

**BORANG PENGESAHAN STATUS TESIS\***

JUDUL: **THE DEVELOPMENT OF BIOLOGY COURSEWARE TITLED "INHERITANCE AND VARIATION" FOR SPM LEVEL.**

SESI PENGAJIAN: **2 - 2007/2008**

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**THE DEVELOPMENT OF BIOLOGY COURSEWARE TITLED  
“ INHERITANCE AND VARIATION ” FOR SPM LEVEL.**

**W NURNADIAH BINTI W MOHD PUZI**

**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**

**2008**

**ADMISSION**

I admitted that this project title name of  
**THE DEVELOPMENT OF BIOLOGY COURSEWARE TITLED**  
**“ INHERITANCE AND VARIATION” FOR SPM LEVEL**

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

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(DR.BURAIRAH HUSSIN)

## **DEDICATION**

To my beloved parents

W Mohd Puzi Bin W Mohamad  
Faridah Bt Mohammed

To my supervisor

Dr. Burairah Bin Hussin

To evaluator

En.Ibrahim Bin Ahmad

And

Friends

## ACKNOWLEDGEMENT

This project was started on January 2008 for the purpose of ensuring the effectiveness of multimedia courseware in learning process. I choose two topics in Biology form 5 which title is Inheritance (Chapter 5) and Variation (Chapter 4) as a case study in this project.

In everything we do, there are sure obstacles to meet. I face a lot of obstacles or problems in this project but thank to Allah s.w.t that give strength to finish this project properly. I hope this project interesting and will achieve the objective.

Special thanks to Dr. Burairah bin Hussin for the guidelines and advice on how to complete this project. Also thanks to Mr. Ibrahim bin Ahmad as an assessor for my project presentation.

I would like to thank to my beloved family for giving a support and financially help me for this project. Lastly, I would like to thank you for University Teknikal Malaysia Melaka, UTeM for this Project Sarjana Muda to fulfill the requirement of completing Bachelor of Computer Science (Interactive Media).

## ABSTRACT

Learning content of *Biology Courseware* is developed to determine the effectiveness of multimedia courseware in learning process. There are two topic of biology form 5 that are chosen as a case study in this project. This courseware can be used by form 5 science stream students. This is important to know the effectiveness of multimedia courseware in learning process whether student's level improved or not after using this courseware. It also can help teachers to deliver the messages and information to the student. This product was developed with multimedia elements like text, audio, graphics and the information (learning content) is based on Biology's Form 5 Text Book. This product has 2 modules which is Inheritance and Variation. Every module has an exercise for student and this is to know their level. This product can attract student because the text and image are suitable for their level. Macromedia Flash 8 has been used to develop this courseware and the other software that has been used is Adobe Photoshop CS2 and Sound Forge 8.0. As users facilitate, this report are provided so that they can understand the flow and process in developing this project.

## ABSTRAK

Kandungan pembelajaran bagi '*Perisian Kursus Biologi*' ini dibangunkan untuk menentukan keberkesanan perisian kursus multimedia dalam proses pembelajaran. Dua topik telah dipilih sebagai kajian kes dalam projek ini. Perisian kursus biologi ini boleh digunakan oleh pelajar sains tingkatan 5. Ini adalah penting untuk mengetahui keberkesanan perisian kursus biologi dalam proses belajar sama ada tahap penguasaan pelajar meningkat atau tidak selepas menggunakan perisian ini. Ia juga dapat membantu guru dalam penyampaian maklumat kepada pelajar. Produk ini dibangunkan dengan menggunakan elemen multimedia seperti teks, bunyi, grafik dan maklumat yang terkandung dalam perisian kursus ini adalah berdasarkan buku teks. Produk ini mengandungi dua modul iaitu 'Pewarisan' dan 'Variasi'. Setiap modul mempunyai latihan kepada pelajar dan ini adalah untuk menguji tahap pemahaman mereka. Produk ini boleh menarik minat pelajar dengan penggunaan teks dan imej yang sesuai dengan kehendak mereka. Macromedia Flash 8 telah digunakan untuk membangunkan projek ini selain daripada Photoshop CS2 dan Sound Forge 8.0. Laporan ini disediakan untuk memudahkan pengguna memahami dan mengetahui proses dalam pembangunan projek ini.

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## CHAPTER 1

### INTRODUCTION

#### 1.1 Project background

Nowadays, there is a lot of method to increase teaching and learning (TnL) process in school. As we know TnL process is important to produce quality student. To achieve the objective of TnL we need to create a conducive condition. Conducive means that helpful and contributive so this situation can help student improve their study. In this era, there is a lot of method that can use as a material to help teacher to maximize the level of student understanding. One of the methods is use media in TnL process. This media is referring to multimedia courseware which is more focus to image, animation and sound which allowed student to understand the topic better and easy. According a research carried by Zaidatun Tasir and Jamalludin Harun from Universiti Teknologi Malaysia (UTM) stated that TnL based on computer is important because:

- information that is presented in knowledge form is more meaningful.
- long text can be simply and represented by using interesting and dynamic media.
- questions and exercises can be loaded for every part so that student can test their ability of understanding.

Used of multimedia elements in TnL process can attract student so that they are not feel bored and give full attention for learning process (Thomas, 1996). Besides, it also has the ability to support the education likes problem solving, to examine and estimate the hypothesis, evaluation based on capability besides to increase the creativity among the student (O'Connor and Brier, 1994).

Survey show that students have problem to master the subject such as difficulty in translate the word, no basic knowledge, no motivation and no effective learning method used by teacher (Wan Zuraila, 2000). To improve the effectiveness of TnL process, a multimedia courseware is developed to overcome the problem and this courseware is more focus in using graphic as medium presentation information to student. Any topic can be loaded in this courseware and I choose the topic of biology form 5 for Chapter 5 (Inheritance) and Chapter 6 (Variation) as my case study in proving the effectiveness of using multimedia in reading and learning process. This courseware is used by student that taking biology subject and also for teacher.

The multimedia courseware that is developed will apply constructivism theory. Constructivism theory is a theory on learning based on the idea that knowledge is constructed by the knower based on mental activity. Learners are considered to be active organisms seeking meaning. Construction of meaning may initially bear relationship to reality, but will become increasing more complex, differentiated and realistic as time goes on. Constructivism is an approach to teaching based on research about how people learn. Many researchers say that each individual constructs knowledge rather than receiving it from others (McBrien & Brandt, 1997). This theory bring ideology that student build their own knowledge based on their basic knowledge so this courseware become additional material to help student to understand the topic apart from the information that given from their teachers. This theory gives attention to develop skill by individual. Learning occur when someone can build or interpretation knowledge and apply the knowledge in new situation (Piaget, 1988; Brunner, 1990).

## 1.2 Problem Statement

My research is about the effectiveness of using multimedia courseware in learning process. Is it the multimedia courseware is effective in learning process? This project is to know the effectiveness of multimedia courseware in learning process. As stated by Bridges (1992) and Charlin (1998), examples of the features in implementing learning process:

- student responsible for their own learning process.
- student will active with information processing.
- present knowledge will be activated and will support to new knowledge.

Because of this problem we need to do something else that can improve student behavior in learning process. One of the way that we can do is developing multimedia courseware which is student can use it as a material helper. As we know multimedia is important in learning process. Evidence that show multimedia is important in education are there were related study of article is seen began to work such as “Producing Interactive Multimedia Courseware for Information Technology in Education: An Initiative at University Teknologi Malaysia” by Baharuddin Aris et al. (1998) and “Integrating Computers Into The Problem-Solving Process” by Lowther and Morrison (2003).

This multimedia courseware also can contribute to the several of learning material. Currently, teachers are teaching with less material that based upon multimedia and sometimes the information is not delivered to the student properly. This courseware can delivered information to student properly.

Student also hard to understand the topic and by just using book it can create a bored environment and it cannot guarantee student can understand the topic clearly. This multimedia can be a material for teacher to teach student based on computer



using which is more attractive. Any topic or subject can be a case study to prove the effectiveness of using multimedia in reading and learning process. This courseware brought a case study on biology form 5 which topic are 'Chapter 5: Inheritance and Chapter 6: Variation' and let the student to cover and understand the topic easily since the topic will described, explained and shown in attractive graphic, text and sound. Student will not get bored while learning biology.

This courseware applies constructivism theory that encourage student to think actively about anything they learned. By using this courseware student will not passively learning and use their own imagine so this will produce creative student. Interactivity that contained will let student to used it and learning process will occur in interesting condition so student are more interested to gain knowledge.

### **1.3 Objectives**

There are three objectives of develop this multimedia courseware in teaching and learning process:

1. To develop multimedia application that can help student to applied learning techniques.
2. To test student opinion about effectiveness of multimedia courseware in learning biology.
3. To make a research of constructivism theory in learning and teaching process.

#### **1.4 Scope**

This courseware is for form 5 students that are taking biology subject and also can be use by teachers. Content of this courseware is Chapter 5: Inheritance and Chapter 6: Variation for biology form 5.

This project is developed by refer the constructivism theory which is focus on student activated their own knowledge and responsible for their own learning process. This theory can be applied in multimedia courseware to create a good courseware. This product is developed based on CD-Base.

#### **1.5 Project significance**

By using this courseware student will be able to repeat a part that they do not understood although for repeatedly. To understand a concept of learning, students have to repeat it for a few times (Gagne, 1985). It's also encouraging them to think and make this courseware as a material for a revision. It's not only limited to be used in school but also can use at home for anytime. This multimedia courseware is interesting and can avoid student feel bored while learning. Teachers also can use it as an additional material and student can continue their learning although teachers are not with them.

Topic of Inheritance and Variation is chosen because of the difficulty to understand it. This courseware used multimedia element to make easier for student understand the topic.

## 1.6 Conclusion

Currently the application of multimedia is very important in reading and learning process because it can help student to understand the topic clearly. So this learning content (courseware) is developed to help student improve their ability to master the topic of Inheritance and Variation. Constructivism theory is applied to encourage student build their knowledge and this can contribute an effectiveness learning process.

The expected output of this courseware is interesting and can attract student to learn. Besides it is an interactive courseware to help student understand and master the topic. Students can understand the topic clearly and do the exercises. Multimedia elements are used correctly.

Besides, the expected output is this multimedia courseware is functioning and buttons that are used is user friendly.

By doing this project, developer can improve skill in Macromedia Flash 8. Besides developer learn about the constructivism theory and know the important element in reading and learning process.

The next chapter will discuss about the methodology and literature of past research that will support the project title.

## CHAPTER II

### LITERATURE REVIEW & PROJECT METHODOLOGY

#### 2.1 Introduction

This chapter describes in details about the methodology and literature of past research that will support the project title. The methodology consists of several phases as guidelines to be achieved. It also makes comparism with the existing system and explained the project requirement in software, hardware and other requirement. Besides, this part will cover the project schedule and milestone. Milestones are useful tools for setting schedule goals and monitoring progress. Project schedule and milestone is for time management which is very important in a project to ensure the project is delivered on time.

The title of this project is “The Effectiveness of Using Multimedia Courseware in Learning Process”. By referred Oxford Dictionary (Edition 2004), this title can be defined as; “*effectiveness*” is noun for effective (adjective) which mean (1) producing a desired or intended result (2) existing in fact, though not formally acknowledge as such; “*using*” means that (1) to do something with a machine, an object, a method, for a particular purpose (2) to need or to take something (3) to threat something in unfair way of expression or communication; “*multimedia*” can define as (1) using more than one medium of expression or communication (2) an extension of hypertext allowing the provision of audio and video material (3) using sound, pictures and film in addition to text on a screen; “*courseware*” can be describe as additional educational material intended as kits for teachers or trainers or as tutorial for student, usually packaged for use with a computer; “*learning*” can define

as (1) to get knowledge, a skill (2) to get some information about something, to find out (3) to study something so that you can repeat it from memory (4) to understand or realize (5) the process of learning (6) knowledge that you get from studying; “*process*” means (1) a series of action that you do for a particular purpose (2) a series of changes that happen naturally (3) to deal with information. A complete definition of this title is the producing intended result by using more than one medium of expression in a series of action to get knowledge.

Ezani Yusoff, 1999 stated a few techniques of the effective learning which are:

- i. condition of the study place
- ii. choose a suitable time
- iii. learning in school
- iv. reading, understanding, memorizing
- v. study hard

This techniques can attract student to learn, pay attention and rise their curiously. He also said that one of the factors that can encourage student to pay the attention is the motivation. Many instructors consider the motivation level of learners the most important factor in successful instruction (Dick and Carey, 1996). So students who are motivated to learn will have greater success than those who are not. Motivation is not only important because it is a necessary causal factor of learning but because it mediates learning and is a consequence of learning as well (Wlodkowski, 1985).

There are many theories regarding how and why students are motivated. When developing instruction one wishes to incorporate strategies that will motivate students to learn. Bork (2002), Hardre (2001), Herdon (1987), Kontoghiorghes (2001, 2002), Moshinskies (2001) and Reeves (2001) all found that materials relevant to a learner in either a work capacity or in personal interest were successful motivators for learning. Bonk (2002), Hardre (2001) and Monhinskie (2001) list

meaningful feedback as an important element in an e-learning experience. Monshinskie along with Song and Keller (2001) suggest incorporating what Song and Keller refer to as motivationally adaptive feedback.

This courseware is developed based on the constructivism theory. According to the theory of constructivism in learning, the logical process from easy to difficult, from simple to complex and from concrete to abstract should be followed while a multimedia courseware is being made. An interaction is one of the most important features of the multimedia courseware. Interactions happen not only between students and computers but also among the different types of knowledge and between the new knowledge and the old one (Mark Shiu Kee Shum and Delu Zhang, 2005).

Hence, this multimedia courseware is developed to give motivation for student in order of effective learning. This courseware can be as an added material helper for teacher. Technology competency requires changes from used computer as computer assisted instruction to computer supported instruction (Hong Kian Sam, 1998). This project is developed based on the text book of Biology Form 5 which refers chapter 5 and chapter 6.

This project is about a research of project related to the learning process by using multimedia courseware. This learning content is to improve the ability of students to understand the topic. Any topic can be choosing as a case study and this courseware is covered of two chapters in Biology form 5 which are chapter 5: Inheritance and chapter 6: Variation.

## 2.2 Domain

This project is about a courseware that content two topic of biology form 5. This courseware is categorized under learning content. The project will develop by using software Macromedia Flash 8.0 for making student easier to understand the topic. The research of this project is about the effectiveness of using multimedia courseware in learning process.

## 2.3 Existing System

According to the research of Baharuddin Aris, *et al.* (2006), result from analysis showed that many students agreed that this courseware is user friendly and able to support the learning of “Goal Programming”. Many students also prefer learning it using an interactive multimedia (IMM) courseware compared to traditional methods of learning while teachers play the role of a facilitator. This project describes a research related to the learning of “Goal Programming” of form six students, using an interactive multimedia (IMM) courseware.

The purpose of the study was to determine the suitability of the design in the multimedia courseware for the learning and student’s preferences toward the use of the courseware compared to traditional methods of learning the topic. IMM courseware was developed by a team of experts at the Department of Educational Multimedia, Faculty of Education (Multimedia Courseware Design and Development) and the Development of Mathematics, Faculty of Science (context expert) at University Teknologi Malaysia. This courseware content of “Goal Programming” of Mathematics S (Sastera/Arts) for Sijil Tinggi Pelajaran Malaysia (STPM) and this topic was chosen as an initiative to integrate the use of an IMM courseware into the existing teaching programmed and to determine whether students would be motivated to learn a topic normally found to be relatively difficult.

Baharuddin Aris (1999) found out that by using multimedia courseware, there is more learner control students are motivated and are engaged in learning. This is because they can construct their own individual paths through the IMM courseware, control the pace at which they work and decide for themselves how much coaching they need.

This courseware allowed student to move freely and they were able to repeat the same lesson as many times as they wanted. The reason use courseware for learning “Goal Programming” because it is attractive, dynamic, interactive and effective since it can combine still and moving pictures and audio with text graphics. If computer based learning material is chosen to assist with individual student problems it must be interactive, probing to find where the student needs help and providing that help (Bork, 1997).

The software components that can be used for the development of the IMM courseware were Macromedia Authorware, Macromedia Flash, Lotus ScreenCam and Camtasia Studio. To produce an instructionally sound IMM courseware package, researchers should always carry out formative evaluation of the product or even ongoing evaluation at its different stages from prototype to final version.

### **2.3.1 Comparism of Existing System**

Nowadays, multimedia courseware is important in learning process. There are a few researches about the effectiveness of using multimedia in learning process. This can be proving by research that have done by Baharudin Aris, et al. (2006). Their research is about learning “Goal Programming” using an Interactive Multimedia Courseware: Design Factors and Students’ Preferences. The purpose of the study was to determine the suitability of the design in the multimedia courseware for the learning and student’s preferences toward the use of the courseware compared