USER ACCEPTANCE STUDY ON INTERACTIVE BOOK

FOR FORM 4 BIOLOGY

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JUDUL: USER ACCEPTANCE STUDY ON INTERACTIVE BOOK FOR FORM BIOLOGY

SESI PENGAJIAN: SEM 2 2015/2016

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USER ACCEPTANCE STUDY ON INTERACTIVE BOOK

FOR FORM 4 BIOLOGY

SUVINITHIRA A/P NADESAN

This report is submitted in partial fulfilment of the requirements for the Bachelor of Computer Science (Interactive Media) With Honours

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

AUGUST 2016

DECLARATION

I hereby declare that this project report entitled

USER ACCEPTANCE STUDY ON INTERACTIVE BOOK

FOR FORM 4 BIOLOGY

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

STUDENT : _____ Date: 9/8

(SUVINITHIRA A/P NADESAN)

I hereby declare that I have read this project report and found this project report is sufficient in term of scope and quality for the award of

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DEDICATION

I would like to dedicate this thesis to the five most important persons in my life who stood by my side all the time in helping me to complete my project. Without them it would have been hard to complete this project. My mother and grandmother who always gave moral support, advised me till date on not to give up, and helped me to focus and concentrate on this project. Their care towards me has always encouraged me on not to stop my effort. It has always been hard to stay up late night to do this thesis in order to produce a good work. But with their prayers to God on behalf of me, I am now standing here at the last phase of my university life. My uncle and aunty, who supported me economically to buy essential items to carry out my project, brought me to two schools to carry out my testing in Terengganu despite their busy schedule. Their love and care towards me as their daughter has always been motivating me to complete my degree thesis as the best as I could. Besides, both of them being a PhD graduates, has always been good role models throughout my life. My brother whom always have been a good friend to lend me helping hands and ears to help me physically, mentally and listen out my problems. He never stopped encouraging me to be better. He has always given me valuable suggestions and ideas to improve my project and thesis. Their love and care towards me have always been growing. It's my pleasure to have been born into this lovely family whom always been motivating me to grow and teaches me on not to stop growing even after I am a graduate soon. With that I would like to dedicate my hard work to all of them and I hope to make them proud with this thesis and project.

ACKNOWLEDGEMENTS

I would like to express my sincere appreciation and thanks to my supervisor En. Muhammad Helmy Bin Emran, who has been a tremendous advisor and mentor for me. I would like to thank him for imparting encouragement during hardships and helping me to overcome problems in my project. My sincere thanks also go to Pn. Norazlin Binti Mohammed as the evaluator who have evaluated my project and gave wonderful comments to improve it from time to time. I am grateful to you both for your brilliant and insightful comments and suggestions.

I would also like to express my thanks to the Universiti Teknikal Malaysia Melaka and its members, who were there for me throughout my project. My sincere gratitude also goes to Sekolah Menengah Kebangsaan Rantau Petronas, Kemaman, Terengganu, Sekolah Menengah Jenis Kebangsaan Cina Keat Hwa Alor Setar, Kedah, Sekolah Menengah Kebangsaan Perempuan Sri Aman Petaling Jaya, Wilayah Persekutuan Kuala Lumpur that allowed me to carry out the project testing in respective schools of Form 4 students who studies Biology.

I also give special thanks to my family. Words cannot express how grateful I am to my mother, Madam Ranjini Raju, grandmother, Madam Walli Krishnan, aunty, Madam Rajeswari Raju, uncle Sritharan Sanggaran and brother, Maviivarman Nadesan for all the sacrifices they made on my behalf. Your prayers for me helped to sustain me this far.

Finally, I would like to thank all of my friends who supported me in writing, encouraged me to strive towards my goal and always provided me with support in the moments when there was no one to answer my queries.

THANK YOU.

ABSTRACT

This thesis entitled User Acceptance Study On Interactive Book For Form 4 Biology focuses on to investigate the Human Computer Interaction elements that influence the better learning of Form 4 Biology and to evaluate the user acceptance between interactive PDF and SWF interactive book format. This project also focuses on to propose a new learning technique to enhance the Form 4 students' current learning method using reference materials. This project is expected to solve the problems that have been identified in the initial phase of this project which are the limited availability and accesibility students have in using interactive book for Biology subject in Malaysia. Therefore, the ADDIE method which has five phases is used to carry out the project detailly. Many software have been integrated in one platform in order to produce a good interactive book that solves most of the problems identified. This interactive book comprises of 2D and 3D graphics, 2D and 3D videos, animations, quizzes and games that would help the students to learn Biology subject on their own as an extra to the lessons learned in school. This project is tested in interactive PDF and SWF formats. These formats have been tested in three different schools and reviewed by subject matter experts. The findings favour SWF format as it is preferred by both the students and experts due to being more interactive, can function without failures in most of the tested software and operating systems. SWF format is more user friendly and interactive compared to interactive PDF, yet it still lacks in some features that interactive PDF has. Therefore it is suggested for the future work to develop an interactive book that comprises interactivity, availability, compatibility and user friendliness of both formats. In conclusion, the objectives of the projects have met and can be improved in future if necessary.

ABSTRAK

Tesis ini yang bertajuk *'User Acceptance Study On Interactive Book For Form 4 Biology'* fokus kepada dua objektif yang terpenting iaitu, untuk menyiasat komponen interaksi manusia dan komputer dalam pembelajaran subjek Biologi dan untuk menilai penerimaan pengguna terhadap sistem ini berdasarkan format PDF interaktif dan SWF. Objektif-objektif ini adalah untuk menyelesaikan masalah yang telah diperlihatkan dari permulaan projek ini iaitu kesusahan pelajar untuk akses dan mendapatkan buku interaktif untuk subjek ini. Oleh itu, kaedah ADDIE telah digunakan dalam setiap fasa projek ini. Beberapa perisian telah digabung bagi menghasilkan buku interaktif yang dapat menyelesaikan masalah yang telah dicarikan. Penggabungan perisian-perisian ini telah membantu untuk menghasilkan buku interaktif yang merangkumi video 2D dan 3D, grafik 2D dan 3D, animasi, kuiz-kuiz dan permainan yang dapat membantu pelajar untuk mengulang kaji subjek Biologi ini. Projek ini telah duji dalam format PDF interaktif dan SWF. Kedua-dua format ini telah digunakan oleh pelajar *Form 4* dari beberapa sekolah dan *Subject Matter Expert.* Keputusan daripada ujian ini memihak kepada format SWF kerana disukai oleh responden dan *Subject Matter Expert* daripada format PDF interaktif disebabkan lagi interaktif, dapat digunakan dalam pelbagai perisian tanpa sebarang masalah dan lagi mesra pengguna. Walaupun begitu, format SWF mempunyai kekurangan daripada format PDF interaktif. Oleh yang demikian, adalah disarankan kepada projek pada masa hadapan yang fokus kepada topic ini untuk menghasilkan buku interaktif yang merangkumi interaktiviti, kesediaa-adaan, serta mesra pengguna. Secara konklusinya, objektif-objektif projek ini telah pun dicapai dan boleh diperbaiki jikalau perlu.

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LIST OF ABBREVIATIONS

ABBREVIATION		FULL FORM
SPM	-	*Sijil Pelajaran Malaysia*
HCI	-	Human Computer Interaction
PDF	-	Portable Document Format
SWF	-	Shock Wave File
2D	-	2-Dimensional
3D	-	3-Dimensional
PT3	-	*Pentaksiran Tingakatan 3*
UAT	-	User Acceptance Test
ADOBE DPS	-	Adobe Digital Publishing Suite
HTML5	-	HyperText Markup Language 5
EPUB3	-	Electronic Publication 3
XML	-	Extensible Markup Language
SDN.BHD.	-	*Sendirian Berhad*
MCQ	-	Multiple Choice Questions
GB	-	Giga Byte
RAM	-	Random Access Memory
CPU	-	Central Processing Unit
iOS	-	Apple Operating System
CD	-	Compact Disc
PC	-	Personal Computer
PNG	-	Portable Network Graphic
MP4	-	MPEG-4 Advanced Video Coding
WAV	-	Waveform Audio
MP3	-	MPEG -2 Audio Layer III
JPEG	-	Joint Photographic Expert Group
SMK	-	*Sekolah Menengah Kebangsaan*
SMJK	-	*Sekolah Menengan Jenis Kebangsaan*

LIST OF ATTACHMENTS

CHAPTER I

INTRODUCTION

1.1 Introduction

In this internet world, secondary school students who are considered Y-Generations want everything in fast pace. Considering them to learn Biology subject, it would be effective if there is a method of learning that includes multimedia elements to keep them up with the pace of technology we are aheading to. Interactive book would be a good companion to be used as one of the reference sources beyond their text books. This project also focuses on to propose a new learning technique to enhance the Form 4 students' current learning method using reference materials such as online notes and printed reference books.

Therefore it is suggested that, an interactive book to be built that covers multimedia elements which will enhance the better learning and understanding of students in Biology subject. Interactive book will be an aid for students to show tutorial videos, meanings of terms, and videos to illustrate the process that takes place either in body or in environment in an interesting way.

They can watch videos and animation in interactive book to learn in an effective environment. Learning through interactive media also allows student to repeatedly watch the tutorials in the case of not able to understand it on the first time.

The reason for developing this interactive book is to keep the students up with the technology we have. This interactive book is also created to encourage students who lacks knowledge in Biology to have an interest and learn it.

This system is specifically built for Biology subject as per the rise in demand of nanotechnology and marine Biology in recent years as we see the prospect of this two fields in our near future. The purpose of creating this application will be to expose students to multimedia applications.

1.2 Problem Statement

This interactive book is developed in order to solve few main problems which are as stated below:

1.2.1 The limited number of interactive books available in the market

There are only few interactive books available for Biology subject at the market but with fewer or no interactions that is based on Malaysian Education Syllabus available for the students to be used as references. The first Malaysian online interactive book was launched by Learning Port on the 2nd December 2015 (Bernama 2015). This proves that students still lack interactive books based on Malaysian syllabus for their reference apart from printed text books and reference books.

Interactive books provide clearer and more creative medium to keep the attention of students via two way learning by reacting to buttons, and choose which sections they want to learn. Interactive book provides knowledge and message using more visual contents in the form of images, videos and animations with voice over help. It is also provided with mindmap, past year questions and activity to test and

retain their knowledge. The features of available interactive book will be discussed at next chapter under the subtopic 2.3 Existing System.

1.2.2 The importance of Biology subject is seeking rise in Malaysia

In recent years, the demand for Biology subject is seeking rise due to increase in number of students who wish to pursue pharmacy, nanotechnolgy or biotechnology subjects in Malaysia. This is because the students find more opportunity in the Biology related field which are interesting and profitable at the same time. Morgan (2016), Director of Outreach, SEMI Americas, has stated his point of view on nanotechnology at an interview with AzoNano in The World of IoT and the Silicon Innovation Forum at SEMICON West 2016:

"The Internet of Things has been a pivotal development point for the semiconductor industry which is part of nanotechnology that allows new opportunities to evolve and grow everyday. The growth has rapidly increased in the last year and the demand is great..."

Therefore, it is evident that Biology field in Malaysia is still rising ad therefore we need good education medium to produce performing students.

1.2.3 Biology is among the hardest subject to score in SPM

It is also a clear known fact that Biology is among the hardest scored subject in SPM for the past few years. The statement of Malaysia's Chief Director of Education, Datuk Seri Dr.Khair Mohamad Yusof (2016) on which he stated that in the recently announced SPM 2015's result there were only three out of seven core subjects that showed improvement, which were *Bahasa Inggeris*, Mathematics and *Pendidikan Moral.* His statement absolutely supports that Biology shows a decrement even in the recently released result. So it is hoped that by creating this

interactive book on Biology for Form 4 students, it will be a great medium for students to improve their Biology knowledge to be used along their text books to improvise their understanding on processes in Biology subject.

1.3 Objectives

This project embarks on the following objectives:

- **To investigate the Human Computer Interaction (HCI) elements that influence the better learning of Form 4 Biology.**

This project will investigate the principles of HCI in the form navigation style, colours used, buttons arrangement, display style and all other criteria that suits in creating a good interactive book. The screen layout, display, and HCI principles will be investigated to make the system fit the current technology.

- **To develop an interactive book that can facilitate the learning of Form 4 Biology.**

The purpose of this project is to make the learning of Biology subject more interesting by providing good means of display by using videos, sounds and animations that can cater the better learning of this subject. Therefore, based on the data gathered, a good illustration of multimedia elements that best cater in learning this subject into a meaningful way will be used in its development.

- **To evaluate the user acceptance of Interactive PDF and SWF format interactive book**

This project will be tested on both Interactive PDF and SWF format of the interactive book to evaluate which format is much preferred and easy to use by Form

4 students. Users will be asked to choose the preferred method of learning whether through Interactive PDF or SWF format based on their experience. Other tests such as compatibilty testing and Subject Matter Expert reviews will be done before choosing the most favoured method from the two available ones.

1.4 Scope

This project targets on Form 4 students of Malaysians who take the Biology subject for their *Sijil Pelajaran Malaysia.* This project will focus on Form 4 syllabus of Biology subject that will cover, Cell Structure, Movement of Substances, Chemical Composition of Cell and few other topics. This project will be built using Adobe InDesign CS6 for creating interactive book, Adobe Photoshop CS6 & Adobe Illustrator CS6 to edit and design images, Audacity to record voice for tutorials, Adobe Animate CC 2015 CC to create animations, quizzes, interactivity elements, Autodesk Maya 2015 to model 2D/3D objects. Whereas Microsoft 2010, Microsoft Visio 2010 to draw flowcharts, diagrams, and Gantt chart and Prezi to prepare the slides for presentation.

The final output of this project will be in interactive PDF and SWF formats. This interactive book is planned to be exported in interactive PDF because of the rising number of PDF users worldwide and the availability to run PDF files in almost all devices. Besides that PDF files are even supported by latest technology such as sharing PDF documents in social media like Facebook and WhatsApp. Considering this as one of the plus point to reach out for more users and to keep up with the growing technology, therefore it is planned to export this interactive book in this format. Besides that, SWF format is chosen due to the additional interactivity features that it has such as able to play animations and has flip page like a book metaphor.

1.5 Project Significance

This interactive book is developed to be used by Form 4 students who take Biology subjects. The commercial value of this project will be, to use interesting and easy to understand method of learning Biology in cheaper way. This interactive book will also provide repeatable tutorials that can be viewed many times in order for the students to understand better and edutainment games for the students to learn in a new environment that ease their understanding process. It will help to contribute in producing better understanding among students who learn Biology which might also lend a hand to improve the overall result of this particular subject nationwide.

1.6 Expected Output

This project will be built using HCI principles; hence the user interface will be very minimal by avoiding complex features that will be hard to understand. Buttons and other components of the screen design will be given proper consideration to keep things easy to learn. There will be term definitions for scientific words that will not be easy to understand. There will also be tutorial videos and 3D models to explain the processes in all covered topics. This application is expected to run on all devices that support PDF and SWF format file reading. The content of the application is given consideration to be made simpler for better knowledge absorption. Therefore the content will be selected from trustable source that follows Malaysian Biology subject syllabus.

1.7 Conclusion

This chapter describes the objective, problem statement, scope and expected output of the project. In simple words, it can be said that interactive book helps students to study on their own without a tutor compared to learning using printed books that is being implemented in school nowadays. This is because, interactive