understand	4.64	0% 0	0% 0	0% 0	35.3% 6	64.7% 11
2	The text used is easy to read	4.23	0% 0	5.9% 1	11.8% 2	35.3% 6	47.1% 8
3	Interactive features can attract the students	4.11	0% 0	0% 0	17.6% 3	52.9% 9	29.4% 5
4	The sequence of learning content in this iBook helps my understanding on the subject matter	4.11	0% 0	0% 0	5.9% 1	76.5% 13	17.6% 3
5	In the future, this type of learning should be continue?	4.59	0% 0	0% 0	5.9% 1	29.4% 5	64.7% 11
6	I enjoy learning using iBook	4.53	0% 0	0% 0	11.8% 2	23.5% 4	64.7% 11

6.6 Analysis testing

After gathering all the required data, analysis has been done to ensure that all the objectives is achieve. This study result was divided into two part which is usefulness and ease of use. There are four key outcomes in this analysis testing which is tutorial delivery very, interactives features can attract the student, the text used is easily to read and in future this type of should be continue. This four key outcomes are based on for different students.

i. Tutorial delivery very clear.

Most of respondent agree that tutorial is this iBook deliver very clear that make the students understand about Qt programming. Student A said they are interested to explore this Qt programming iBook because in this tutorial, it is including step by step how to start doing with Qt programming software. Plus, it is also containing figures about the software to make sure students more understand compare reading the manual. Student A also said they are attracted to learn more about Qt programming when the tutorial contains popup and slide out effect.

ii. Interactive features can attract the students

To attract some of students in learning, iBook is suggested as a one of learning material. In iBook, a lot of interactive features can be adding on to make the iBook more interesting. Student B are attracted with the interactive features that contain in iBook which is Button tutorial, Video tutorial, games and simple exercise. Student B said Button tutorial are showed with figure and when click the figure, the information popup makes the students know the description about the figure. Next, video tutorial is another type of tutorial can be display. Student B agree that this video tutorial are attractive

because contain a clearly instruction, understandable figure and catchy sound effect. On the last page of every chapter contain games and simple exercise makes the student B are not bored in learning of Qt programming. Student B suggested that combine a lot color in iBook in order use as a memorize method.

iii. The text used is easily to read

Almost half of the respondent agree that the text used is easily to read. The feedback that student C gave is the size of text not too small and not too big to be display. The font is suitable with the size of interface iBook Although, Qt programming is a difficult subject and some of content are really boring to learned but choosing the right font can gain student interest in learning this subject. Plus, student C said this iBook worth to read since every font has different representations and impact, used the right font in order to send the right message. Moreover, student C also said that as a reader, in this iBook, they can easily differentiate which word symbolize as title and which word display as content.

iv. In future, this type of learning should be continue.

From the data above, 64.7% are strongly agree that this type of learning should be continue in the future as a new platform of learning. Student D also agree with this type of learning material This is because currently technology already expand in education and most of nowadays kids learning using computer, iPad and smartphone Student D suggested that this Qt programming should replace the slide in the class to attract more students in learning and they do not have to print out the lecture note or bring a lot of book during class. Plus, student D said Qt programming iBook can understand better than normal books because this iBook contains interactives features. With this iBook technology in education, help students stay engaged. Most students

today have been using mobile devices to play and learn since they crawl. So it seems logical to align today's classrooms with the way they used to learning..

In addition, expert agree that iBook is well designed, the course content is arranged in a clear and logical way. Thus, the color that use is attractive and interactive. From expert opinion, the tutorial deliver is very clear, understandable and the video is interesting to attract students.

Figure 6.3 Testing and answer questionnaire with students

6.7 Conclusion

The testing phase are consisting of question based on functionality of the product which is to improve the product and prevent from having any difficulties when using iBook. Besides, the questions are based on usability in term of design and ease of use also be given to test the effectiveness of the iBook. The result has shown clearly and the weakness has been identifying. From that weakness, may be considered to improve the product better and iBook becomes a good platform in learning and teaching.

On the next chapter, the summary for the whole project will be documented. This chapter also cover topic such as observation on weakness and strengths, propositions for improvement and contribution.

CHAPTER VII

CONCLUSION

7.1 Introduction

This chapter will elaborate about all development process and conclusion of the project. In order to conclude overall project, the weakness and strength, the future improvement and also project contribution to the university will clarify is being explained in this stage. iBook has been developed towards the user and receive feedback from the experience of using the product.

7.2 Observation on Weaknesses and Strengths

Based on the analysis from the results that have been occurred, there are several weakness and strengths of the product. This strengths and weakness will be considered as guidance to improve the product.

- Strengths

    The activities provided is interactive. In every chapter of this iBook has been included activities, question and answer part. Most of the students are attracted to learn each chapter because they do not feel bored when learn this subject.

    Interactive tutorial easily to understand. Each tutorial in this iBook is shows by video, slideshow and button tutorial. This type of interactive tutorial is to make the iBook become more interesting and attractive.

- Weakness

    Inconvenience. This interactive book about "Learning and Teaching Qt Programming using iBook in education" is one of reading materials and can be view only in iOS device which is iPad, MacBook and iPhone. This application is inconvenience for public user because iOS device are not friendly user to android. Plus, this format cannot be supported to view in android.

    Content. Interactive book is another platform to attract students to learn in education. In this iBook, there is are a lot of words to explain the situation and the color is to bright make the user are not comfortable to read.

7.3 Propositions for Improvement

After analyzed the interactive book, there are several strengths and weakness of the product that have been detected. All these feedbacks can be used as a guideline to make an improvement on the product.

- Convenience. Use another domain that can supported in all operating system with same interactive as iOS device. For example, Adobe InDesign.

- Less word. The content of iBook should be display more graphic and interactive tutorial to make it easily understand.

7.4 Project Contribution

This interactive book "Learning and Teaching Qt programming using iBook in education" is one of the electronic book which is develop to student who learns Qt programming. This iBook is to attract the student in learning and knowing about programming. With interactivity that include, the students will become more interested to learns. Besides, this interactive book can be a new platform to lecturer for guideline during teaching.

7.5 Conclusion

This project has met and initial objectives which are to study the current understanding level of student for Qt in programming 2 subject, to develop iBook with

features that can be used to build a references material for student who learn Qt and to evaluate the effectiveness of the new approach in learning and teaching Qt for FTMK students.

In conclusion, this project has been successful developed from the main plan and all objectives of this project is achieved. This Qt programming iBook project could be a new platform in learning and teaching to become more fun and effectives. It helped student understand the subject much better. Moreover, it also proved that Qt programming iBook is an effective approach in learning and teaching. In future, a new improvement could be added to make this iBook more interesting.

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APPENDICES

APPENDIX A: MILESTONES

Activity	Roles	Start Date
1. Attend PSM Briefing	• Student • JK PSM MI	19 Dec 2016
2. Register Student-Supervisor on Google Form	• Student	20-22 Dec 2016
3. Check List of supervision on ULearn	• Student • Supervisor • JK PSM MI	28 Dec 2016
4. Discuss project with Supervisor Prepare proposal Submit proposal to supervisor for review and get signature.	• Student • Supervisor	29 Dec 2016 – 9 Jan 2017
5. Get proposal feedback – available on ULearn	• Student • JK PSM MI	6 Feb 2017

6.	Discuss and revise project plan and proposal with supervisor	• Student • Supervisor • JK PSM MI	13 Feb – 26 Mar 2017
	Prepare finalized proposal based on JK PSM feedback		
	Upload revised proposal on the PSM System		
	Check student registration status on SMP		
7.	Work on Project and PSM 1 Report	• Student	13 Feb – 9 Apr 2017
8.	Check on Student Progress	• Supervisor	20 - 24 Mar 2017
9.	5 minutes Progress Presentation *details will be announced on ULearn*	• Student • Supervisor • JK PSM MI	24 - 28 Apr 2017
10.	Continue working on Project and PSM 1 Report	• Student	10 Apr – 21 May 2017
11.	Check on Student Progress	• Student • Supervisor	22 – 30 Apr 2017

12. Update Student Status (Continue/Withdraw)	• Student • Supervisor	8-13 May 2016
13. Check Presentation Schedule Submit Final PSM Report (hardcopy) to Supervisor and Evaluator *Note: Marks will be given based on this submission. Draft to supervisor should be submitted earlier than week 14.*	• Student	15 – 19 May 2017
14. **PSM PRESENTATION & SHOWCASE**	• Student • Supervisor • Evaluator • JK PSM MI	22 – 26 May – 2017
15. Do correction on PSM Report based on Supervisor and Evaluator comments Upload updated PSM Report on PSM System	• Student	27 -31 May 2017
16. Submit overall marks JK PSM	• Supervisor • JK PSM MI	1-3 June 2017

APPENDIX B: STUDENTS QUESTIONAIRE

Title : Learning and Teaching Qt programming using iBook application

I am Nurul Nabilah binti Zulkifli from Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka(UTeM).

First of all, thank you for participating in my testing for my final year project entitle "Learning and Teaching Qt programming using iBook in education".

This survey is to evaluate the effectiveness of the new approach in teaching and learning Qt for FTMK students using iBook or interactive book.

Thank you for your time and willingness to participate in this study.

INSTRUCTION: Please (/) the point that is closest to your opinions.

PART A: BACKGROUND INFORMATION

Gender: Male   [   ]   Female [   ]

Have you ever use iBook before? :   Yes   [   ]   No [   ]

PART B

For Part B please refers to the table given.

INSTRUCTION: Please (/) the point that is closest to your opinions.

1	2	3	4	5
Strongly Disagree	Disagree	Agree	Very Agree	Strongly Agree

No	Questions	1	2	3	4	5
1	Tutorial delivery very clear					
2	The diagram concept is easy to remember					
3	The activities provided is interactive					
4	Learning materials are prepared accordance with the prescribed syllabus					
5	The activities template is easy to use					
6	Interactive tutorial easily to understand					
7	iBook is more fun and interesting					
8	Learn using iBook is more understand					
9	The text used is easy to read					
10	Interactive features can attract the students					
11	The sequence of learning content in this iBook helps my understanding on the subject matter					
12	In the future, this type of learning should be continue?					
13	I enjoy learning using iBook					

14. In your opinion, what should be improve in this iBook in the future?

_____

15. Based on this experience, would you like iBook for other subjects?

                    Yes [   ]   No [   ]

APPENDIX C: EXPERT QUESTIONAIRE

Title : Learning and Teaching Qt programming using iBook

I am Nurul Nabilah binti Zulkifli from Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka(UTeM).

First of all, thank you for participating in my testing for my final year project entitle "Learning and Teaching Qt programming using iBook in education".

This survey is to evaluate the effectiveness of the new approach in teaching and learning Qt for FTMK students using iBook or interactive book.

Thank you for your time and willingness to participate in this study.

INSTRUCTION: Please (/) the point that is closest to your opinions.

PART A: BACKGROUND INFORMATION

Gender: Male   [   ]   Female [   ]

Have you ever use iBook before? :   Yes [   ]   No [   ]

PART B

For Part B please refers to the table given.

INSTRUCTION: Please (/) the point that is closest to your opinions.

1	2	3	4	5
Strongly Disagree	Disagree	Agree	Very Agree	Strongly Agree

No	Questions	1	2	3	4	5
1	Overall. The iBook is well designed					
2	The sequence of learning content is same as syllabus					
3	The course content is arranged in a clear and logical way					
4	The color that use is attractive and interactive					
5	The tutorial is deliver very clear and understandable					
6	The video is interesting to attract student					
7	The font size that used is suitable					

8. In your opinion, what should be improve in this iBook in the future?

_____

9. Based on this experience, would you like iBook for other subjects?

        Yes [   ]   No [   ]

APPENDIX D: INTERFACE OF IBOOK CONTENT