

BORANG PENGESAHAN STATUS TESIS[^]

JUDUL: PHYSICS EDU GAME- SECONDARY SCHOOL STUDENT (THE NATURE OF MASS)

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[^] Tesis dimaksudkan sebagai Laporan Projek Sarjana Muda (PSM)

**PHYSICS EDU GAME – SECONDARY SCHOOL STUDENT
(THE NATURE OF MASS)**

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

**FACULTY OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
KOLEJ UNIVERSITI TEKNIKAL KEBANGSAAN MALAYSIA
2006**

DECLARATION

I hereby declare that this project report entitled

PHYSICS EDU GAME – SECONDARY SCHOOL STUDENT (THE NATURE OF MASS)

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

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DEDICATION

Specially dedicated to my beloved parents,
En. Razani bin Saad and Pn. Sarimah Saadiah binti Taib

For my supervisor, En ahmad Naim Che Pee@Hanapi, Dr Sazilah binti Salarn
(KUTKM)

And lastly to my beloved friend who have
encouraged, guided and inspired me throughout my journey in education

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This project would not have been possible without the help of so many people. I would like to take this opportunity to thank them for their effort in completing the PROJEK SARJANA MUDA (PSM). Firstly to my God who never fails me. My deepest appreciation goes to my supervisor, En. Ahmad Naim Che Pee for his extra ordinary level of support and patience. I always remember those countless hours he spent time for this project. His expertise and advice have been a great motivation for me and have a key role in making this unique and rewarding Degree Project. And my special thanks go to my family, En Razani bin Saad, Pn Sarimah Saadiyah Binti Taib. And also to Nurhidayah as my counselor, my beloved friend that I cannot mention here because there are too many of them who always provide moral support and encouragement throughout this project. I always able to count on their support and advice. Without all of them that I had mentioned above, I would not be able to undergo my PSM successfully.

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ABSTRACT

PhysicsEdu game for secondary student – Physics (The nature of matter) is a game based education. It is a new approach to use a game as instructional tool of learning. The game book is the investigation game on Physics topics, the nature of matter. It has 3 levels and players need to find the answer based on the hint that is given previously. The hint is the basic physics theory and the answer is the equipment and the object in this house. The information is based on what the student has learned in classes. Every path that the user pass has the information and the information is the clue for solution the problem that the user reaches in each level. This game has no limit and no expiry time. This game is more to exploration in a house by find the clue or answer to a problem to complete the mission.

ABSTRAK

PhysicsEdu game untuk pelajar sekolah menengah – Fizik merupakan permainan beasaskan kepada pelajaran. Ia merupakan konsep menggunakan permainan sebagai bahan pengajaran. Ia merupakan permainan penyiasatan mengenai fizik iaitu sifat – sifat jirim. Permainan ini mengadungi 3 tahap dan pemain akan mencari jawapan berdasarkan klue yang telah diberikan. Klue klue tersebut merupakan teori – teori asas dalam fizik, dan jawapannya ialah objek – objek yang mempunyai pertalian atau aplikasi daripada teori teori tersebut. Maklumat akan berdasarkan apa yang telah dipelajari oleh pelajar di dalam kelas. Setiap langkah pelajar dalam permainan ini akan dilengkapi dengan maklumat dan maklumat ini adalah petunjuk kepada permasalahan yang sedang dihadapi oleh pemain. Permainan ini tidak mempunyai limitasi dan tidak mempunyai masa tamat. Permainan ini lebih kepada explorasi pemain terhadap setiap perkakasan di dalam rumah untuk mencari klue serta menyelesaikan masalah.

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LIST OF ABBREVIATIONS

ACRONYM	WORD
KUTKM	Kolej Universiti Teknikal Kebangsaan Malaysia
AI	Artificial Intelligent
MOE	Ministry of Education Malaysia
SQ3R	Survey, question, read, recite and review.
CDROM	Compact Disc Read Only Memory
PDA	Personal Digital Assistant
MP3	MPEG Audio Layer III
3D	3 dimension
wav	Windows Wave (audio format/file extension)
aiff	Audio Interchange File Format
swft	Stand format for save file in Swift 3D
GB	gigabyte
VGA	Video Graphics Adapter
IT	Information technology
PC	Personal computer
Esc	escape
SMS	Short Messaging Service
.jpg	Joint Photographic Expert Groups
.png	Portable Network Graphics
fps	Frame per second
swf	Standard format for flash compile file
px	pixel
kbps	kilobits per second
GHz	Gigahertz

CHAPTER I

INTRODUCTION

1.1 Project Background

The PhysicsEdu game for secondary student – Physics (The nature of matter) is the new approach for multimedia application presentation and interactive learning for the student who slow learner and need more visualizing the topics in Critical subject especially the Physics subject. The existing multimedia learning application such as e-learning, courseware has the same concept and it is like transform from the book into the computer and creates it more interactive so that the user looks different from the book. Of course it is difference from the book because it is computerize and the user can interact with the application. Other than that, the output can be generated from the exercise and it has a sound, video and animation. But the concept is still the same. The notes, the exercises, and the answer are still the same. The concept of game book is totally different from either e-learning or courseware. The game book is totally based on a game concept. It has storyline, missions, and levels and each level need to be completed before players can end the game.

The PhysicsEdu game – Physics is an experimental new concept of game for educational. It is a new approach to use a game as instructional tool of learning. Basically the effectiveness of the application is not totally depends on it but it also depend on the user, the learner. The game book is the investigation game on Physics topics, the nature of matter. It has 3 levels and each decision from the user choice or decision is looping if the user makes the mistake or the wrong answer. The information is based on what the student has learned in classes. User cannot see the level increase, but if the user pass or get what the game need, user will get the new task to complete to escape the house to win the game. The process of taking decision is not just select the answer, but is it more interactive, need the user more to interact with the application.

As usual, the multimedia element like audio, video, animation will be included in the game. Other than that, the decision of the answer sometime just has an optional decision, but sometimes need user to find or do something before get the clue or answer. This game has not limit time or loses the game. The PhysicsEdu game is the game that user need survive to find the answer to escape from the house.

1.2 Problem Statement(s)

Nowdays the learning method can be computerized and more interactive with the visual notes, interactive exercises, the output can be generated and has an Artificial Intelligent (A.I) for the every result. The output also can be automatically summarize when the user end the course with the exercises. The content of the courseware is totally different from the traditional book. The problem that occurs is how and it is true the courseware can make the user try to make their own decision, the strategy and logic thinking when finishes the courseware. This is basically the courseware is transformation from the book to the computerized concept. The concept is good and perfect but it should have an advance option for those who are complete the courseware and need the problem that based on the real life and it is visualize and computerize.

The concept of game book is the expansion from courseware or e-learning. Other than that, the courseware or e-learning is a linear learning and need not too much

thinking ideas, strategy, and decision. Basically the courseware or e-learning has only the basic exercises and tutorial that based on the learning measurement from the Ministry of Education Malaysia (MOE). But the game book is more to real life application and many examples from the scene of the game are taken from the theory from what they have learned in class. So the user can more visualize from the games. Therefore the courseware also important for learning in the class. But the game is just for expansion in lab, for getting more visualize from the theory in classes. The game also can be used in group exercise, discussion and lab session

1.3 Objective

In order to ensure that the project working properly and smooth, the objective of the project must be stated clearly. This will not only eased the development of the system but also others who are involve in this project. Below are the objectives for this project.

- To provide an interactive learning that suitable to ages between 16 – 17 years old.

Education game book for secondary student – Physics (The nature of matter) is made for students who taking the Physics subject and focuses more to secondary school student, form 4 and form 5.

- To come out with the new concept of educational learning in multimedia development.

The new concept that combining the e-learning concept with the game structure to develop a new experimental of educational learning in multimedia development.

- To provide the learning system for science that is more effective and easier to understand.

The now days e-learning are basically are transform from the text books to the interactive and computerize but it is less effective if the functional, the concept and the manipulation of the e-learning and courseware is still the same with the

text books. But the new concept of gaming educational courseware, it is more effective if the user play the game and get the benefit from what they have learned form the game. Actually the game can generate the thinking skill and knowledge of the user. Beside that, the moral value also can be learned from what they have played.

- To provide the learning environment in the interactive ways and enjoyable to learns.

Now days, the courseware, e-learning are based on the topics that the student have learned from school. This looks too schematic and standard. This is why because all the courseware and e-learning is used for learning material at school. But if the games concept application is used in school, it is not use for learning material. Otherwise it is use as an expansion for classes in tutorial, group exercises, and it is used in lab only. The courseware is used in the class for learning material and the game is used in the lab. That is because it is more to real life application, and it is application from the theory from what they have learned from the class.

1.4 Scopes

To define the project and make sure the goal for the project reached the target. The scale, component, target user and report is different and it depends on the type of project built either for commercial, corporate, international, government, education and many more. Below are the scopes for the project.

- Target user is secondary school student and the user age between 16 – 17 years old.
The target user generally is to all the user that has knowledge on Physics or Science. But for the specific user is for secondary school student age 16 – 17 years old.
- The topic is more to discover learning the nature of matter and visualize the real life application the theory that the user learned in the class.

The area scope for development the educational game books is only for the topics the nature of matter. Other topics from the syllabus form 4 and 5 are not including in the game development. This is because the educational game book is an experimental for part of multimedia educational application development. Other than that, if in the future the development is approved and accept in school, it will be an expansion set of courseware or e-learning in school.

- Able to run in Windows platform.

Basically, all the school in Malaysia is using the computer with the Windows as an operating system. So as the suitable platform, it should be Windows as the platform for operating system.

1.5 Project Significance

Basically the project Educational Game Book – Secondary School Subject (Physics) the nature of matter is all for those who has the basic knowledge of Physics, Science and even the general people that want to learn the Science Physics. Generally the nature of matter is the basic of Physics that contain the concept and theory of matter and how the application and development for the real life.

The benefit from the educational game book is the learner or the user gain the learning process via new concept that is visualize the theory and concept that they have learned in class to real life. Other than that, the learner also gain the knowledge of applied of the theory and concept that has been learned in class. This is important because the visualization can generate the idea and understanding of the concept and theory. Basically the topic, the nature of matter is suitable because in this topic there are lots of concept and theory that the learner must understood and know the how to use the concept.

Mission student in their life is got the good result and grad with a good pointer. This concept is good but can they apply to real life or do they know that all what had they learned are basically applied for their selves. That why the learning method must

also be include the real life application.

Other than that, the learner can gain the knowledge, information and can generate the thinking idea in completing the game. How the knowledge and information deliver to the learner? Basically the game that will be developed is educational game. So when the user plays the game, they will be guide with the information and the problem that user solve is based on the information. The problem that the user faces is structural problem that need user to think and recall back the related topics and combine to solve the problem. So the knowledge gain from what had the user done in solving the problem in the game. The other thing is the game book also must follow general spec of the game like features, game play and interface, rules and level design.

1.6 Expected Output

First concept, core design, game play, and spec are the general aspect that must be focus on development the game. Basically the expected output would have the 4 level that the user must complete it to end the game. The game generally is based on the topic of Physics, the nature of matter. When enter the game, the user will see the montage, short animation and intro of the game. After that, user will enter the environment of room. From that, user needs to find the key which is clue to go out from the house.

The game more on to walkthrough, find and match, psychology question. At this level, user only uses the general fact and the match the theory and concept of physics for this level. After user reaches the next level, the question should be more difficult differ to level before this. Before user reaches the problem (question), there is information that will guide the user about the theory or concept.

Each way has the level of difficulty that needs the user to think and make the solution for each problem that user face on. This is the core design and concept of game book. The story and character is not defined because in this phase, the research and observation must be done with the target user so that the story and character will match

with the ages, environment and genre.

Other than that the graphics design should look more to level age 16 and upper. The character is not too childish. It is because the target user that will use the application is ages between 16-17 years old.

1.7 Conclusion

The development of educational game is not easy as the existing game that majority played. This development need to combine the concept of e-learning, courseware with the game concept. Basically education game book is also an e-learning, but the concept is different from the manipulation and the style of a game.

The need for game based learning is growing within the formal education world as well as in corporate training environments. The vast potential they hold to affect positive learning outcomes excites many people, but much research into their effectiveness remains.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

The literature review and the project methodology briefly review the specific factor and research about the project and the significant between the earlier project and the existing project. Other than that, this chapter also will cover the methodology, schedule and milestone and review the hardware and software requirement that need for project development. All the information is gather from the internet, books and magazine.

2.2 Fact and Finding

2.2.1 Human memory system

Generally when learn something new, it will store in memory. How the memory store? And how the memory system is working? In everyday life almost all activities in one or the other way deal with memory. Loss of memory means loss of one's self. Learning will make no sense if it is not retained by the individual. It is only through the capacity of memory that we are able to relate different events, experiences, conditions, people and objects. Also, these relations are use in different contexts and on different occasions. A child learns

something in class and uses it in home or in some other place. Memory establishes links across diverse experiences. It's a great mental capacity, a real great magic. It is needed in making social relationships, mastering cognitive competencies (mental capacities) and solving various problems.

Memory is a remarkable mental process and a mental system which receives information from (external or internal) stimuli, retains it and makes it available on a future occasion. It provides continuity to our experiences across different time points. This simple characterization of memory, however, does not mean that the memory is like a tape recorder which records a song or music and plays when ever it needed. Memory system does perform this but, it is more dynamic and versatile than that. For example, when singing the song is like a tape recorder. But a moment's reflection will reveal that human memory differs from a tape recorder in many important ways. For instance human being remember not only verbal material but visual experiences, tactile impressions, feelings of pain and joy, motor skills, events, activities and so on.

Human gather the information through their senses. Each sensory modality has its own sensory register (or sensory memory). It holds information for a very short duration then it passes the information for further processing.

Sensory memory is the type of memory that occurs within the senses while it is being transmitted to the brain. The sensory memory can hold any images for about $\frac{1}{2}$ second. In early processing, Short term memory implies stores memories for a short duration. But for the Long term memory is a relatively permanent memory in which information is stored for use at a later time.

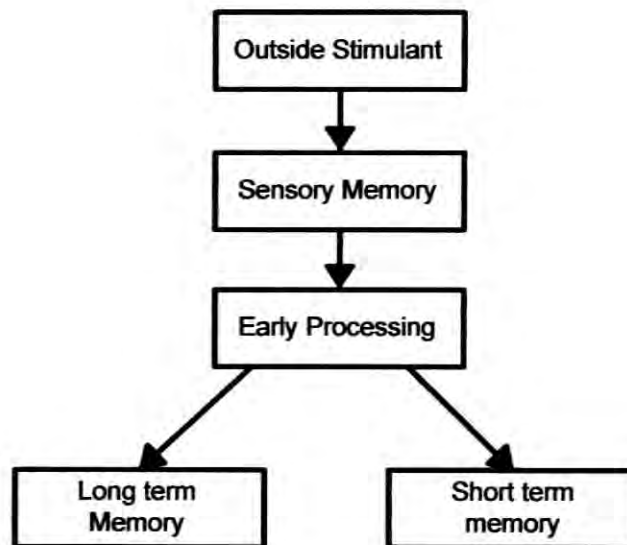


Figure 2.1 General Model of Human Memory System

There are some characteristic that define the Short term memory and Long term memory. The two term memory has a limited capacity. The duration of remembering is depends on the situation and the cause of forgotten the information is displacement of old interference, inadequate.

2.2.2 Process remembering

Process of remembering is important in raise and the improvement of the learner. This also can guide the developer in order to avoid from alter course of the concept of learning and style of learning for ages 16-17 years old. The memory system is important part that control of the whole of human body. Each data will store in the memory. The process recall back the information sometime takes time and need to has a clue like place, person that has the significant when the information stored. Generally the process of remembering involves in 3 stages:

a) Code

Process of converting the raw information to a form where it can be stored in the memory. Usually it involves effort so that the raw information could be remembered even some time it could happen automatically.

b) Storage

Storage will store the information and maintained in the memory. When information in storage wanted to enable, physiology changes in the brain must occurs. It's known as perseverance. If the person is in unconscious form, the process will be disturbed and permanent memory will not be established.

c) Collection

This process occurs when the information stored is brought to the mind. The process enabling person to remember smoothly, all the three process must happen smoothly without any problem.

2.2.3 Enhancing memory

Learning to use it enhances their self-esteem and makes them excited about coming to school (Rieber, 1996). It is obvious that forgetting is usually a source of trouble for people. Everyday conversation, class room participation, examination, interview, presentation and communication in meetings often involve remembering information. Failure in doing so has negative consequences which all of us experience in different degrees in our lives. As a result most of us are interested in improving memory. The study of memory aids and related techniques is called mnemonics. Some of the techniques used in improving memory are listed below: