NEW TECHNOLOGY TO SUPPORT LEARNING IN DISCRETE MATHEMATICS USING THE IBOOK

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DECLARATION

I hereby to declare that this project report entitled

NEW TECHNOLOGY TO SUPPORT LEARNING IN DISCRETE MATHEMATICS WITH THE IBOOKS

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

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DEDICATION

I dedicate this thesis to my parents Rozi Bin Mohd Noor and Madam Laizini Binti Ghazali, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to family especially to my brother, Mohd Azim Bin Rozi who always follows and supports my final year project and also gives me an idea about choosing the title of this project. Lastly, to all my lecturer and friends that always give the excellence idea and helping me in finishing final year project.

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ABSTRACT

To most average students, Discrete Mathematics is considered quietly a tough and difficult subject to learn. Moreover, with lots of formulas, concepts and definition to understand from the ordinary thick textbooks, students will tend to avoid taking Discrete Mathematics if they are given choice. Currently, with the massive and impressive technology development in information and communication technology, Discrete Mathematics will be no longer a boring and troublesome subject. iBook Author, a free app from Mac Apple store is one of the possible tool that can be used to change the current textbook. iBook can integrate all sorts of multimedia elements such as text, sound, image, video and animation to create a new interactive textbook that is more engaging. Students can flip through iBook by simply sliding a finger on the iPad screen. Two subtopics in Discrete Mathematics which have been considered as difficulty by majority students have been chosen as subjects' matters in order to develop the iBook.

ABSTRAK

Teknologi baru untuk menyokong konsep pembelajaran dalam matematik adalah cara terbaik untuk keluar beberapa topik yang pelajar sukar untuk difahami. Sistem ini dibangunkan dengan menggunakan iBook Pengarang di mana ia adalah salah satu permohonan daripada produk Apple. Dalam tahun 2015, UTeM mahu memberikan konsep baru pembelajaran di dalam kelas terutama dalam mata pelajaran Matematik Sains Komputer, di mana pelajar sukar untuk memahami dan mengingatkan nota kerana menggunakan sistem yang sedia ada. Walau bagaimanapun, orang sudah tahu bila berkata kira-kira matematik, ia membayangkan bahawa pembelajaran matematik adalah kertas putih dan warna hitam fon yang digunakan untuk belajar pelajar. Ia tidak menyeronokkan dan tidak berminat untuk belajar pelajar terutamanya pelajar Teknologi Maklumat (IT). Pemaju memilih iBook sebagai satu konsep baru pembelajaran dalam matematik dan membangun menggunakan semua elemen multimedia ke dalam iBook seperti video, audio, imej dan animasi. IBook ini dibangunkan untuk FTMK pelajar yang perlu mengambil subjek Matematik Sains pengiraan I. Pelajar perlu mencuba dan belajar dengan iBook ini kerana mereka akan merasakan pembezaan menggunakan pembelajaran yang sedia ada atau baru konsep pembelajaran mata pelajaran Matematik.

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CHAPTER I

INTRODUCTION

The New Technology to Support Learning Object in Discrete Mathematics focused on the design and development of the iBook. Besides that, this iBook will be used by any department in UTeM and PSTP as a new perspective of learning to cater the different learning styles of gen-Y today. The contents of iBook come from the learning outcomes that provided by Faculty of Information and Communication Technology (FTMK) to the lecturer. The contents of iBook also come from any additional notes or video from the internet. The iBook will be developed using iBook Author which is a free application from Mac Apple store. The iBook Author is one of the possible tools that can be used to change the current textbook.

The students can flip through iBook by simply sliding a finger on the iPad's screen by chapter. The Students will be able to play the video and open the sound in this book. It is also easy to calculate the question without using any paper and can do assestment each chapter for revision. The elements used in the iBook will motivate the students to study and prevent them from easy to bored during learning the Mathematics subject.

1.1 Project Background

The iBook will be specifically developed for the use of lecturer and students in Universiti Teknikal Malaysia Melaka (UTeM) and Pusat Sumber dan Teknologi Pengajaran (PSTP) who take the course of Discrete Mathematics. This iBook also has preferences to the students to do the calculation using calculator and white space as a paper to draw something. So, it will reduce a lot of paper and can save cost to buy any scientific calculator if require to do the calculation.

One of the benefits of this iBook is it can make the textbook more interesting than before with the elements of multimedia applied in this textbook. It will looks fun and enjoy learning with it. Furthermore, it also can reduce usage amount of paper because it will save as softcopy to any iPad or Mac without print it and it also will use as a reference in the future if needed to do revision because the iBook will be not defect like the books or other hardcopy.

1.2 Problem Statements

There are several problems that arise, therefore, the development of interactive book or iBook textbook is required to find a way to make learning Discrete Mathematics more interesting and engaging. It will also examine all the learning style of gen-Y in order to improve their understanding and comprehension in Discrete Mathematics.

Most of the courseware nowadays requires the students to take Discrete Mathematics subject. Unfortunately, to the most average students, Discrete Mathematics is considered quietly a tough and difficult subject to learn. Moreover, with lots of formulas, concepts and definition to understand from the ordinary thick textbooks, students will tend to avoid taking Discrete Mathematics if they are given a choice. Therefore, they tend to find something fun and enjoy while learning this subject and

easy to understand. By using this iBook, the students just can save their notes only in iPad and can bring it anywhere.

Not only that, they also become more attractive to learn and explore the notes because of its interactive content of information in the iBook make more interest and enjoy with it.

1.3 Objective

The objectives of the system are listed below:

1.3.1 To study the different learning styles of gen-Y and the technology supported them that are currently available.

1.3.2 To develop iBook (interactive book) comprised of three subtopics in Discrete Mathematics which is considered a tough subtopics.

1.3.3 To evaluate and assess students perception and acceptance about the effectiveness of learning three subtopics in Discrete Mathematics.

1.4 Scopes

Nowadays, majority students come from gen-y, where they have different learning style and need to take it serious to gain more interest in their studies. The students will be chosen randomly from each course such as Bachelor of Computer Science (Networking), Bachelor of Computer Science (Media Interactive), Bachelor of Computer Science (Software) and Bachelor of Computer Science (Database). Two subtopics in Discrete Mathematics that considered as the most difficult subtopic by

majority of the students have been chosen as a subjects matter in order to develop the iBook after we do the questionnaire to the students who was took this subject before.

1.5 Project Significance

In this iBook will require the information based on learning outcomes from FTMK on subject Discrete Mathematics. This iBook can integrate all sorts of multimedia elements such as text, sound, image, video and animation to create a new interactive textbook that is more engaging. So, it will improve their learning skills. It also gives the effectiveness to the student to understand using the interactive book than textbook while learning this subject. It can make a new technology to support in learning object in Discrete Mathematics using iBook. Then, this iBook also give encourage to the student to learn anywhere even outside of the campus.

1.6 Expected Output

In the future, UTeM and PSTP want to improve usage of technology in education with using iMac or iPad to teach or learn for lecturer and students. They need improvement for their material of studies. Because of that, the iBook will choose to improve their way in education. In this project, it is to study the different learning styles of gen-Y among students and the technology supported them that are currently available that will help them to improve their learning skills. It is also to develop iBook (interactive book) comprised of two subtopics in Discrete Mathematics which is considered as a tough subtopics. Furthermore, this project will improves the skills in the teaching plan which is it will covers two subtopics that is difficult to the students and to develop an iBook for student and lecturer as a new technology learning in Discrete Mathematics to easy to understand and more interest in learning when use it. Besides

that, it is also to encourage students to learn this subject using this system and the students will enjoy during studying not only in the campuses but also in other place such as when students are waiting at the bus stop, at home and anywhere else. Lastly, the project built to evaluate and assess student's perception and acceptance about the effectiveness of learning the two subtopics in Discrete Mathematics.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

In developing the project, a lot of information is needed such as about the iBook and the software that suitable for this project by searching using Internet, journal and article to make references for the information content in iBook.

Furthermore, the research was done on other way with do the questionnaire at students to know that which chapter covered is difficult for them to understand and it must do a lot of material in learning concept to make students easy to understand.

The methodology for this project is also explained in this chapter. The methodology is the method chosen to be as a guide when develop this project. The ADDIE model is applied during the completion of the project. The ADDIE model is approach to meet the specification of learning application development.

Besides that, the project requirement for this project such as software and hardware requirements are defined in this chapter and also described the project schedule and milestones.

2.2 Fact and finding

The facts and findings of the information that relates to the project are briefly described in this topic. In this topic explain about what the existing system does and what the problems. Beside make research for existing system that which is similar with the project, fact and finding also could be done by journal, article or case study. The research should be done from internet, library or at the school and ask people opinion about existing system and the project that developed. This system will develop based on theory and case study because the theory is try to create the system that user friendly, make user feel like interact with system and more interested to learn when using this renewals. For example, when gen-y learns the Discrete Mathematics is quickly bored with lots of formulas, concepts and definition to understand from the ordinary thick textbooks. User wants that renewals must user friendly with the instruction how to used and easy to understand with kind of interaction in the system. To make the system that follows the requirements that user wants, the project must be more entertaining, more sophisticated and more interesting so that user will enjoy when used it. The case study on this research is based on the approach new object learning Discrete Mathematics with the interactive ways. The research include the questionnaire of the topics that students difficult to understand. Other than that, research of Open Education Resources (OER) to create all the interactive elements for this project. Besides that, developer also does the research about usage of theme and fonts in this project. Lastly, this includes research of approach new object learning Discrete Mathematics using interactive elements to give more effective way to students understand and more interesting to learn Discrete Mathematics.

2.2.1 Domain

The domain that defines for this project through the research and references are the learning method of the subject and the new way for learning in subject of Discrete Mathematics. The related and relevant information and project requirements are gathered according to the syllabus of the subject and about the software to develop for this project. In the next sections the terms that are used in this project are discussed.

2.2.1.1 iBook

Nowadays, many existing technologies used in the classroom to support the ways teacher teaching the students and improve educational outcomes. However, with the abundance of technologies available at schools, many teachers do not have the knowledge necessary of effectively integrate these technologies into their lessons. (Davis, 2002)

So, developer decided that iBook is the one of new effectiveness technologies to build one concept lesson of mathematics that will give students enjoy and fun to study. iBook is the one of the current and popular application of interactive learning experiences. It is becomes easier for students and teachers from all background and age group to absorb in order rapidly, enjoyable, and even educational skill. This application is the new philosophy of experience driven technology from Apple that played a most important part in securing this truly revolutionary and innovative element within computing. Then, in term of learning, it has only been in the last two years, that the iBook has started to take shape and to move gradually into the educational globe. For example, some of successful iBook are Alice in Wonderland which has been used to educate young children in classic storytelling (Dahlquist, D., 2010) and iBook from Al Gore which to educate people on the damaging effects of Climate Change (Lee. A., 2011)

2.2.1.2 Open Educational Resources

In this projects, developer using Open Educational Resource (OER) to develop multimedia elements such as text, audio, 2D animation, video and graphics. OER are teaching, learning and research materials in any medium that reside in the public domain and have been released under an open licence that permits access, use, repurposing, reuse and redistribution by others with no or limited restrictions (Atkins, Brown & Hammond, 2007)

The Open Educational Resource software that used for this project such as Powtoon, Tumult Hype, Voki, Yakitome, Wideo, ToonDoo and others.

2.2.2 The Existing system

Developer does the research about the type of approaches to learn Discrete Mathematics. Normally, there are few methods and approaches that have been used when learning in the subject of Discrete Mathematics. The researchers also about the type of approaches are giving easy way to student learn and gain more interest to learn this subject. The existing approaches are listed below:

1. Learning Mathematics using Textbook and text-based notes.

2. Learning Mathematics using Web-Based application.

3. Learning Mathematics using CD ROM.

2.2.3 Comparison of Existing system

Table 2.1: Comparison Table of System

System / Apps	Description	Pro and Con
Learning Mathematics using Textbooks and Text-based notes	These is normal approach that used by lectures to teach. This book has images and use full text description. It require book, printed notes from the lecture slides or softcopy noted uploaded in u-learn.	- Images and text explanation will help the students to understand. - Easy carried anywhere. - Required use a lot of paper. - Not provide video and Interactive image that can show the tutorial to do revision and to increase understanding. - No interaction between user and paper.
Learning Mathematics using Web-Based Application	The Web-Based application for learning provides a platform for its user which combines element of ICT. Student can learn and do the exercise in interactive content. It is application that makes student fun and enjoys learning with it.	- Students also get more material in one website with one click. - Can easy to communicate with lecturer or any tutor for enquiries. - Students need the Wi-Fi or connection of internet to learn mathematics and this make it limited to learn with it. - Difficult to find the website is free and mostly need to make payment in few of period was set.