MATHERACTIVE EBOOK : DEVELOPMENT OF INTERACTIVE MATHEMATICS BOOK FOR PRIMARY SCHOOL

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MATHERACTIVE EBOOK : DEVELOPMENT OF INTERACTIVE MATHEMATICS BOOK FOR PRIMARY SCHOOL

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FINAL YEAR PROJECT REPORT SUBMITTED TO FULFILL THE REQUIREMENTS TO OBTAIN THE REQUIREMENTS TO OBTAIN THE DEGREE OF BACHELOR OF SOFTWARE ENGINEERING (EDUCATIONAL SOFTWARE) WITH HONOURS

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SULTAN IDRIS EDUCATION UNIVERSITY

FACULTY OF ARTS, COMPUTING AND CREATIVE INDUTRIES

DECLARATION OF ORIGINAL WORK

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Field of Specialization : Software / Computing

Project Title : Matheractive eBook : Development of Interactive Mathematics Book For Primary School

I confirm that all the material contained in this final year project report is the result of my own efforts. If there are other people's or other parties' work whether published or not (such as books, articles, papers, or materials in other forms such as audio and video recordings, electronic publications or the Internet) that have been used, I have already recorded the recognition of their contributions through appropriate academic conventions. I also acknowledge that the material contained in this final year project report has not yet been published or submitted for another program or diploma/degree in any university.

24 /02/ 2023
Date

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Supervisor's Certificate:

I acknowledge that I have read this work and in my view this work is adequate in terms of scope and quality for the purpose of awarding a Bachelor of Education (Information Technology/ Multimedia / Computer Design) with Honors.

14/04/2023
Date

Supervisor Signature
Dr Roznim binti Mohamad Rasli

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ABSTRACT

Matheractive eBook is a multimedia courseware that is mainly developed to assist Year 3 students to learn basic mathematical operations involving addition and subtraction of large value of money in a fun and easy ways through videos and games provided. Static traditional method that is not or less interactive leads to unattractive, bored-ness and teacher-centered learning that is hard for students to understand and interpret. Thus, the development of Matheractive eBook offers an interactive learning through videos and games provided specifically targeted for Year 3 students in learning addition and subtraction. ADDIE model has been used as a guidance throughout this study, which comprises five phases namely, analysis, design, development, implementation and evaluation. Findings indicate that 17 respondents agreed that Matheractive eBook is easy to be used even without using any help from a technical person. This eBook is beneficial for students, teachers and parents to be used to promote self-paced learning in a fun and easy way.

ABSTRAK

Matheractive eBook ialah perisian kursus multimedia yang dibangunkan terutamanya untuk membantu pelajar Tahun 3 mempelajari operasi asas matematik yang melibatkan penambahan dan penolakan nilai wang yang besar dengan cara yang menyeronokkan dan mudah melalui video dan permainan yang disediakan. Kaedah tradisional statik yang tidak atau kurang interaktif membawa kepada pembelajaran yang tidak menarik, kebosanan dan berpusatkan guru yang sukar difahami dan ditafsirkan oleh pelajar. Justeru, pembangunan *Matheractive eBook* menawarkan pembelajaran interaktif melalui video dan permainan yang disediakan khusus untuk murid Tahun 3 dalam pembelajaran tambah dan tolak. Model ADDIE telah digunakan sebagai panduan sepanjang kajian ini, yang merangkumi lima fasa iaitu, analisis, reka bentuk, pembangunan, pelaksanaan dan penilaian. Dapatan menunjukkan bahawa 17 responden bersetuju bahawa eBook Matheractive mudah digunakan walaupun tanpa menggunakan sebarang bantuan daripada orang teknikal. *EBook* ini bermanfaat untuk pelajar, guru dan ibu bapa untuk digunakan untuk mempromosikan pembelajaran kendiri dengan cara yang menyeronokkan dan mudah.

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LIST OF ABBREVIATIONS

SDD	*Software Design Document*
SRS	*Software Requirement Specification*
STD	*Software Testing Design*
TnL	*Teaching and Learning*
eBook	*Eelectronic Book*
ABM	*Alat Bantu Mengajar*
BBM	*Bahan Bantu Mengajar*
MOE	*Ministry of Education Malaysia*
SUS	*System Usability Scalibility*
ICT	*Information and Communication Technology*
IT	*Information Technology*
ISD	*Instructional System Design*
UPSI	*Universiti Pendidikan Sultan Idris*

CHAPTER 1

INTRODUCTION

1.1 Introduction

The use of technology in information today is seen to be gaining attention and is increasingly used for various purposes such as learning in educational institutes, online information delivery, and information storage and so on. The use of technology in this information is able to assist in the delivery of information either face to face or online.

As recently, it can be seen that the development of technology in information is gaining major attention in the delivery of information especially in the service sector, education. For the education sector, due to the sudden closure of schools has urged teachers and students to continue learning sessions online. This is one of the reasons for the need to use technology in learning today to ensure that students do not lag behind in learning. Learning

courseware is a method that can be used to help students in improving understanding in learning. According to M. Michalko et.al, (2012) the concept of an effective electronic book or eBook in learning is to provide themost effective transmission of information from teachers to students and textbook related information among students themselves, to provide distribution and updating of textbook content the fastest and easiest electronics for students with the goal of reducing publishing expenses, should have multimedia support, ensuring that the data contained in the electronic book cannot be changed arbitrarily.

1.2 Research Background

Matheractive eBook was developed to improve the quality of student learning process in school. It is an educational courseware that can be used by teachers and parents to help students understand and improve their skills in adding and subtracting money. Skills in adding and subtracting money are basic skills that need to be nurtured and improved when students enter the school world. This is because money is used in daily life, therefore, it should be practised at an early age. For example, usually, parents who send their children to school will give their children money to eat and drink at school, therefore, these children need to be trained to calculate the amount and balance of their spending money so that they always be vigilant and not easily deceived by traders or their associates.

As is commonly done in schools, the learning of adding and subtracting money is done in an exercise where the teacher explains the process of adding and subtracting money and then gives examples of calculations and exercises. However, this method lacks student

interaction and students pay less attention because they think that it is just a mere exercise. Possibly, students can answer each exercise given, but it is less effective because students interact less. Interaction during learning is very important because it is able to increase the brain cells that communicate during the learning process. For example, students who count and do exercises in the textbook only count the numbers listed and do not interact with money such as seeing the different colours of money according to the amount, giving money according to its types and so on. Therefore, students are unable to describe how the real situation when giving money and giving the balance takes place.

The use of this Matheractive eBook courseware can to some extent help students in adapting tothe real situation that occurs when students want to give money and receive the balance. The learning and teaching process in the classroom can also be improved by applying knowledge related to computers and multimedia. Along with the current development of technology, technology in learning also needs to be expanded so that young people do not feel awkward when using technology for the purpose of learning and knowledge.

1.3 Research Problem Statement

In general, the problems found in this courseware are the concept of Mathematics subjects that are too awkward and the use of traditional methods is quite boring. This is because the way learning and teaching is carried out in the classroom in the past and now is no different which causes no development towards technology today. Therefore, the solution to this problem must be done to help improve the concept of learning for the subject of Mathematics.

The same and undeveloped problem -solving methods that cause a slow learning process. In addition, teaching aids (ABM) and teaching aids (BBM) used in the classroom are of poor quality. The use of low quality ABM and BBM can have a negative impact on the learning process of students, especially in the subject of Mathematics. This is because Mathematics is a subject that requires practice and interaction to help improve students' understanding and skills during the learning process in the classroom.

In addition, there are also problems where students do not interact with the teacher while in class during the learning sessions. Passive students are more likely to remain silent because they are embarrassed to interact in public. Therefore, by improving the system and methods of learning in the classroom, that is, by using media technology, it can be used as one of the catalysts to help improve the interaction between teachers and students who are passive in the classroom.

1.4 Research Objectives

The purpose of the interactive courseware for media -assisted learning through the title of Matheractive eBook is to give students the opportunity to improve students' understanding and skills in the calculation of addition and subtraction of money in daily life. Therefore, there are several objectives that have been identified for the development of this interactive courseware, namely :

1.4.1 Analyse the needs in the development of learning courseware through document analysis and questionnaire instruments.

1.4.2 Develop interactive learning courses using ADDIE methodology as well as software tools such as Unity.

1.4.3 Evaluate the usability using the System Usability Scale (SUS) through a questionnaire instrument that is Google Form.

1.5 Research Questions

As a guide to achieve the objectives of this study, some research questions are presented as follows:

1.5.1 What is the appropriate content to be included in developing the learning courseware to adapt it according to the student's level of education?

1.5.2 What are the appropriate methodologies and software used to develop the Matheractive eBook learning courseware?

1.5.3 What are the appropriate instruments used to assess the function, acceptance and use of Matheractive eBook.

1.6 Research Scope

This courseware development project focuses on multimedia -based projects with the concept of school curriculum in assisting the teaching and learning process. Emphasis in this courseware is given to Year 3 students in primary schools in the subject of Mathematics. The topic that will be discussed and involved in this courseware is the topic of money for the subtopic of add and subtract money according to the KSSR standards set by the Ministry of Education Malaysia (MOE). There are various multimedia elements that will be applied in

this courseware to help make it more interactive. The methodology used to develop this courseware is ADDIE which consists of five phases namely Analysis, Design, Development, Implementation and Evaluation. The hardware used during the development of this courseware is a laptop while the software is such as Microsoft Words, Power Point, Unity and so on. The hardware and software used are an alternative guide for students to learn computers on their own through the learning provided in this educational courseware. Questionnaire instruments were used in this courseware project which involved 30 primary school students and 3 experts, namely teachers as respondents to evaluate the content contained in this courseware. This is to ensure that this educational courseware can function well through the assessment methods that have been used.

1.7 Operational Definitions

1.7.1 Students

The importance of the development of this educational courseware is to help identify the level of students' skills in the subject of Mathematics for the topic of Add and Subtract Money with a multimedia concept. In addition, this courseware also aims to see the extent to which the process of computer-assisted teaching and learning has a different effect from traditionally conducted learning methods and the skills of teachers during computer-assisted teaching can also be detected indirectly.

1.7.2 Teacher

The educational courseware is developed to overcome the problems faced by teachers in schools to help to improve the teaching and learning process in the classroom. The teaching and learning process will be easier, more fun and effective with the existence of this courseware. This is because this courseware can increase the interest in learning of students who now usually use technology and media in their daily lives. This courseware is also developed according to standards that are used as a guide based on the findings of the study where the level of effectiveness of computer -assisted teaching and learning content can be known.

1.7.3 Government

With the development of this courseware, it will be the starting point for educators to respond to the challenge from the Ministry of Education Malaysia (MOE) to implement teaching and learning sessions in line with current world developments, namely 21st century learning. If this courseware is successfully developed, it will be able to give encouragement to the ministry to allocate funds for the development of the courseware in each school.

1.8 Thesis Organisation

This thesis has been organised into six main chapters. Each chapter contains each specific element which will be explained as follows:

Chapter 1 provides a thesis that includes an introduction to the study covering; introduction, background of the study, problem statement, objectives of the study, research questions, scope of the study, importance of the study, organisation of the study and conclusions.

Chapter 2 contains a variety of information focusing on the proposed study. To understand the focus and gap of the study, a literature review was identified using secondary data. This literature review is described further based on the overall study and is divided and discussed according to specific sub-topics.

Chapter 3 describes in detail each phase involved in the development of interactive multimedia learning courseware in this Matheractive eBook. It discusses the reasons for using the ADDIE model, the phases involved, activities for each phase and the conclusions.

Chapter 4 provides details of the phases of the study methodology such as collecting and needs analysis, design and development concluded with conclusions.

Chapter 5 discusses the findings of the study and is divided into Part A (Personal Details) and Part B (Product Evaluation). This chapter ends with a conclusion.

Chapter 6 is the last chapter that comments on the Matheractive eBook courseware such as advantages, disadvantages, limitations of the study, recommendations and closure.

1.9 Summary

This chapter clearly discusses the importance of diversifying learning methods that prioritise student interaction during the learning process. The development of this interactive courseware can be used as a teaching aid (ABM) that can help students in learning the basics of adding and subtracting money and also teachers in the delivery of information in learning.

In conclusion, this chapter provides an introduction to the research study, background study, problem statement, objectives for the study conducted, questions for the study conducted, scope of the study, importance of the study to students, teachers and government, thesis organisation and conclusions as a whole. Findings from previous studies will be reviewed and discussed in the next chapter, namely Chapter 2.