

BORANG PENGESAHAN STATUS TESIS*

JUDUL: PROCESS PHOTOSYNTHESIS FOR SECONDARY SCHOOL USING SIMPLE 2D AND 3D ANIMATION

SESI PENGAJIAN: 2006/2007

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CATATAN: * Tesis dimaksudkan sebagai Laporan Projek Sarjana Muda (PSM)

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**PHOTOSYNTHESIS PROCESS IN 2D AND 3D ANIMATION FOR
SECONDARY SCHOOL**

SURIATI BINTI ABD RAHIM

**This report is submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Interactive Media)**


**FACULTY OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2007**

DECLARATION

I hereby declare that this project report entitled

PROCESS PHOTOSYNTHESIS FOR SECONDARY SCHOOL USING SIMPLE 2D AND 3D ANIMATION

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

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SUPERVISOR: _____ Date: _____
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DEDICATION

To my beloved parents, brother, sisters and friends...

ACKNOWLEDGEMENTS

I would like to take this opportunity to say thank you to Encik Ibrahim bin Ahmad for giving assistant to complete this report successfully. Thank you for the kindness and cooperative toward me as being a supervisor. I also learnt a lot of knowledge and skills in developing a project that begin with this first task report.

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Lastly, I would dedicate this to my beloved parents and family who really give me supports motivations and encouragement.

ABSTRACT

This project is proposed to develop multimedia application software photosynthesis for secondary school using simple 2D and 3D animation. By developing this application, it will let users (students) experience of perceiving and interacting through sensor and effectors with a synthetic environment containing simulated objects as it were real. Currently, the materials that are used to illustrate the photosynthesis to the students are pictures and articles and other. It is difficult for some students to understand the process because cannot imagine the real environment of the process. The 3D animation will be replacing all the conventional materials with the real picture. This will give a new interactive ways for the student in process to learn, understand and memorized them. The project methodology is based on ADDIE Instructional Design Model that consists are five stage; Analysis, Design, Development, Implementation and Evaluation. It is hope that, by the implementation of this project, the students will get a better way to understand and memorize the subject. At the same time, it will increase the education standard in Malaysia.

ABSTRAK

Projek ini adalah untuk membangunkan aplikasi perisian multimedia fotosintesis dengan menggunakan 2D dan 3D animasi. Dengan membangunkan aplikasi ini, ianya akan memberi pengalaman kepada pelajar dalam suasana yang mengandungi objek model sebenar. Pada masa kini, kaedah-kaedah pembelajaran yang digunakan untuk menggambarkan fotosintesis adalah melalui gambarajah, artikel dan lain-lain lagi. Bagi sesetengah pelajar, kaedah-kaedah ini adalah rumit untuk digunakan dalam menghafal kandungan dalam topik ini. Kaedah dalam 3D animasi ini dapat menggantikan kesemua kaedah-kaedah pembelajaran tersebut dengan menggambarkan suasana sebenar yang berlaku di dalam fotosintesis dan sekaligus memperkenalkan kaedah baru dalam proses pembelajaran kepada pelajar. Projek metodologi adalah berdasarkan *ADDIE Instructional Design Model* yang mengandungi 5 fasa, iaitu analisis, rekabentuk, pembangunan, pelaksanaan dan penilaian. Dengan pelaksanaan projek ini, para pelajar akan memperoleh kaedah yang lebih mudah dalam memahami dan mengingat subjek ini. Pada masa yang sama ianya akan meningkatkan lagi taraf pendidikan di Malaysia.

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LIST OF ABBREVIATIONS

UTEM	Universiti Teknikal Kebangsaan Malaysia
FTMK	Fakulty Information and Communication Technology
PSM 1	Projek Sarjana Muda 1
PSM 2	Projek Sarjana Muda 2
3D	Three Dimensional
2D	Two Dimensional
KBSM	Kurrikulum Bersepadu Sekolah Menengah
ADDIE	Analysis Design Development Implementation Evaluation
ID	Instructional Design
IT	Information Technology
CPU	Central Processing Unit
MB RAM	Mega Bait Random Access Memory
GHz	Giga Hertz
MHz	Mega Hertz
GB	Giga Byte
HCI	Human Computer Interaction
JPEG	Joint Photographic Experts Group
BMP	Bitmap
MPEG	Motion Pictures Experts Group
GIF	Graphics Interchange Format
SWF	Shock Wave Flash

CHAPTER I

INTRODUCTION

1.1 PROJECT BACKGROUND

The purpose of this research is to develop process photosynthesis for secondary school using simple 2D and 3D animation. Photosynthesis is the process of creating glucose from sunlight, carbon dioxide and water, with oxygen as a waste product. It will focus on how the water get into the leaf. The primary source of energy for nearly all life is the Sun. The energy in sunlight is introduced into the biosphere by a process known as photosynthesis, which occurs in plants, algae and some types of bacteria. Photosynthesis can be defined as the physico-chemical process by which photosynthetic organisms use light energy to drive the synthesis of organic compounds. The photosynthetic process depends on a set of complex protein molecules that are located in and around a highly organized membrane. Through a series of energy transducing reactions, the photosynthetic machinery transforms light energy into a stable form that can last for hundreds of millions of years.

Normally, the material that being used to describe the whole process photosynthesis to the student are such as models, graphics and notes from textbooks. But it is difficult for some student to understand the process because they cannot imagine the real environment of the whole process. This project tries to present the new thing for

learning method for the process photosynthesis using the 3D animation. At the end of the project, the user will be able to know the whole process happened during the photosynthesis.

1.2 PROBLEM STATEMENT

Photosynthesis is one of the sub topics that contains in the sciences subject for the lower forms student especially Form 2. Photosynthesis, generally, is the process of glucose from sunlight, carbon dioxide and water, with oxygen as a waste product. The process of photosynthesis included the factors of photosynthesis, the importance of the photosynthesis and the relationship between photosynthesis and the oxygen and carbon dioxide cycles.

The manual teaching methods uses the textbooks, references book, transparency and slide presentation and other graphics during the learning process of all the syllabus in science subject including the photosynthesis process. The old methods are insufficient way for the student to understand and imagine the whole process happen using the photosynthesis. Most of the student lack of the understanding and difficult to imagine how the process do if only the textbook provided to reading the notes and see the graphics of the process. So for the solution, 3D animations are the best ways to make an improvement especially in education and also in other application. 3D animation allows better and faster understanding of even complex applications.

1.3 OBJECTIVE

The objectives of this project are:

- To provide the process photosynthesis in 2D and 3D animation for secondary school.
Nowadays, the references book or text book is used during the learning process of the entire syllabus in science subject including the photosynthesis process. This project is to providing the process of photosynthesis in 3D animation.
- Provide the learning environment in interactive ways and enjoyable to learns. This project is to providing a new method in the learning surrounding environment for learn the whole process of photosynthesis.

1.4 SCOPE

The scopes of the project are to develop the simple animation in 3D model for the process of photosynthesis for secondary school especially form 2. The target of the project is in the educational field that is for science subject. The target user for this project is lower form students that take the science subject in the secondary school. This project can provide more information about process of photosynthesis and will help the user to understand about the whole interdependence among living organisms and the environment include the factors of photosynthesis, the importance of the photosynthesis and the relationship between photosynthesis and the oxygen and carbon dioxide cycles. For the platform of the project, this project uses the 3D models for the process of photosynthesis with combination of 2D animation and audio.

1.5 PROJECT SIGNIFICANCE

The significance of this project is to help secondary students to better understand of the photosynthesis process in their science subject. These projects provide more information for the whole process. This project to develop 3D models for process of photosynthesis to be experience by user for the clear of word during the whole process. At the same time, the student is able to see and should know the real process happen during the whole process. The project can be one alternative reference for learning the process of photosynthesis.

1.6 EXPECTED OUTPUT

The expectation from this project can produce more effective way to understand the whole process. In the end of the project can produce the simple animation of the process photosynthesis in 2D and 3D models.

1.7 CONCLUSION

As a conclusion, this chapter describes the project background which explains about the learning method for the process photosynthesis using the 3 animation modeling, the problem statements about the current education, and the objectives of the project, the scopes, the project significance that gives benefits to stakeholder and the conclusion of the chapter which cover all activities. The next phase will be discussed about the literature review and project methodology.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 INTRODUCTION

This chapter will include about the definition of the process of photosynthesis which covers the whole interdependence among living organisms and the environments including the factors of photosynthesis, the importance of the photosynthesis. Fact and finding is a way to collect data such as the related information in this project to meets the user requirement before develop the project. Besides that, it includes some techniques for this project. For this project, the technique use is key frame animations.

Other than that, this chapter does the research and identify about the software and hardware requirement that will use be to develop this project. This chapter also describes about the project methodology use in this project and explanations on every activity or stage. Project schedule and milestones is a project progress plan that shows all activities that has been planned for this project development.

2.2 FACTS AND FINDING

The fact and finding information was taken from references books and some articles from internet that related to this project. The first part of the research is about the computer animations including comparison between 2D and 3D animations which contains 3D animation in education and multimedia courseware. The second research is about the process of photosynthesis which includes the factors of photosynthesis and the importance of the photosynthesis.

2.2.1 Domain

The domain for this project is about the 2D and 3D animation in education and training. The process of photosynthesis will be developing using the simple 3D animation for the secondary school and combine the 2D animation.

2.2.2 Existing System

Nowdays, the computer animation is a popular thing in the worldwide. According to ms.wikipedia.org, computer animation is the art of creating moving images or pictures by means of use the computers. It is a subfield of computer graphics and animation. Increasingly it is created by means of 3D computer graphics. For the 2D computer graphics are still widely used for low bandwidth and faster real-time rendering needs. Sometimes the target of the animation is the computer itself, but it is sometimes the target is another medium, such as film. It is also referred to as computer graphic interactive to generated imagery or computer generated image. To create the illusion of movement, an image is displayed on the computer screen then quickly replaced by a new image that is similar to the previous image, but shifted slightly. This technique is

identical to how the illusion of movement is achieved with television and motion pictures.

Computer generated 3D images, animations, and objects are all illusion. The multimedia producer creates images that look as if they are in 3D, even though they are on a flat surface. Developing 3D animation is still new topic in Malaysia even though it is quite old topic in other modern countries such as Japan, Korea and Europe countries. Computer graphics technology was developed in the early 1950s to make visible what was invisible to human eye. But none of the early computer graphics systems was developed for artistic work. Most of these early applications were related to the military, manufacturing, or the applied sciences and included, for example, flight simulators to train fighter pilots without having to fly a real plane.

Refer to the references book “The art of 3d computer animation and effects “, Kerlow V .(2004) say that during the 1960s and 1970s, the early years of computer technology became more practical and useful, and a significant number of visual creators started to get interested in using computers. During the 1990s a significant drop in the prices of computer systems and in increase in their computing power occurred. The early 1990s were characterized by refined examples of computer animation as well as a successful revival of special effects for feature films. 3D or three-dimensional computer animation had become quite complex and full of varied styles and attitudes. Many of the projects from this period encompass an exciting body of works and variety of styles and techniques. By the middle of the decade 3D or three-dimensional computer animation and gained a fair amount of wide recognition.

According to wikipedia, the comparison between 2D and 3D animations include more aspect. For 3D animations, objects or models are built on the computer monitor and 3D figures are rigged with a virtual skeleton. In 3D animations all frames must be rendered after modeling is complete. Compare with the 2D figure animations, separate objects or illustrations and separate transparent layers are used, with or without a virtual skeleton. Then the limbs, eyes, mouth, clothes, etc. of the figure are moved by the

animator on key frames. The differences on appearance between key frames are automatically calculated by the computer in a process known as tweening or morphing. Finally, the animation is rendered. For 2D vector animations, the rendering process is the key frame illustration process, while tweened frames are rendered as needed. For pre-recorded presentations, the rendered frames are transferred to a different format or medium such as film or digital video. The frames may also be rendered in real time as they are presented to the audience. Low bandwidth animations transmitted via the internet for example 2D Flash, often use software on the end-users computer to render in real time as an alternative to streaming or pre-loaded high bandwidth animations.

According to the About.com, computer animation can be more than just an enjoyable hobby; with an education in the field, it can become a long and rewarding career with endless possibilities and applications.

Referring to CyberWorld Teacher's Resource Guide, (2004) is designed to help students learn about computer animation, and can help enliven the way to teach the basics from language arts to mathematics. Through interesting information and engaging activities, the students will discover what animation is, how it is created, and its applications to many aspects of their lives. This flexible resource draws on concepts from the film to create an enjoyable and relevant learning experience for the students.

In education environment, nowadays have so many website to provide the teaching resource. For example, www-rohan.sdsu.edu. ROHAN, the Academic Computing Web Server at San Diego State University provides chemistry teaching which includes courses and tutorials text on the web such as virtual classroom, science syllabus and other tutorials. The website also provides graphics and visualizations, demonstrations and experiments.