

## BORANG PENGESAHAN STATUS TESIS

**JUDUL:** Prototype of Mobile Learning for Physics Entitle Motion

**SESI PENGAJIAN:** 2007 / 2008

**Saya :** LIYANA SYAZANA BINTI ABDUL WAHAB

mengaku membenarkan tesis (PSM/Sarjana/Doktor Falsafah) ini disimpan di Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dengan syarat-syarat kegunaan seperti berikut:

1. Tesis dan projek adalah hakmilik Universiti Teknikal Malaysia Melaka.
2. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan untuk tujuan pengajian sahaja.
3. Perpustakaan Fakulti Teknologi Maklumat dan Komunikasi dibenarkan membuat salinan tesis ini sebagai bahan pertukaran antara institusi pengajian tinggi.
4. **\*\*Sila Tandakan (/)**  
 **SULIT** (Mengandungi maklumat yang berdarjah keselamatan atau kepentingan Malaysia seperti yang termaktub di dalam AKTA RAHSIA RASMI 1972)  
 **TERHAD** (Mengandungi maklumat TERHAD yang telah ditentukan oleh organisasi/badan di mana penyelidikan dijalankan)  
 **TIDAK TERHAD**

  
(TANDATANGAN PENULIS)

**Alamat tetap :** 5-8-5, Genting Court  
Condominium, Off Jln Genting Klang  
53300 Setapak, Kuala Lumpur.

**Tarikh :** 23/06/08

  
(TANDATANGAN PENYELIA)

En. Ibrahim bir Ahmad  
Nama Penyelia

**Tarikh :** 23/06/08

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

\*\* Jika tesis ini SULIT atau TERHAD, sila lampirkan surat daripada pihak berkuasa.

PROTOTYPE OF MOBILE LEARNING APPLICATION FOR PHYSICS ENTITLED  
MOTION

LIYANA SYAZANA BINTI ABDUL WAHAB

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

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA


2007


## DECLARATION

I hereby declare that this project report entitled

**Prototype of Mobile Learning for Physics entitled Motion**

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

STUDENT :  \_\_\_\_\_ Date: 23/06/08  
(LIYANA SYAZANA BT ABDUL WAHAB)

SUPERVISOR :  \_\_\_\_\_ Date: 23/06/08  
(EN. IBRAHIM BIN AHMAD)

## **DEDICATION**

Specially dedicated to my beloved parents, my supervisor, and all my friends  
who always support and guide me in making this thesis complete.  
I sincerely thank all of them.

## **ACKNOWLEDGEMENTS**

I would like to thank my supervisor Mr. Ibrahim Bin Ahmad for giving assistance and being so supportive to complete this project.

I would also like to thank my mother who has been giving me support and motivation throughout my project. Thanks to all my friends and those who helped me and giving support till the end of this project

## ABSTRACT

The thesis of Prototype of Mobile Learning Application for Physics entitled Motion was done to fulfill the requirement for final year project (PSM). This project is the prototype of mobile learning for physics student between the ages of 16 to 17 years old. This application basically has five modules which consist of introduction, acceleration, deceleration, inertia, and quiz. With this m-learning, user can learn and study whenever and wherever they want as long as they bring their mobile to anywhere they go. There are a lot of animation and graphics used in this m-learning to make it interesting. This report concludes for the topic of introduction of the project, the literature review, and project methodology, analysis of the project, prototype design and detailed design, implementation, testing, observation on weaknesses and strengths of the project and lastly project conclusion. The software used in developing this mobile learning prototype are Adobe Flash CS3 and also Flash Lite player. . Hopefully this project will become one of the potential learning platforms in the future.

## ABSTRAK

Tesis bagi prototaip pendekatan pembelajaran menggunakan aplikasi mobile yang bertajuk 'Motion' telah disiapkan untuk melengkapkan projek tahun akhir (PSM). Projek ini adalah prototaip bagi pembelajaran Fizik menggunakan mobile bagi pelajar subjek Fizik di antara umur 16 hingga 17 tahun. Terdapat lima modul di dalam iaitu pengenalan, pecutan, nyahpecutan, inersia, dan kuiz. Penggunaan pembelajaran secara mobile membolehkan pengguna mengulangkaji pada bila-bila masa atau di mana sahaja asalkan mereka membawa telefon bimbit bersama. Banyak animasi dan grafik digunakan di dalam pembelajaran mobile ini untuk menjadikannya lebih menarik. Laporan ini merangkumi semua bab dari pengenalan projek, , kajian literasi dan metodologi projek, kajian analisis, rekabentuk awalan dan prototaip, implementasi dan ujian, kekuatan dan kelemahan hasil kerja serta kesimpulan dan cadangan bagi keseluruhan projek. Perisian yang digunakan dalam membangunkan prototaip adalah Adobe Flash CS3 dan juga Adobe Flash Lite. Projek ini diharapkan akan menjadi salah satu kaedah pembelajaran yang mempunyai potensi di masa hadapan.

## TABLE OF CONTENTS

CHAPTER	SUBJECT	PAGE
	<b>DECLARATION</b>	<b>ii</b>
	<b>DEDICATION</b>	<b>iii</b>
	<b>ACKNOWLEDGEMENTS</b>	<b>iv</b>
	<b>ABSTRACT</b>	<b>v</b>
	<b>ABSTRAK</b>	<b>vi</b>
	<b>TABLE OF CONTENT</b>	<b>vii</b>
	<b>LIST OF TABLES</b>	<b>xi</b>
	<b>LIST OF FIGURES</b>	<b>xiii</b>
<b>CHAPTER I</b>	<b>INTRODUCTION</b>	
	1.1 Project Background	1
	1.2 Problem Statement(s)	3
	1.3 Objective	4
	1.4 Scopes	4
	1.5 Project Significance	5



	1.6	Expected Output	6
	1.7	Conclusion	6
<b>CHAPTER II</b>		<b>LITERATURE REVIEW AND PROJECT METHODOLOGY</b>	
	2.1	Introduction	7
	2.2	Domain	8
	2.3	Existing System	10
		2.3.1 Comparison of Existing System	11
	2.4	Project Methodology	12
		2.4.1 Instructional Design	15
	2.5	Project Requirement	17
		2.5.1 Software requirement	17
		2.5.2 Hardware requirement	18
	2.6	Conclusion	18
<b>CHAPTER III</b>		<b>ANALYSIS</b>	
	3.1	Current Scenario Analysis	19
	3.2	Requirement Analysis	23
		3.2.1 Project Requirement	23
		3.2.2 Software Requirement	35
		3.2.3 Hardware Requirement	36
		3.2.4 Other Requirements	37
	3.3	Project Schedule and Milestones	37
	3.4	Conclusion	38
<b>CHAPTER IV</b>		<b>DESIGN</b>	
	4.1	Introduction	39
	4.2	System Architecture	40
	4.3	Preliminary Design	41
		4.3.1 Storyboard Design	41

4.4	User Interface Design	42
4.4.1	Navigation Design	42
4.4.2	Input Design	43
4.4.3	Output Design	43
4.4.4	Metaphors	44
4.4.5	Media Creation and Integration	45
4.5	Conclusion	46
<b>CHAPTER V</b>	<b>IMPLEMENTATION</b>	
5.1	Introduction	47
5.2	Media Creation	47
5.2.1	Production of Text	48
5.2.2	Production of Graphic	49
5.2.3	Production of Animation	50
5.3	Media Integration	51
5.4	Product Configuration	
	Management	52
5.4.1	Configuration Environment Setup	52
5.4.2	Version Control Procedure	53
5.5	Implementation Status	54
5.6	Conclusion	54
<b>CHAPTER VI</b>	<b>TESTING AND EVALUATION</b>	
6.1	Introduction	55
6.2	Test Plan	55
6.2.1	Test User	56
6.2.2	Test Environment	56
6.2.3	Test Schedule	57
6.2.4	Test Strategy	58
6.3	Test Implementation	59
6.3.1	Test Description	59

	6.3.2	Test Data	60
	6.3.3	Test Result and Analysis	61
	6.3.4	Analysis Testing	61
	6.4	Conclusion	74
<b>CHAPTER VII</b>	<b>PROJECT CONCLUSION</b>		
	7.1	Observation on Weaknesses And Strength	75
	7.2	Proposition and Improvement	75
	7.3	Contribution	76
	7.4	Conclusion	76
<b>REFERENCE</b>			77
<b>BIBLIOGRAPHY</b>			82
<b>APPENDICES</b>		<b>Appendix A - Gantt Chart</b>	
		<b>Appendix B - Storyboard</b>	
		<b>Appendix C - Questionnaire</b>	

## LIST OF TABLES

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE</b>
Table 3.1	Hardware Specification	26
Table 3.2	Number of Male and Female Respondents	27
Table 3.3	Number of Respondents Having Mobile Phone	28
Table 3.4	Number of Application Used in Mobile	29
Table 3.5	Number of Most Used Learning Tools for Physics	30
Table 3.6	Number of Respondents Ever Heard of Mobile Learning	31
Table 3.7	Number of Respondents Having Problem in Physics	31
Table 3.8	Types of Problems in Physics	32
Table 3.9	Previous Physics Test Result of the Respondents	33
Table 3.10	Color choose by the Respondents	34
Table 4.1	Input Design	43
Table 4.2	Output Design	43
Table 5.1	Example of Fonts use in Mobile Physic	48
Table 5.2	Development Software Setup	52
Table 5.3	Development Duration	54
Table 6.1	Table of Test Schedule	57
Table 6.2	Test Case Form	59

Table 6.3	Description of Test Case	60
Table 6.4	<b>The mean of a statistical distribution based on the question answered for category student and teacher</b>	72
Table 6.5	The Score Obtained by the Participants	73

## LIST OF FIGURES

DIAGRAM	TITLE	PAGE
Figure 1.1	The place of m-learning as part of e-learning and d-learning	2
Figure 2.1	The example of Online Physics Tutorial for Motion	11
Figure 2.2	The Main Menu	12
Figure 2.3	Example of Animation	12
Figure 2.4	ADDIE Model	13
Figure 2.5	Course Flowchart	15
Figure 3.1	Logical architecture of a web service built on the flexible services architecture	21
Figure 3.2	Flexible services architecture for web services	22
Figure 3.3	General and Generic M-learning Architecture	23
Figure 3.4	Total Number of Respondents	27
Figure 3.5	Number of Respondents Having Mobile Phone	28
Figure 3.6	Application Used in Mobile	29
Figure 3.7	The most used learning tools for Physics	30
Figure 3.8	Number of Respondents Who Knows About Mobile Learning	31
Figure 3.9	Number of Respondents having Problems in Physics	32

Figure 3.10	Problems in Understanding Physics	33
Figure 3.11	Previous Physics Test Result	34
Figure 3.12	Preferred Color to Attract Focus in Study	35
Figure 4.1	System Structure for Prototype of Mobile Learning Application in Physics entitled Motion	40
Figure 4.2	Sample of Storyboard	41
Figure 4.3	Navigation Flow	42
Figure 4.4	Main Menu Interface	44
Figure 4.5	Introduction Interface	44
Figure 4.6	Graphics in Interface	44
Figure 4.7	Input Text	44
Figure 4.8	Character created using tracing technique	45
Figure 4.9	Button to link among interfaces and to get the answer after answering questions	45
Figure 5.1	Example of Graphics in Main Menu	49
Figure 5.2	Example of the character	50
Figure 5.3	Example of the Motion Tweening	51
Figure 6.1	Question 1 Result for Student	62
Figure 6.2	Question 1 Result for Teacher	63
Figure 6.3	Question 2 Result for Student	63
Figure 6.4	Question 2 Result for Teacher	64
Figure 6.5	Question 3 Result for Student	64
Figure 6.6	Question 3 Result for Teacher	65
Figure 6.7	Question 4 Result for Student	65
Figure 6.8	Question 4 Result for Teacher	66
Figure 6.9	Question 5 Result for Student	66
Figure 6.10	Question 5 Result for Teacher	67
Figure 6.11	Question 6 Result for Student	67
Figure 6.12	Question 6 Result for Teacher	68
Figure 6.13	Question 7 Result for Student	68
Figure 6.14	Question 7 Result for Teacher	69

# CHAPTER I

## INTRODUCTION

### 1.1 Project Background

In 1996, Malaysia's Prime Minister Dr. Mahathir Mohamed launched an ambitious project, the Multimedia Super Corridor (MSC), attracting investment and support from the world's most renowned Information Technology (IT) companies.

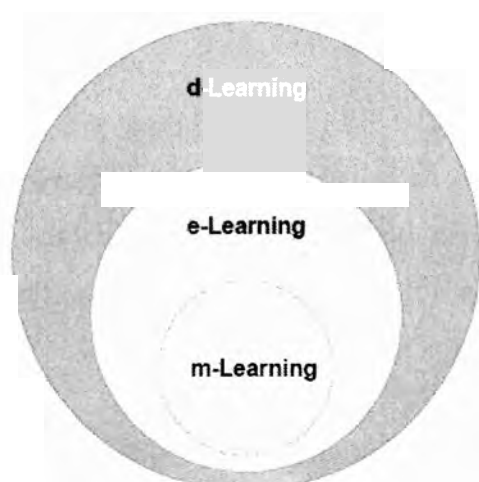
Situated in Malaysia, the MSC Malaysia or formerly known as Multimedia Super Corridor is a Government designated zone, designed to leapfrog Malaysia into the information and knowledge age. It originally includes an area of approximately 15x50 km<sup>2</sup> which stretches from the Petronas Twin Towers to the Kuala Lumpur International Airport and also includes the towns of Putrajaya and Cyberjaya. It has been expanded to include the entire Klang Valley on 7 December 2006.

The MSC Malaysia Flagship Applications consists of seven types of applications and one of it is Smart Schools which applies distance-learning Universities and wired schools. The Malaysian Smart School Flagship was premised on the strong belief that information and communication technology is a key enabler to imparting the learning desire to all. It was implemented on a Pilot basis between 1999 and 2002. Deemed one of the most forward-looking ICT-mediated learning initiatives in the world, the Smart School Flagship attempts to reinvent the teaching-learning processes.



The rapid growth of information and communication technologies and rising computer knowledge of the students make possible appearance of these new educational forms. If 15 years ago the main accent has been on Computer Based Training which used primary CD and local area networks as information medium, 5 years ago the accent is moved to use of Internet and Learning Management Systems. The e-Learning as new term is appeared. Nowadays extremely actual and perspective is mobile learning (m-Learning).

According to Tsvetozar Georgiev *et al*, (2004), m-Learning is a new stage of the progress of distance learning (d-Learning) and e-Learning. By nature, the m-Learning is a form of existing d-Learning and e-Learning. Historically the distance education has more than one hundred years of experience and traditions. Its main characteristic is the distance and time separation between teacher and students. The e-Learning offers new methods for distance education based on computer and net technologies. Simultaneous to e-Learning the other forms of d-Learning still exist for example satellite based d-Learning.



**Figure1.1: The place of m-Learning as part of e-Learning and d-Learning**

Development of physics mobile learning prototype entitled motion base on SPM syllabus is to make the learning environment of physics more fun and easy. Mobile learning (m-Learning) can be defined as learning that is facilitated and enhanced by the use of digital mobile devices that can be carried and used anywhere and anytime, such as mobile phones and PDAs .

Nowadays, mobile phone is affordable to all kind of ages, so mobile learning is an exploration of a new technology. Mobile Learning is the use of mobile or wireless devices for learning on the move. It is the exciting art of using mobile technologies to enhance the learning experience. Mobile phones, PDAs, Pocket PCs and the Internet can be blended to engage and motivate learners, any time and anywhere.

According to Allan Knight (2006), although mobile learning is related to e-learning and distance learning, it is differ of learning using mobile device and learning without limited time and place. M-learning has many advantages in the mobile world, in schools and workplace. Technology has made it possible to communicate over vast distances with a very wider audience. M-learning has reached out to many individuals who can now access learning materials at their own will regardless of their commitments.

## **1.2 Problem statement(s)**

In this running of time world, people would find something that will help them to consume their precious time. This applies to nowadays student who always busy attending schools and tuition classes day and night. So, for them mobile learning would be a good idea to manage their time learning wherever and whenever they want.

According to John Laurence Mallory (2004), most of the students have a negative perception that Physics is not an interesting subject and is the most difficult science. It requires a lot memorization of formulas. Although e-learning is popular among students, but it also has some disadvantages where it need a student to sit down in front of their PC and the PC must be in a room with electricity supplies. E-learning also required internet facilities, so if the student does not have internet they need to go to cyber cafe to get their additional education. This will waste their time.

### 1.3 Objective

To carry on the research of learning techniques used in mobile learning application.

To develop a Physics mobile learning prototype entitled motion base on SPM syllabus.

- To test the efficiency of this mobile learning prototype to the users.

### 1.4 Scope

- Target user of aged between 16-17

Focus on secondary school student which at the age around 16-17 years old as the target user.

- Learning physic term in motion content.

This m-learning project will focus on linear motion including differences of distance and displacement, speed and velocity, and also acceleration and deceleration. There are also equations and formulas of motion. In addition, there are quizzes to test the user understanding of motion.

- Symbian OS phone – Nokia N90

Symbian OS is an advanced, open operating system licensed by the world's leading mobile phone manufacturers. It is designed for the specific requirements of advanced 2.5G and 3G mobile phones. Symbian OS combines the power of an integrated applications environment with mobile telephony. The Nokia N90 is based on Symbian OS Version 8.1 and user interface S60.

## 1.5 Project significance

According to Nitin Upadhyay (2006), today's ICT has significantly extended the scope for learning anywhere, anytime and the term m-learning has gained serious strength and influence in describing the future of education. From a pedagogical perspective, mobile learning supports a new dimension in the educational process.

Features of mobile learning include:

- Urgency of learning need;  
Initiative of knowledge acquisition;
- Mobility of learning setting;
- Interactivity of the learning process;  
'Situatdness' of instructional activities; and  
Integration of instructional content.

No other learning approach matches the integrated, continuous flow of m-learning:

**Seamless access to learning resources:** With mobile learning, you can learn and study anywhere - from the classroom to your desktop or laptop to your pocket. A true mobile learning system allows users to take a course on any device (Nitin Upadhyay, 2006).

**Freedom, power, and choice:** M-learning students can choose where, when, and how they will study. The new range of options includes online synchronized, online self-paced, downloaded courseware, and computer-based training. M-learning offers new levels of freedom with the ability to exercise control over learning patterns (Nitin Upadhyay, 2006).

**Organized productivity:** With only a cell phone, handheld device, PDA, or hybrid unit, users can access administrative functions, download courses, and review their learning history through a learning management system. M-learning offers an efficient way for learners to access key information and maximize their time (Nitin Upadhyay, 2006).

Flexible, portable convenience: The ability to customize learning schedules is a key advantage to m-learning. Learners are not restricted to a specific physical environment, a particular delivery channel, or a fixed set of times for undertaking training and education. Using the latest technology, students can update their knowledge base on a just-in-time basis to prepare for meetings or presentations (Nitin Upadhyay, 2006).

## **1.6 Expected output**

The expected output from the development of physics mobile learning prototype for motion is that it will help the students to more understand the application of motion and make them having fun in learning physics. The usage of symbols, navigation buttons, and interesting usage of colors in this m-learning will create excitement as it provides new method and environment of learning physics in motion and make it easy to remember.

## **1.7 Conclusion**

As the conclusion, this chapter briefly explains the outline of the m-learning for motion in physics that will be developing including the project background and objectives of the project.

The purpose of this m-learning project is to make learning of motion is more interesting and fun for the students as mobile learning is more convenient in this era of technology. Mobile is a portable device that has no limited time and place.

M-learning provides a new and fresh learning method that is useful to make physics an exciting subject to both educators and learners. The next activity to be developing is chapter two which contains literature review and project methodology of the mobile physics.

## **CHAPTER II**

### **LITERATURE RIVIEW AND PROJECT METHODOLOGY**

#### **2.1 Introduction**

Literature review usually precedes a research proposal, methodology and results section. Its ultimate goal is to bring the reader up to date with current literature on a topic and forms the basis for another goal, such as the justification for future research in the area.

According to Cooper (1988), a literature review uses as its database reports of primary or original scholarship, and does not report new primary scholarship itself. The primary reports used in the literature may be verbal, but in the vast majority of cases reports are written documents. The types of scholarship may be empirical, theoretical, critical/analytic, or methodological in nature. Second a literature review seeks to describe summaries, evaluate, clarify or integrate the content of primary reports.'

Methodology refers to more than a simple set of methods; rather it refers to the rationale and the philosophical assumptions that underlie a particular study. The methodology that being chosen for this project is according to the priorities and the flow of the project so the suitable methodology for this project is ADDIE.

According to A.W.Strickland, the ADDIE model is a generic and simplified instructional systems design (ISD) model. ADDIE is short for Analyze, Design, Develop, Implement, and Evaluate.

In the analyze phase, the instructional problem is clarified, the goals and objectives are established, and the learning environment and learner characteristics are identified. The design phase is where the instructional strategies are designed and media choices are made. In the develop phase, materials are produced according to decisions made during the design phase. The implement phase includes the testing of prototypes (with targeted audience), putting the product in full production, and training learners and instructors on how to use the product. The evaluation phase consists of two parts: formative and summative. Formative evaluation is present in each stage. Summative evaluation consists of tests for criterion-related referenced items and providing opportunities for feedback from the users.

## **2.2 Domain**

According to Wagner (2005), the mobile revolution is finally here. Wherever one looks, the evidence of mobile penetration and adoption is irrefutable: cell phones, PDAs (personal digital assistants), MP3 players, portable game devices, handhelds, tablets, and laptops abound. No demographic is immune from this phenomenon. From toddlers to seniors, people are increasingly connected and are digitally communicating with each other in ways that would have been impossible to imagine only a few years ago. Even though mobile networks and services in the United States are just at the beginning of broadband and broad-scale adoption, mobile technologies clearly have already changed life.

As mobile connectedness continues to sweep across the landscape, the value of deploying mobile technologies in the service of learning and teaching seems to be both self-evident and unavoidable. Using portable devices to support teaching and learning is not a new concept in educational circles. Robby Robson notes that graphic calculators were a revolutionary addition when they were first introduced to the classroom a few decades ago but are now often a requirement for statistics and business classes. The use of PDA-based performance tools to support classroom instruction and on-the-job training alike has been well under way for a number of years, particularly in the fields of medicine and allied health, business, and journalism. Currently, laptop computers used in higher education settings outnumber

desktop and laboratory computers on campus, while notebook computers are ranked as the most important hardware issue on campus today, followed in second place by cellular telephones.

Bryan Alexander (2004), m-learning define new relationships and behaviors among learners, information, personal computing devices, and the world at large. The mobile learning landscape he envisioned as recently as August 2004 was described primarily in terms of mobile laptops and handheld computers. Until the early months of 2005, there would have been no strong reason for looking beyond notebook and handheld computers at least not in North America.

The heightened interest in mobile possibilities for teaching, learning, and research can be attributed to a number of factors: the continuing expansion of broadband wireless networks; the explosion of power and capacity of the next generation of cellular telephones; and the fact that mobile telephones, a familiar tool for communications, are already fully ingrained in contemporary life as part of our social practice. In other words, unlike most other mobile devices used in education, devices such as PDAs or tablet computers, there is very little extra effort required to get people to adopt and use mobile phones. Rather, people can be offered more things to do with the mobile phones to which they are already attached and with which they are already reasonably competent.

According to Ellen D.Wagner (2005), approximately 75 percent of South Koreans have a mobile phone, whereas only 60 percent of Americans have a mobile phone. The statistics from China's Ministry of Information Industry (MII) show that total phone users in that country reached 647,267 million last year, comprising 334.8 million mobile users and 312.4 million wire line users. Also according to the MII, in 2004 China had 114,567 million new phone subscribers, 64,871 million of them being mobile phone subscribers and 49,696 million fixed phone subscribers. One interesting statistic notes that Chinese mobile phone users sent 217.76 billion short messages in 2004, up 58.8 percent from the previous year.

In describing the possible changes that mobile technologies are likely to introduce in teaching, learning, and research practice, Penny Wilson (2005), has