BORANG PENGESAHAN STATUS TESIS^

JUDUL: INDOOR AIR QUALITY 2D MOBILE GAME

SESI PENGAJIAN: 2011/2012

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MOBILE GAME: INDOOR AIR QUALITY (IAQ) 2D MOBILE GAME

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DEDICATION

This project report is especially dedicated affectionately to my beloved parents, my sisters and my brother, my lovely supervisor, Prof. Madya Dr. Sazilah Salam and also last but not least to all my beloved friends who have given encouraged, guided and inspired me throughout my journey in university.

ACKNOWLEDGEMENTS

This research report has been undertaken in partial fulfillment of the Bachelor Degree of Computer Science in Interactive Multimedia. I wish to acknowledge certain individuals for their contributions towards the production of this research report.

Foremost, I wish to humbly acknowledge with sincere gratitude to my supervisor, Prof. Madya Dr. Sazilah Salam. I can't say thank you enough for her tremendous support and help. I feel motivated and encouraged every time I had meeting with her. Without her encouragement and guidance this project would not have materialized.

Besides that, my sincere thank goes to all lecturers at Universiti Teknikal Malaysia Melaka who had shared their knowledge and skills, ideas in completing this project.

Moreover, the guidance and support received from all my fellow friends and my classmates who contributed and who are contributing to this project. I am very grateful for their constant support and help.

Finally, yet importantly, an honorable mention goes to my beloved family for their kind encouragement, endless patience and blessings which help me in completion of this project. Without helps of the particular that mentioned above, I would face many difficulties while completing this project. Thank you very much.

ABSTRACT

Mobile Game: Indoor Air Quality (IAQ) is a 2D mobile game which players able to play for green awareness and also enjoyment. People nowadays still did not concern about the indoor air pollution which is very dangerous to the human's health. Besides, nowadays people also only consider or focus more on to outdoor air pollution. Therefore, IAQ game is developed in mobile to increase the indoor air awareness where player able to play the game wherever they want because mobile phone is a common device that people always use in their daily life and it is also easy to use. IAQ game is not only just a game for fun but it is also an edutainment game which it provides a little awareness to the player. IAQ game is aimed for kids aged 7 years old until 12 years old. This is because the kids should be provided with early awareness about the harmful effects of indoor air pollution to the human's health. In particular, this report explains the methodology used in developing the product which is using ADDIE model. ADDIE model is stands for Analysis, Design, Develop, Implement and Evaluate. Analysis is the critical part in this report where all the information are captured and collected properly as the reason to develop the product. The Design of IAQ game is focuses more to the home environment which shows the indoor air pollution in home. For the implementation, the processes will encompass the text, graphic, audio and animation. Testing phase was conducted intended to the target users to retrieve their opinions on the game and the goals or objectives of the product either it can successful attract the player or not. Thus, the findings of this study are useful for introduce the player about the indoor air pollution and harmful it is to the human's health. This is concluded with the product has the strengths and weaknesses which all the weaknesses will be implement for future work or further improvement.

ABSTRAK

Mobile Game: Indoor Air Quality (IAQ) adalah sebuah permainan mudah alih dimana pemain boleh bermain permainan ini sambil belajar dan juga keseronokan. Pada masa kini,disebabkan orang ramai masih tidak mengendahkan tentang masalah pencemaran udara di dalam sebuah bangunan dimana ianya sangat merbahaya untuk kesihatan manusia. Orang ramai pada masa kini hanya menumpukan masalah pencemaran udara di luar bangunan. Oleh itu, permainan IAQ mudah ahli ini dibangunkan agar pemain boleh bermain bila-bila sahaja disebabkan telefon mudah alih merupakan alat komunikasi yang biasa digunakan kerana ia sentiasa digunakan dalam kehidupan seharian dan mudah digunakan. Permainan IAQ ini bukanlah sekadar untuk menyerokkan tetapi ia juga sebuah permainan yang memberi sedikit kesedaran kepada pemain. Permainan IAQ ini dibangunkan untuk kanak-kanak yang berumur 7 tahun sehingga 12 tahun. Hal ini kerana kanak-kanak boleh mendapat kesedaran awal tentang kesan buruk pencemaran udara dalam rumah terhadap kesihatan. Disamping itu juga, laporan ini juga menjelaskan metodologi yang digunakan untuk membangunkan produk ini iaitu rekabentuk ADDIE. ADDIE terdiri daripada Analisis, Reka Bentuk, Perlaksanaan dan Penilaian. Analisis merupakan bahagian kritikal dalam laporan ini dimana semua maklumat dikumpulkan dan direkodkan dengan teliti. Bahagian rekabentuk ialah bahagian dimana struktur aplikasi dibangunkan. Bahagian perlaksanaan pula ialah bahagian menerangkan produksi dan perlaksanaan proses dimana mengandungi produksi teks, grafik, audio dan animasi. Dalam peringkat pengujian, ia dilaksanakan dikalangan pengguna untuk mendapatkan pendapat tentang permainan tersebut dan memastikan samaada objektif permainan tercapai dan berjaya menarik hati pemain atau tidak. Dengan itu, hasil daripada pengujian adalah berguna untuk mengenalkan pemain tentang pencemaran udara dan kesan buruk terhadap kesihatan manusia. Secara kesimpulannya, produk ini mempunyai kelebihan dan keburukan dan segala keburukan ini akan dibaiki pada masa hadapan.

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CO	**Carbon Monoxide**
IAQ	**Indoor Air Quality**
VOC	**Volatile Organic Compound**

CHAPTER I

INTRODUCTION

1.1 Project Background

Nowadays, people are growing more and more concerned about the quality of the air they breathe. There are more information is coming to light about how poor air quality can negatively affect human's health, making this issue more important than ever before. Although most of people are aware of the problems associated with smog and other industrial pollution that is seen hanging over the sky of many major cities, but a lot of people still don't realize just how toxic the air inside our own home is which can be called as indoor pollution. Majority of everyday chemical exposure occurs through the air we breathe in our homes, offices, schools and other indoor environments. Therefore, people must aware about the harmful of the indoor air pollutant and practising to keep indoor air quality in home are healthy.

Indoor air quality (IAQ) may be broadly defined as the nature of air that affects the health and well-being of occupants. It differs from industrial indicators of acceptability, such as threshold limit values, as the latter primarily reflect concern for control of potential hazards. There are five indoor air quality can be adversely affected by other pollutants such as mould, asbestos, carbon monoxide, lead and volatile organic compound.

Mould can exists everywhere in our environment and is found both indoors and outdoors. Besides, Moulds known to produce these sometimes dangerous toxins are commonly found in old and water-damaged structures. These mycotoxins can enter an individual's body via ingestion, inhalation, or even skin contact. In order for mould to thrive the right conditions must be met. The existence of nutrients, moisture, and the proper temperatures are all necessary for mould to fester. Some of the materials that attract mould colonies include wood, paper, fabrics, plants, and animals. Even certain paints and adhesives contain the organic materials that moulds consume.

On the other hand, Asbestos is the name given to a group of six different fibrous minerals which are amosite, chrysotile, crocidolite, and the fibrous varieties of tremolite, actinolite, and anthophyllite that occur naturally in the environment. Asbestos minerals have separable long fibers that are strong and flexible enough to be spun and woven and are heat resistant. Because of these characteristics, asbestos has been used for a wide range of manufactured goods, mostly in building materials for roofing shingles, ceiling and floor tiles, paper products, and asbestos cement products, friction products for example, automobile clutch, brake, and transmission parts. It also used for heat-resistant fabrics, packaging, gaskets, and coatings. Some vermiculite or talc products may contain asbestos.

Carbon monoxide is a toxic gas which is colourless, odourless, tasteless and invisible. It can produce symptoms in humans and animals almost immediately when concentrations are high enough. CO acts like oxygen molecules when you breathe them in, so red blood cells will begin to transport carbon monoxide throughout your body instead of oxygen, which can cause a wide range of problems, from muscle fatigue, to brain damage, to death.

In addition, Lead was used in paint, adhesives, and other staining or coating substances. If lead-based paint stays intact and in good repair there is little risk of lead exposure. However, like all paints, lead-based paint will dry, flake, chip, peel, and crack over time. Dust and tiny paint chips can fall to the ground or become airborne. Once inhaled the lead enters the bloodstream, causing a number of serious health effects. Lead poisoning in adults can cause "reproductive problems in men and women, high blood pressure, kidney and digestive problems, nerve disorders,

memory and concentration problems, and muscle or joint pain."(Nebraska Department of Health and Human Services)

Besides that, Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short and long term adverse health effects to human's health. Concentrations of many VOCs are consistently higher indoors which is up to ten times higher tha n outdoors. VOCs are emitted by a wide array of products numbering in the thousands. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions.

In this Indoor Air Quality (IAQ) awareness, it will focus more on the general users especially kids. This is because they can get early awareness about the harmful of indoor air pollutant in human's health. Indoor Air Quality (IAQ) game awareness will develop in mobile game application. The game application will be store in the tablet and will be played in touch screen. The games will be one level only but consist of a few missions.

1.2 Problem Statement

- There is none of Indoor Air Quality game awareness developed in mobile game application.

- Majority people still do not aware with the harmful effects of indoor air pollutant. They only consider more on outdoor air pollutant.

- People nowadays still do not aware about the existing of the indoor air pollutant chemical which is dangerous to human's health.

1.3 Objectives

There are three objectives in this project which are:

- To develop a 2D mobile game to encourage Indoor Air Quality (IAQ) awareness for indoor environment.
- To implement a 2D Indoor Air Quality problem scenario in the game.
- To evaluate user's acceptance of the prototype.

1.4 Scope

The scopes in the IAQ awareness are include the target user who will be test to play the game, the content in the IAQ game and the platform use in develop the game.

1.4.1 Target User

- Kids in age 7 years old until 12 years old.

1.4.2 Content

The content in the IAQ game includes the main page where in main page, there are three modules that player have to play in the game.

1.4.2.1 Main Page

The main page will display the play buttonto star the new game. The game does not have levels but have several activities in the game in order to solve the problems cause indoor air pollutant in home. When player click the play button, the player will enter the living room as the begin of the game.

Table 1.1: IAQ Game Level

Modules	Description
1) Hidden objects game	The hidden game will be at living room and bedroom. The mission is to find the entire listed thing which is sources of the indoor air pollution. Player must find the hidden object by defeating the time given. If the player successful finding the objects, the player will gain scores. Each item will be scored 20.
2) Click and match game	The click and match game will be applied in a bathroom. The mission is to clean or eliminate the mould with a few objects given. The game will start with a waterholes and

	turns into mould. The waterholes will be cleaned by suitable object then the mould also will be eliminated with suitable object. Player will able to choose and match the objects given. There are time will be given.
3) Turn off the gas and clear the smoke	At the kitchen, the player's mission is to turn off the gas stove.

1.4.2.2 Platform

The mobile games will be installed in mobile with compatible software used in developed this game. The game will developed using Adobe Flash CS5.5 in Adobe Air IOS with Action script 3.0. The product will be install in Samsung Galaxy Note NT-7000.

1.5 Project Significant

The IAQ awareness in 2D mobile games can benefit to general people either among the children, teenagers and adult. This game developed is not just a game play for fun but it also delivers awareness to their audience about the harmful of the IAQ pollutant to human's health. Since many people still didn't aware about the indoor air pollutant, therefore they just take simply with their household products in their house which contains many chemical where can effects human's health through breathing.

This game will give players step on how to overcome the indoor air pollutant in home. The game is good to be played where the players can learn the important of reducing the indoor air pollutant.

The technology used to develop this game is using Flash CS5.5. It will be installed in the tablet so that player able to play the game everywhere and anytime and the usage is increasing year by year.

1.6 Conclusion

In conclusion, the IAQ awareness 2D mobile game benefits to the kids in age 7 years old until 12 years old as the target of this product as they can get early awareness and general knowledge about the type of indoor air pollutant can occur in home. Therefore, besides in learning by reading books, playing the IAQ awareness 2D mobile game also will provide teenagers to recognize the negative effects of the indoor air pollutant. By deliver in interactive way such as by using mobile will help them feel enjoyable studying instead of playing the game at anywhere and anytime.

CHAPTER II

LITERATURE REVIEW & PROJECT METHODOLGY

2.1 Introduction

A literature review is the effective evaluation of selected documents on a research topic. A review may form an essential part of the research process or may constitute a research project in itself. This chapter reviews literatures that have been written by others that have relation with the title of this project. These literature and reviews will be compared to strengthen the chosen title. The comparisons will be made based on the domain of the project, current technology found, the hardware and software requirement in developing this project and the technique to develop the project.

Moreover, in this literature review also will be discussing the methodologies used which approaches the project will be develop and describe all the activities stage by stage. In multimedia development system, there are many types of methodologies that can be used. For example, ADDIE model is the best model for developing an e-learning. Besides that, there are also many models in Software Development Life Cycle (SDLC), Multimedia Production Process and more.

Lastly, the hardware and software requirement will be explain in this literature review. The hardware and software are very important to define as it must be compatible and suitable to avoid any obstacle or incompatible system at the end of development stage.

2.2 Domain

The domain of this project is to develop an awareness mobile game about Indoor Air Quality for Green Indoor Environment. The application is developed in Air for IOS using Adobe Flash CS5.5. While using tablet, this will enable the user interact easily using tablet as the tablet has bigger in size display and have better resolution.

2.2.1 Mobile Phones Usability

In the last decade, the mobile phone has rapidly evolved from a simple device to make or receive phone calls to a complex multimedia interactive system. The research of the usability of mobile phones has been a newly area with few established methodologies and realistic practices that ensure capturing usability in evaluation. Thus, there exists growing demand to explore appropriate evaluation methodologies that evaluate the usability of mobile phones quickly as well as comprehensively. The phones themselves have expanded in functionality from a device to dial numbers to a personal digital assistant. It is now common for a mobile phone to include a personal phone directory, an alarm clock, an appointment

calendar, and several games. In conjunction with mobile phone's popularity, a folklore about which brands are easiest to use has arisen.

Besides that, mobile usability also is an application of the user-centered design process to small, handheld electronics. The uniqueness about mobile usability is the physical limitations, social limitations and mental limitations. It is because the small and less buttons design.

2.2.2 Games and Mobile Games

According to Penttinen, Esko; Rossi, Matti; and Tuunainen, Virpi Kristiina (2010), Mobile games are one of the largest mobile application areas and one where users are often willing to pay for services. According TomChatfield (2011), Because almost all games are enhanced by a sociable element, there is special group which are the social games seems to the most important mechanisms of reward and pleasure come attached to explicitly social aims. And these aims will tend to involve sharing, competing and cooperating with other players, as well as harnessing existing social bonds and networks as part of the game's fundamental mechanisms of progress an achievement.

In practice this means planning from the very beginning to build a game around social relationships, and deciding that it will be the different ways in which people relate to each other that will drive the play experience for people: sociability will be the main hook and the main engine of progress and continued interest.

In some senses, this begins to take user away from the idea of a game completely, and towards something that can be playful more in the sense that a toy or hobby is playful: an occasion for mutual enthusiasm and interest. So a lot of "social