UNIVERSITI PUTRA MALAYSIA

MULTIMEDIA SOFTWARE DEVELOPMENT - EXPLORING THE SOLAR SYSTEM

LAU PUNG WEE

FSAS 2002 58

MULTIMEDIA SOFTWARE DEVELOPMENT - EXPLORING THE SOLAR SYSTEM

By

LAU PUNG WEE

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Master of Science

November 2002

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirements for the degree of Master of Science

MULTIMEDIA SOFTWARE DEVELOPMENT - EXPLORING THE SOLAR SYSTEM

By

LAU PUNG WEE

November 2002

Chairman: **Dr. Zaidan Abdul Wahab**

Faculty: **Science and Environmental Studies**

The developed encyclopedia-oriented multimedia software uses English Language as the main language. The main purpose of this project is to develop multimedia encyclopedia software in astrophysics to provide reference materials and attract people to study about astrophysics in order to increase their knowledge through the multimedia technology. The project target groups are the students ranging from the secondary to university levels and the public users. This project is very important just because our Malaysian Society are lack of knowledge about astrophysics and the problems in learning the astrophysics concepts could be reduced by using the multimedia technology. The various software's used to develop the multimedia software are Macromedia Director, Macromedia Flash, Adobe Photoshop, PhotoImpact, Corel Draw, 3D Studio Max, Adobe Premiere and SoundForge. The developed multimedia software was made up of six basic parts: History Of Astronomy, Exploring The Sky, The Solar System, Astronomical Tools, Astronomical Quiz and Astronomical Experts. The developed multimedia software contains the animation, graphic, audio, video and text, which make the learning

process more effective. This kind of multimedia-learning environment can improve the users understanding and prevent the misconception of astrophysics concepts. Hopefully, the developed multimedia software can serve as an interactive learning material to the Malaysian society to transform the Malaysian society into a knowledge-based society by the year 2020.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Master Sains

PEMBANGUNAN PERISIAN MULTIMEDIA
- PENEROKAAN SISTEM SURIA

Oleh

LAU PUNG WEE

November 2002

Pengerusi: **Dr. Zaidan Abdul Wahab**

Fakulti: **Sains dan Pengajian Alam Sekitar**

Perisian multimedia yang dibangunkan adalah direkabentuk dengan berorientasikan ensiklopedia dan menggunakan Bahasa Inggeris sebagai bahasa pengantar. Tujuan utama bagi projek ini adalah untuk membangunkan perisian multimedia ensiklopedia yang bertindak sebagai bahan rujukan yang dapat menarik perhatian orang ramai untuk mempelajari fizik astronomi bagi mempertingkatkan ilmu pengetahuan mereka melalui teknologi multimedia. Golongan sasaran projek adalah daripada pelajar peringkat sekolah menengah sehingga peringkat universiti dan juga orang ramai. Projek ini sangat penting memandangkan masyarakat Malaysia kekurangan ilmu pengetahuan tentang fizik astronomi dan masalah dalam pembelajaran konsep fizik astronomi ini dapat dikurangkan melalui teknologi multimedia. Antara perisian-perisian yang digunakan untuk membangunkan perisian multimedia ini adalah Macromedia Director, Macromedia Flash, Adobe Photoshop, PhotoImpact, Corel Draw, 3D Studio Max, Adobe Premiere dan SoundForge. Perisian multimedia yang dibangunkan terdiri daripada enam bahagian iaitu Sejarah Astronomi, Peninjauan Langit, Sistem Suria, Peralatan-peralatan Astronomi, Kuiz Astronomi dan Pakar-pakar Astronomi. Setiap paparan

dalam perisian multimedia yang dibangunkan mempunyai penerangan animasi, grafik, audio, video dan teks yang menjadikan proses pembelajaran lebih berkesan Persekitaran pembelajaran multimedia ini dapat mempertingkatkan kefahaman pengguna dan mengelakkan miskonsepsi terhadap kosep fizik astronomi Maka adalah diharapkan perisian multimedia yang dibangunkan dapat dijadikan sebagai satu bahan pembelajaran interaktif oleh masyarakat Malaysia bagi menghasilkan masyarakat Malaysia yang bermaklumat pada tahun 2020

ACKNOWLEDGEMENTS

First and foremost, I would like to express my gratitude to my project supervisor, Dr. Zaidan Abdul Wahab, who contributed his knowledge, invaluable advice, suggestions, ideas, endless encouragement and also constructive criticism to complete this project paper.

I would also like to take this opportunity to express my sincere appreciation to all those who have rendered their help directly or indirectly in one way or another, especially to my Thesis Supervisory Committee members: Assoc. Professor Dr. Sidek Haji Abdul Aziz and Assoc. Professor Dr. Zainal Abidin Sulaiman, Mr. Looi K. K., my family and all of my friends especially Lee Shau Yee who act as my project narrator.

Finally, I wish to extend my utmost gratitude to each and everyone in the Faculty of Science and Environmental Studies, Physics Department and also Library of Universiti Putra Malaysia for their invaluable support, cooperation and service.

I certify that an Examination Committee met on 29th November 2002 to conduct the final examination of Lau Pung Wee on his Master of Science thesis entitled "Multimedia Software Development – Exploring The Solar System" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. The Committee Members for the candidate are as follows:

ISMAIL ABDULLAH, Ph.D.
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
(Chairman)

ZAIDAN ABDUL WAHAB, Ph.D.
Faculty of Science and Environmental Studies
Universiti Putra Malaysia
(Member)

SIDEK HAJI ABDUL AZIZ, Ph.D.
Associate Professor,
Faculty of Science and Environmental Studies
Universiti Putra Malaysia
(Member)

ZAINAL ABIDIN SULAIMAN, Ph.D.
Associate Professor
Faculty of Science and Environmental Studies
Universiti Putra Malaysia
(Member)

SHAMSHER MOHAMAD RAMADILI, Ph.D.
Professor/Deputy Dean,
School of Graduate Studies,
Universiti Putra Malaysia.

Date: 21 JAN 2003

This thesis submitted to the Senate of Universiti Putra Malaysia has been accepted as fulfillment of the requirements for the degree of Master of Science. The members of the Supervisory Committee are as follows:

ZAIDAN ABDUL WAHAB, Ph.D.
Faculty of Science and Environmental Studies
Universiti Putra Malaysia
(Chairman)

SIDEK HAJI ABDUL AZIZ, Ph.D.
Associate Professor,
Faculty of Science and Environmental Studies
Universiti Putra Malaysia
(Member)

ZAINAL ABIDIN SULAIMAN, Ph.D.
Associate Professor
Faculty of Science and Environmental Studies
Universiti Putra Malaysia
(Member)

AINI IDERIS, Ph.D.
Professor/Dean,
School of Graduate Studies,
Universiti Putra Malaysia.

Date: 13 MAR 2003

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

(LAU PUNG WEE)

Date: 11 / 1 / 2003

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

avi	Video for Windows
bmp	Bitmap
CD	Compact Disc
CDR	File format for CorelDraw
exe	File format for the software that can be execute independently without support from other software's
gif	Graphic interchange format
MSC	Multimedia Super Corridor
UPM	Universiti Putra Malaysia
wav	Audio file for Windows
3-D	Three Dimensions

CHAPTER 1

INTRODUCTION

1.1 Introduction

In the early 1990s, manufacturers began producing inexpensive CD-ROM drives that could access more than 650 megabytes of data from a single disc This development started a multimedia revolution that may continue for decades The term multimedia encompasses the computer's ability to merge sounds, video, text, music, animations, charts, maps, etc., into colorful, interactive presentations, a business advertising campaign, or even a space-war arcade game

Multimedia is a computer technology that combines text, audio, video and animation Multimedia can easily be applied to a large quantity of information resources, such as animated and graphical industrial training manuals, dictionaries, and encyclopedias Therefore, multimedia can be used widely in the fields of communication, education, and entertainment

At the same time, Malaysia welcomes the advent of the Information Age with its vision of a new world order where information, ideas, people, goods and services move across borders in the most cost-effective and liberal ways

With the companies, capital, consumers, communications and cultures becoming truly global, new approaches and attitudes to business are required

Malaysia upholds the virtues of the new world order, believing that the world is moving collectively towards a "century of the world" - a century of worldwide peace and shared prosperity among nations

Malaysia has chosen to be open and pragmatic in dealing with change, and is committed to working with other countries to encourage creativity, innovation and entrepreneurship

As a first step, Malaysia has created the Multimedia Super Corridor (MSC) - the world's first of its kind and a world-class act to help international companies to test the limits of technology and to prepare themselves for the future The MSC will also accelerate Malaysia's entry into the Information Age, and eventually bringing about the actualization of Vision 2020

The MSC will bring together, for the first time ever, an integrated environment with all the unique elements and attributes necessary to create the perfect global multimedia environment

MSC is a stretch of Greenfield "corridor", 15 kilometers wide and 50 kilometers long, that starts from the Kuala Lumpur City Center (KLCC), an intelligent

precinct which houses the world's tallest buildings - down south to the site of the region's largest international airport, the Kuala Lumpur International Airport (KLIA) which was launched on the 27th June 1998.

Two of the world's first Smart Cities are being developed in the MSC: Putrajaya, the new seat for the government and administrative capital of Malaysia where the concept of electronic government will be introduced; and Cyberjaya, an intelligent city with multimedia industries, research and development centers, the Multimedia University and operational headquarters for multinational companies that wish to direct their worldwide manufacturing and trading activities using multimedia technology.

1.2 Project Background

One of the main objectives of creating the Multimedia Super Corridors is to transform the Malaysian society into a knowledge-based society by the year 2020. Therefore, multimedia is one of the technology fields that have to be developed in realizing the applications of the Multimedia Super Corridor.

Multimedia encyclopedia software that had been developed and packaged into the CD-ROM disc is one of the methods that could prepare the reference materials for the users, especially for the home users. Multimedia presentation that includes texts, audios, graphics, videos and animations will provide a more attractive and interesting learning environment. Besides, multimedia is easier to be manipulated

and user-friendly, thus improving the user's learning efficiency. The multimedia-learning environment will also improve the users understanding and prevent the misconception of physics concepts.

In general, most Malaysians lack the knowledge of astrophysics, such as how the solar eclipse happen. Therefore, the topic "Exploring The Solar System" was selected for this research with the aim to improve the knowledge of Malaysians regarding to astrophysics. This research also aims to reduce any misconception of the users regarding the phenomenon that happen in our Solar System.

1.3 Multimedia

Multimedia is the computer technology that combines text, audio, video, and animated graphics. It provides easy access to large quantities of information, such as industrial training manuals, dictionaries, and encyclopedias.

Multimedia is a robust tool for communicating ideas. By presenting words, sounds, pictures, animation and film in an interactive way, multimedia allows us to choose our own paths through information. The method is unlike reading a book or watching television; in multimedia, we can control and decide which of the various avenues we want to explore. For example, we can jump forward or backward, or move from one point to another at will. It allows us to crawl around, touch things, look at, hear and feel in a way that we had never experienced before. It takes text

off our mind. By adding brilliant images with music, digital video and animation. it can create a total interaction.

1.4 Astrophysics

Astrophysics is a branch of astronomy, mostly developed since 1960. It applies chemical and physical knowledge to the study of celestial objects (the sun, the moon, planets, stars, nebulas, comets, and meteors); discusses their formation, evolution, composition, and evidence of radiation emission; uses telescopes on land, in balloons, and in satellites; it also uses space probes to collect particles from meteorites as sources of data.

1.5 Solar System

Solar System is the system consisting the Sun; the nine planets and their satellites; the asteroids, comets, and meteoroids; and interplanetary dust and gas. The dimensions of this system are specified in terms of the mean distance from the Earth to the Sun, called the astronomical unit (AU). One AU is 150 million km. The most distant known planet, Pluto, has an orbit at 39.44 AU from the Sun. The boundary between the solar system and interstellar space called the heliopause, is located near 100 AU. The comets, however, achieve the greatest distance from the Sun; they have highly eccentric orbits ranging out to 50,000 AU or more. The solar system is the only planetary system known to exist.

1.6 The Aim of the Project

The aim of the project is to develop multimedia encyclopedia software in astrophysics to provide reference materials for students ranging from the secondary to university levels and to the public user through the multimedia technology. This will help to transform the Malaysian society into a knowledge-based society by the year 2020, which was stated in Vision 2020. The main purpose of this project is to visualize the astrophysics concept in an interactive form to provide knowledge for the public user.

1.7 Objectives

The objectives of this project are as follow:

(i) Develop multimedia encyclopedia software in astrophysics.

(ii) Provide reference materials, which attract the people to study about astrophysics in order to increase their knowledge through the multimedia technology.

(iii) Introduce astrophysics to the public.

(iv) Visualize the astrophysics concept in an interactive form to provide the maximum understanding for the user.

1.8 Project Target Group

Project target group are students ranging from the secondary to university levels and the public users who wish to study about astrophysics in order to increase their knowledge.

CHAPTER 2

LITERATURE REVIEW

2.1 What is Multimedia?

Multimedia computing means different things to different people To some, it is the thrill of computer games, to others, it is a source of reference for any topic under the sun So, according to Axelson and Nichols (1996), there are probably as many definitions of multimedia as there are technology-using educators Here are a few definitions, lets us discern the points of agreement as well as the differences

Gayeski (1993) gives us a relatively straightforward definition

> Multimedia is a class of computer-driven interactive communication systems, which create, store, transmit, and retrieve textual, graphic, and auditory networks of information

Ambron and Hooper (1990) have this to say

> What is "multimedia"? It is a collection of computer-center technologies that give a user the capability to access and manipulate text, sound, and images Just as word-processing programs today enable users to integrate text and graphics, multimedia programs in the near future will enable users to access not only libraries of text documents but also storehouses of music,