

MATRIX MULTIPLICATION MOBILE GAME APPLICATION



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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I hereby declare that this project report entitled
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 is written by me and is my own effort and that no part has been plagiarized
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SUPERVISOR :  Date : 22.08.2016
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DEDICATION

This project is dedicated to my family who have always been there for me whenever I need and provide me with a strong love shield that always surround me and never allow any depresses bring me down. Besides, this project also dedicated to my supervisor, Dr. Ibrahim bin Ahmad who have guided me with great attention and motivated me to set a higher goal to produce a better project. Last but not least, I dedicated this project to my friends for the helps and supports they have provided to me when I faces problem.



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ABSTRACT

Education has become more and more important where the quality of life will be indirectly dependent on it. Today, mobile phone has become popular that people evolved the technology from only communication tools to different functions. Access to games has increased significantly over recent decades. Games, on the other hand are on rapid development as well. The game absorbing educational elements has been gaining popularity in recent decades as the power of game as education tools affectivity in a positive way has gained recognition.

This project is the synthesis of the study of the development of a mobile game that combined with the multimedia elements to provide a platform for students for practicing multiplication matrix in the subject related to Mathematics. The multiplication of matrices is one of the sub topic in Mathematics or Algebra subject which is hard for students to understand. As the sayings goes “Practice Make Perfect”, a constant practicing of it is important so students can improve their skills on the sub topic. Therefore, this educational game is able to provide a platform for students to practice multiplication of matrix in an interactive way in order to raise their interest on it.

The aim of this project is to develop a mobile game application which is able to provide a platform for students to practice their multiplication of matrix. This game might be able to contribute to the education system in future if it is given chances to be developed.

ABSTRAK

Pendidikan telah menjadi semakin penting di mana kualiti hidup bergantung pada tahap pendidikan. Telefon mudah alih telah menjadi popular dan teknologi telefon mudah alih semakin berkembang dari zaman dulu yang fungsinya dari hanya peralatan komunikasi kepada fungsi yang lain. Permainan kini telah menyerap unsur-unsur pendidikan dan menjadi semakin popular pada zaman ini kerana kuasa permainan menjadi semakin ketara. Alat permainan yang mempunyai unsur pendidikan semakin mendapat sambutan dan kebaikkannya telah mendapat pengiktirafan.

Projek ini adalah sintesis kajian untuk pembangunan aplikasi permainan mudah Alih (*Mobile*). Projek ini telah menggabungkan elemen-elemen multimedia dalam membangunkan mobile aplikasi ini supaya dapat menyediakan satu platform bagi pelajar untuk membuat latihan tubi pendaraban matriks dalam matapelajaran yang berkaitan dengan Matematik. Pendaraban matriks adalah salah satu sub topik dalam subjek matematik atau Algebra yang sukar dikuasai pelajar. Peribahasa Melayu ada menyatakan bahawa alah bisa tegal biasa yang membawa maksud perkara sukar apabila kerap berlatih akan terasa mudah dan menjadi mahir. Sama seperti pendaraban matriks, latihan tubi boleh membantu pelajar meningkatkan kemahiran mereka dan mobile aplikasi ini menyediakan satu platform yang menarik bagi pelajar membuat latihan tubi. Pendaraban amalan daripada mahasiswa dalam cara yang interaktif dalam usaha untuk meningkatkan minat mereka di atasnya.

Matlamat projek ini adalah untuk membangunkan sebuah aplikasi permainan mudah alih yang boleh menyediakan platform bagi para pelajar untuk berlatih mereka Pendaraban matriks. Permainan ini akan menyumbang kepada sistem pendidikan pada masa akan datang jika ia diberi peluang untuk dibangunkan.

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Chapter I

INTRODUCTION

1.1 Introduction

From a few decades ago, education has become more and more important where the quality of life will be indirectly dependent on it. It is the source of our knowledge. As the world is revolving, new uncertainties and the demand created by the globalization world, the rise of knowledge economy has made the future of education more important (Gordon Well and Guy Claxton, 2002). Through education, man has been evolving to a new stage where technologies have become in as a part of education.

Access to games has increased significantly over recent decades. Games, on the other hand are on rapid development as well. From the point of view of designing, games are evolving and have become increasingly complex and spreading in a fast pace to gaming device like mobile phones, pocket computers and website (Simon Egenfeldt-Nielsen and Jonas Heide Smith, 2003). Upon the development, the roles of the games are also evolving from entertainment to a variety of roles including for education.

Mathematics has always been a very important subject to learn in education. The achievement of Mathematics is vital on its own right, and the nation's economy is increasingly recognized it as a crucial economy.

Matrix mathematics is one of the sub topics in mathematics which applies to several branches of science, as well as different mathematical disciplines. However, it seems that matrix learning is yet to be mastered by a lot of people. This topic tends to give an impression of boring and hard but they fail to understand that practice make perfect. In a time like this, the idea of creating a game as a medium of learning might be an alternative way for learning. This is because games are visually attractive and provide instant feedback as well as fun element. All this element will hone spatial thinking, reasoning, memory and problem solving skills.

1.2 Project Background

Multiplication matrices in mathematics have been a topic which is hard for many young adults while games is an activity that people do for leisure. According to Farid Bahram, Zahra Rahimi Chegini, Asghar kiazadeh, Farshad Emami, Hasan Abdi (2012), the outcome results of his research on the comparison of the effectiveness of game-based and traditional teaching on learning of first grade math concepts showed that the game based learning group scored higher in learning tests and retention tests than the traditional group and thus applying educational games for teaching of first grade math concepts is effective and efficient. Therefore, a game based on learning is proposed to assist young adults in learning the multiplication matrices in Mathematics. The game is presented in an interactive style and in an exciting way which will pleasure the players and at the same time boost their learning. The targeted players are young adults between 18 to 24 years old who are diploma holders.

1.3 Problem Statement

Currently, the ways of generating knowledge is by reading and learning from books. This method has cause students to felt bored, not interesting and gradually lose interested in it as it is not graphically attractive, interactive and sound which will easily attract their attention and improve their understanding. In Mathematics, matrices have been a subtopic which is hard for student to master. Most of the Mathematics educational games in market focus on primary school student and have neglected the diploma's students which mostly focus more on basic mathematics. There is short of the educational games on this topic in market. It is hard for student to master it without practicing. According to Ted S. Hasselbring and Candyce H. Williams Glaser (2000), sheer quantity of educational software that is available for teachers to use in the classroom is significant and commitment to improving the Mathematics performance of students with math difficulty is strong and is effectiveness. Therefore, a game will make study to become more fun, attractive and interesting as the games proposed is aimed to assist educators in teaching.

1.4 Objective

The objectives of this project are:

1. To develop a mobile application of Matrixes Mathematics learning.
2. To investigate the elements of game based learning by comparing the existing game with the current game.
3. To study the prototype of the mobile game can provide platform for user to practicing Matrixes Mathematics.
4. To investigate the interest of young adults on practicing Matrixes Mathematics using the prototype of Matrix Mobile Game Application.

1.5 Scope

This game based learning product is developed for players who are between the age of 18 and 24 years old who are studying matrixes. The players must have basic knowledge of Mathematics in addition, subtraction and multiplication. Through this educational game, players will be able to learn the matrices in Mathematics. This educational game consists of different level of difficulties where players will be learning from 2x2 matrices to 4x4 matrices. Through this game, players will be able to understand, learn and get skilled in Matrices in an interesting way. The concept of this project is the combination of the elements of educational and entertainment for players to experience new way of learning in some enjoyable manners.

1.6 Expected Results / Benefits

This game is designed to assists young adults in learning skills via the game. Thus, the players must have basic knowledge on Mathematics. The expected result of this educational game is that players are able to learn or improve their knowledge and skills in Matrices Mathematics in an enjoyable way. It will attract the players to the game and unconsciously, it will improve the learning via continuously answering the question. This educational game consists of different level of difficulties where players will be learning from 2x2 matrices to 4x4 matrices. Greater learning will take place as the interaction between young adults has risen.

1.7 Project Significant

The game absorbing educational elements has been gaining popularity in recent decades as the power of game as education tools affectivity in a positive way has gained

recognition. The reason to develop educational games is to encourage student's continuity of learning outside of the class. Games are effective as players are willing to spent hours playing a game rather than studying. Therefore, with this game, learning will take place in a fun and enjoyable way.

Besides, student tends to work hard and focus to learn in playing to achieve a good game. According to Lepper and cordova (1992) stated the learning performances of a person can be improved significantly by rewriting a lesson with a story context with the combination of challenges for the student to overcome the obstacles (in order words, making it into a game).

1.8 Conclusion

In conclusion, the purpose of this educational game is to assist students who have a weak understanding and low interest in Matrices Mathematics. A weak understanding of this sub topic will lead to low interest and gradually students will felt inferior and started t think this topic is boring and hard to understand. Therefore, a game based learning is developed to enhance learning of this sub topic as teaching will be emerging in an interesting way. This game will consist of different difficulties to make the game more challenging and exciting. The use for game based learning in education is growing rapidly within the formal education world. The vast potential the game holds to affect positive learning outcomes give an excitation to a lot of people, but much research have been conducted to prove their effectiveness remains.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

Scholars and researchers define literature review as the piece of work related to a topic that has been published. It usually is part of the introduction to a research report, essay or thesis. Conveying the knowledge and ideas of the established topic is the purpose of conducting a literature review. Literature review, as a piece of writing, it must be led by a guiding concept and it is not just a set of summaries or summaries descriptive list of the available material (Dena Taylor, 2008). The ability to review, and to report on relevant literature is a key academic skill. A literature review will situate a research focus within the context of the wider academic community in a topic, identifies a gap within that literature that s research will attempt to address and reports the critical review of the related literature (SSDS, University of Leicester, 2010). The project methodology is defined as the discipline of initiating, planning, designing, executing, controlling, and closing the project to reach specific target and meet specific success requirements. In this project, the project methodology will discuss the approaches, techniques and tools used in developing of the system.

In this chapter, the literature review and project methodology will be conducted and discussed. The area of research in this chapter will involve the benefit of game based

learning, the comparison between the existing game and the proposed project as well as the elements required in developing a game based on learning. At the end of the chapter, the process of developing the game will be discussed as well.

2.2 Domain

Education in accordance to Oxford Dictionaries is defined as the information about or practice in a subject. It is the process or act of acquiring or implementing general knowledge, powers development of reasoning and judgmental and generally of preparing one or others to intellectually adapt for mature life (online dictionary). On the other hand, mobile games are extensively defined as downloaded, embedded or networked games uses in handheld devices such as cell phones, PDAs and dedicated gaming devices (Eui Jun Jeong and Dan J. Kim, 2009).

What is game? According to Oxford Dictionary, game is defined as an activity that one engages in for amusement. Game, in the context of this project, is a system which players engage with artificial conflicts with of a few features which are ruled-based, resulted varies, quantifiable and attached outcomes to player and negotiable consequences (Jesper Juul, 2003 and E. Zimmerman, 2003).

Game based learning is the results of combining games with educational purpose where players will be able to learn things in an interesting way. In game based learning, the main concept in game based learning is to understand users and create the value of learning for them by setting an enjoyable journey for the game environment. Recognition has been given that game based learning is one of an effective way for learning to motivate students to learn. Learning via game has emerged to be a promising approach to traditional lecture-based learning. Recently, training courses in academic and industrial domains have applied game based learning as many schemes, methodologies and systems are developed (Hsin-Chang Yang, 2005).