

**Asthma Education Games for Children**

**“Bronchi Talisman”**

by

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Dissertation submitted in partial fulfilment of

the requirements for the

Bachelor of Technology (Hons)

(Business Information System)

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CERTIFICATION OF APPROVAL  
**Asthma Education Game for Children**  
**“Bronchi Talisman”**

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A project dissertation submitted to the  
Business Information System Programme  
Universiti Teknologi PETRONAS  
in partial fulfilment of the requirement for the  
Bachelor of Technology (Hons)  
(Business Information System)

Approved by,

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UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

January 2014

## CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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SITI AISHAH BINTI ABDUL GAFFAR

## **ABSTRACT**

Asthma is one of respiratory diseases, categorized as one of the four most chronic diseases in Malaysia. This disease covers about 3.25 millions of Malaysian population and the biggest group that have this disease is children below 12 years old. Hence, to educate and manage the increasing cases of asthma, Bronchi Talisman, a game-based mobile application, is specially created for children. With the objective of building a game-based mobile application and investigating the effect of using the mobile game application to the asthma patients, Bronchi Talisman is expected to solve the problems that have been found about asthma prevention and treatment. The first problem that has been identified is the lack of knowledge of the parents about asthma. Secondly, lack of attractive material that is available related to asthma education. Lastly, the existing game-based mobile applications do not educate the children about medicine. Instead, they are just providing entertainment solely.

The scope of the project is the asthmatic children from the age of 5 to 11 years old and it should be able to run on any Android devices. The language used for this application will be English and Malay. The project is using Agile Development methodology which is extensively used in mobile development. This methodology provides flexibility to developer to do any changes at any stages of the application development. In conclusion, the high number of asthma cases shows that the awareness about asthma prevention and treatment is still low. Thus, it is beneficial to develop such game-based mobile application to educate the asthmatic kids and the parents on asthma and ways to manage this disease.

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# CHAPTER 1

## INTRODUCTION

### 1.1 Background of Study

Bronchi Talisman is a game-based mobile application for Android that is developed as an asthma education tool for the children of Malaysia. *Bronchi* is the short form of bronchiolitis which is the alternative name of asthma and *Talisman* means charm or amulet that brings good luck. Together this name means protection from asthma. This mobile game application previously have been deployed and released. Hence, this project will be an extended version of the previous release of this game. Several differences have been made to the previous version such as some of the user interfaces have been changed and additional functionality will be implemented in this project.

### 1.2 Problem Statement

#### 1.2.1 Problem Identification

Asthma is one of the increasing chronic diseases in the world especially when the global environment status is endangered. According to World Health Organization statistic in 2010, there are 284 million of people in the world that suffered from asthma. In Malaysia itself, it is estimated that about 2 million of people suffering from asthma where it covers 12.5% of Malaysian population and the numbers are growing. The numbers include not only adults but lots of children too. Looking at the numbers, it portrays that the awareness about asthma prevention and treatment is still lacking in Malaysia. This lack of awareness is related to the problems identified as below:

- i. Children have a lack of understanding about asthma due to insufficient asthma education material to be provided to them. (refer Appendix 3)
- ii. There are difficulties in clarifying about the disease to children.

The parents face a problem in explaining the disease clearly to the child. A verbal explanation is not sufficient for the children to understand about his/her disease.

- iii. Existing asthma education materials are too formal and not attractive for the children to learn.

The current materials are not attractive for children. Most of the materials are too formal and wordy. It makes it tough for children to understand what the material is trying to convey or to remember it.

- iv. Abundance of games that only provide entertainment instead of education especially in medicine.

Most of the famous game such as Candy Crush, Fruit Ninja or Zombie does not give much value to the children. It only provides entertainment and enjoyment to them but does not help them to broaden their knowledge about medicine.

### **1.2.2 Significance of the project**

The project will be a medium for parents and as well as the healthcare organization in reducing and controlling the asthma cases. This project will help in providing an interactive way of learning about asthma to the asthmatic children. Since the project is a game, the attractiveness for the children to play it is higher than just referring to booklets, pamphlets and brochures given by the doctor to explain about asthma to them.

### **1.3 Objectives and Scope of Study**

The objectives of this project are:

- a) To develop a game based mobile application that will increase public awareness of asthma prevention and treatment.
- b) To study the effect of using game based mobile application on asthmatic children and parents.

The target group of this project are the asthmatic children aged 5-11 of age and their parents. This application will be able to run on any Android device starting from version 2.2 till 4.1 with the code name Froyo and Jelly Bean respectively. The language used for this game will be English and Malay.

### **1.4 Relevancy of the Project**

This project is relevant in increasing the awareness about asthma prevention from the early stages of the citizen of Malaysia. It is significant as along with providing entertainment and enjoyment for the children the application educates them about asthma management. Moreover, the emerging of the mobile learning games trends is one of the effective ways to attract the children on learning while playing.

### **1.5 Feasibility of the Project within the Scope and Time Frame**

The project is feasible as it does not require any extra equipment to create the games application. The author only needs a computer and an Android smart phone to code the program. The first semester of the project will be used for thorough documentation, research and prototyping. The following semester will focus on the application development. The project should be completed within the duration from September 2013 till May 2014. (Refer to Gantt chart on Appendix 1&2).

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 What is Asthma?**

According to National Heart, Lung and Blood Institute (2012), asthma is a common long term chronic lung disease which inflames and constricts the airway. People who suffer from this chronic condition are said to be asthmatic. The disease is associated with a range of symptoms, including cough particularly at night, wheezing, breathing difficulty and chest tightness. Asthmatic patients usually suffer these symptoms during the night and early in the morning where the temperature is lower than the day.

Asthma can affect people of all ages, but it most frequently starts during childhood. The Asthma Society of Canada (2013) stated that asthma is the most common chronic disease in children. Children have a high risk to get asthma starting from the day they are born. They have smaller airways than adults, which makes asthma especially serious for them. Statistics from Medical News Today (MNT) reported by Peter, C. in 2013 also suggest that asthma kills about 255000 people worldwide every year.

##### **2.1.1 What causes Asthma?**

Medical News Today (2013) stated that children who are being born prematurely, have a low birth weight, are exposed to extreme tobacco smoke, and were brought up in a low income environment have more risk to suffer asthma. The symptoms are typically present when the children are about five years of age. Additional causes of asthma include allergies, atopy, obesity, stress, genes and airway hyperactivity.

### 2.1.2 Asthma is incurable

Asthma is an incurable illness. It will flare at any times if person is exposed to the triggers. However, with good treatment and asthma management plan they can live normally and actively.

### 2.1.3 Asthma Management Plan

As stated previously, asthma is incurable. Nonetheless, with a good asthma management plan, this disease can be avoided or reduced to enable the asthmatic patients to enjoy a normal lifestyle. As defined from Asthma Foundation West Australia (2013), there are 6 steps that for the asthma management plan which are:

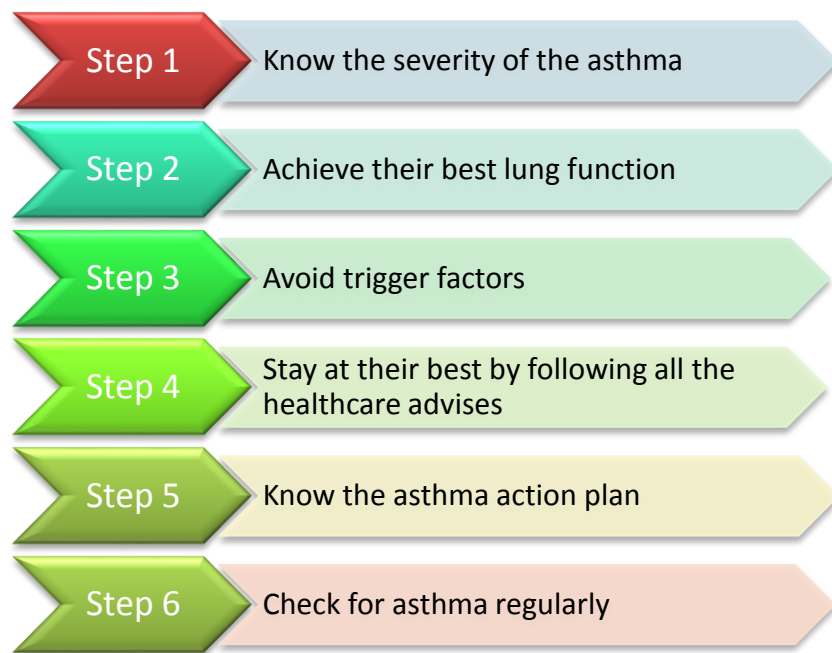


Figure 1: Asthma Management Plan

### 2.1.4 Asthma Action Plan

Asthma action plan is created for the asthmatics to detect the early warning of asthma attack so that they can take an appropriate action for it. The aim of the asthma management plan is to enable the asthmatics to take control of their asthma, decide on which medication that they should take and the amount of the medicines, and lastly to decide whether they should seek the emergency help. The asthma action plan has three zones which are:

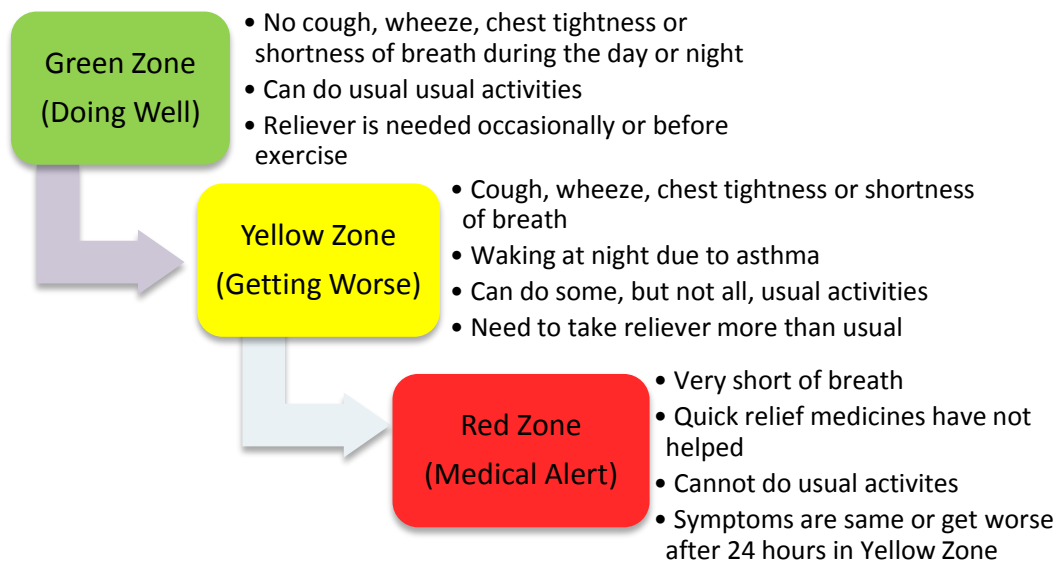


Figure 2: Asthma Action Plan

## 2.2 Asthma in Malaysia

### 2.2.1 Asthma Cases in Malaysia

According to Health Indicators 2010, sourced from Ministry of Health Malaysia Virtual Library, asthma as one of the respiratory diseases, contributes to the top 2 of 10 leading cause of hospitalization and death at government hospitals in



2010 with the statistic of 9.56%. In comparison in 2012, the statistic taken from Health Facts 2013, the percentage is getting worse to 12.08%.

PETUNJUK KESIHATAN NO: 4.4.  
Health Indicator No: 4.4.

**JADUAL 4.4. : 10 SEBAB UTAMA KEMASUKAN KE HOSPITAL KEMENTERIAN KESIHATAN MALAYSIA, 2010**  
Table 4.4. : 10 Principal Causes of Hospitalisation in Ministry of Health Hospitals, Malaysia 2010

NO. Rank	SEBAB UTAMA Principal Causes	BILANGAN DISCAJ Number of Discharges	% KEPADA JUMLAH DISCAJ % To Total Discharges
1	Pregnancy, childbirth and the puerperium	540,291	25.72
2	Diseases of the respiratory system	200,693	9.56
3	Injury, poisoning and certain other consequences of external causes	188,522	8.98
4	Certain infectious and parasitic diseases	174,051	8.29
5	Certain conditions originating in the perinatal period	154,328	7.35
6	Diseases of the circulatory system	144,459	6.88
7	Diseases of the digestive system	107,012	5.09
8	Diseases of the genitourinary system	103,972	4.95
9	Neoplasms	76,080	3.62
10	Factors influencing health status and contact with health services	74,250	3.54
<b>ALL CAUSES ( Admissions)</b>		<b>2,100,375*</b>	<b>100.00</b>

NOTA: Berdasarkan: "3 Digit Code Grouping - ICD 10"      Note: Based on actual 3 Digit Code Grouping - ICD 10  
\* Tidak Termasuk Hospital Umum Sarawak      \* Excluding Sarawak General Hospital

PUNCA : PUSAT INFORMATIK KESIHATAN, KEMENTERIAN KESIHATAN MALAYSIA.  
Source : Health Informatics Centre, Ministry of Health Malaysia

Table 1: Ten Principal Causes of Death and Hospitalization in Ministry of Health Hospitals, Malaysia 2010

Ten Principal Causes of Hospitalisation in MoH & Private Hospitals, 2012	
1. Pregnancy, childbirth and the puerperium	21.79%
2. Diseases of the respiratory system	12.08%
3. Certain infectious and parasitic diseases	8.62%
4. Injury, poisoning and certain other consequences of external causes	7.95%
5. Diseases of the circulatory system	7.44%
6. Diseases of the digestive system	6.75%
7. Diseases of the genitourinary system	5.53%
8. Certain conditions originating in the perinatal period	5.40%
9. Factors influencing health status and contact with health services	3.98%
10. Neoplasms	3.82%
Ten Principal Causes of Death in MoH and Private Hospitals, 2012	
1. Diseases of the circulatory system	25.10%
2. Diseases of the respiratory system	17.90%
3. Certain infectious and parasitic diseases	16.37%
4. Neoplasms	13.63%
5. Diseases of the digestive system	5.01%
6. Injury, poisoning and certain other consequences of external causes	4.93%
7. Diseases of the genitourinary system	4.16%
8. Certain conditions originating in the perinatal period	3.23%
9. Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	2.01%
10. Endocrine, nutritional & metabolic diseases	1.76%

Note: Based on 3 digit code grouping ICD10.

Table 2: Ten Principal Causes of Death and Hospitalization in Ministry of Health and Private Hospitals, Malaysia 2012

In addition, it has been reported in Health Indicator 2010 as well that the number of asthma cases is quite high, which is 33,585 cases out of 100,000 population. The discharge rate for these cases is 118.53 per 100,000 populations as shown in Table 3.

<i>Detailed Cause Groups ( Diseases of the Respiratory System )</i>	KOD I.C.D. - 10 <i>I.C.D. - 10 Code</i>	BILANGAN DISCAJ <i>No. of Discharges</i>	KADAR DISCAJ (SETIAP 100 000 PENDUDUK) <i>Discharge Rate (Per 100 000 Population)</i>
<b>CHRONIC LOWER RESPIRATORY DISEASE</b>	J40-J47	54,198	191.28
Chronic bronchitis	J40	283	1.00
Emphysema	J43	110	0.39
Other chronic obstructive pulmonary disease	J44	18,712	66.04
Asthma	J45-J46	33,585	118.53
Bronchiectasis	J47	1,474	5.20
Other chronic lower respiratory tract diseases	J41-J42	34	0.12
<b>LUNG DISEASES DUE TO EXTERNAL AGENTS</b>	J60-J70	2,978	10.51
Pneumoconiosis	J60-J65	50	0.18
Other lung diseases due to external agents	J66-J70	2,928	10.33
<b>OTHER RESPIRATORY DISEASES PRINCIPALLY AFFECTING THE INTERSTITIUM</b>	J80-J84	4,604	16.25
Pulmonary oedema	J81	3,945	13.92
Remainder of other respiratory diseases principally affecting thr interstitium	Remainder of J80-J84	659	2.33
<b>SUPPURATIVE AND NECROTIC CONDITIONS OF LOWER RESPIRATORY TRACT</b>	J85-J86	830	2.93
Suppurative and necrotic conditions of lower respiratory tract	J85-J86	830	2.93

Table 3: Number and Discharge Rate in Ministry of Health Hospitals, Malaysia, 2010: Diseases of the Respiratory System

<i>Detailed Cause Groups ( Diseases of the Respiratory System )</i>	KOD I.C.D. - 10 <i>I.C.D. - 10 Code</i>	BILANGAN KEMATIAN <i>No. of Deaths</i>	KADAR KEMATIAN (SETIAP 100 000 PENDUDUK) <i>Mortality Rate (Per 100 000 Population)</i>
<b>CHRONIC LOWER RESPIRATORY DISEASE</b>	J40-J47	968	3.42
Chronic bronchitis	J40	5	0.02
Emphysema	J43	6	0.02
Other chronic obstructive pulmonary disease	J44	759	2.68
Asthma	J45-J46	143	0.50
Bronchiectasis	J47	55	0.19
Other chronic lower respiratory tract diseases	J41-J42	0	0
<b>LUNG DISEASES DUE TO EXTERNAL AGENTS</b>	J60-J70	1,078	3.80
Pneumoconiosis	J60-J65	7	0.02
Other lung diseases due to external agents	J66-J70	1,071	3.78
<b>OTHER RESPIRATORY DISEASES PRINCIPALLY AFFECTING THE INTERSTITIUM</b>	J80-J84	588	2.08
Pulmonary oedema	J81	475	1.68
Remainder of other respiratory diseases principally affecting thr interstitium	Remainder of J80-J84	113	0.40
<b>SUPPURATIVE AND NECROTIC CONDITIONS OF LOWER RESPIRATORY TRACT</b>	J85-J86	31	0.11
Suppurative and necrotic conditions of lower respiratory tract	J85-J86	31	0.11

Table 4: Number and Mortality Rate in Ministry of Health Hospitals, Malaysia, 2010: Diseases of the Respiratory System

Table 4 shows the number of death cases for respiratory diseases in Malaysia for 2010. For asthma, it was reported that there are 143 cases of death per 100,000 population of Malaysian citizen.

To add more, data from WHO statistics published in 2011 in World Health Rankings reports that Malaysia reached 988 or 0.97% of total deaths out of 100,000 populations. Asthma is categorized as one of top 20 causes of death in Malaysia (World Health Rankings, 2011).

### **2.2.2 Children's knowledge towards healthcare and asthma**

A study has been done in 2011 by Omar T.D, Mohamed I.M.I, & Anna C.A, (2011), the knowledge of children about healthcare is limited. The children involved in the study were from the age of 11 and 12. The results show that out of maximum point score of 12, they scored 7.725. This shows that the children do not know really about asthma.

Another survey conducted by the author of the previous version of Bronchi Talisman shows that out of 50 respondents, the percentage of the children who have lack of knowledge in asthma is more than 50%. This result tells that the Malaysian children do not know very much about asthma.

### **2.3 Mobile applications**

Mobile applications also known as mobile app are applications developed for small handheld devices such as mobile phones, smartphones and PDAs. Mobile apps can come preloaded on the handheld device as well as can be downloaded by users from app stores or the internet. Furthermore, mobile apps usually help users by connecting them to Internet services more commonly accessed on desktop or notebook computers, or help them by making it easier to use the Internet on their portable devices.

### **2.3.1 Advantages of Mobile Game-based learning for Children**

- **Enhances abilities on decision making**

Learning via games has its plus points. By doing some reasoning for the solution needed for games, children will use their thinking abilities which can improve their intellect as well. Furthermore, children can develop their cognitive abilities through playing games. Kebritchi and Hirumi (2008) explain that game-based learning is much more effective for learning process as they use action instead of explanation. This aids the children to understand more in an interactive way.

- **Good use of ‘dead time’**

Boyes (2011) said that mobile learning can happen during ‘dead time’ or time in which someone or something is inactive or unable to act productively. While travelling or waiting for public transport to come, the users can access the mobile apps anytime and anywhere provided there is internet access.

### **2.3.2 Advantages of using Android to develop application**

- **Low barrier to entry (not credible)**

Android has a low barrier to entry. There are no pricey licensing fees or development tools. In fact, it is probable to build applications without spending a dime. The main costs fall into three categories: development and testing expertise, royalty fees (if the developer decides to distribute using third party app stores), and test devices. (Conder and Darcey, 2009).

- **Open source software**

The source code is open to the general public. Developers are free to access whatever sections of the Android code they might want for their application, through the Android Software Development Kit.

Because Android is open-source, the platform has many advantages for consumers and developers. The developers are free to create apps that improve on the operating system's standard features (Mies, 2010).

- **Ability to multitask**

Android can run multiple applications concurrently. This is supported by Meier (2012) that, Android enables the devices to run few applications and services in background while the mobile is being used for other applications. For example, while the user is streaming the music player, the mobile is running other services like email or messaging applications at the same time. Android gives the similar opportunities for all applications and developers.

## **2.4 Previous version of Bronchi Talisman**

This version consists of a game that includes several stages. The game is educating the user about:

- Identifying and avoiding asthma triggers
- Asthma zone in Asthmatic Action Plan (Green for doing well, Yellow for getting worse and Red for medical alert.)
- Measuring and monitoring peak flow

Some of the interfaces for the previous version of Bronchi Talisman:

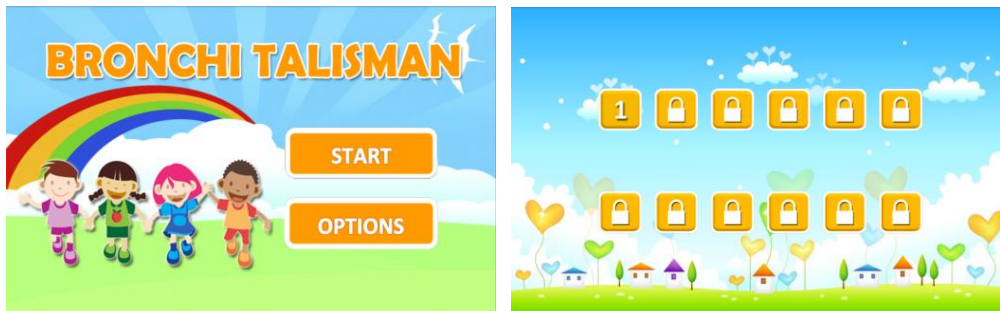


Figure 3: Main Scene and Level Scene

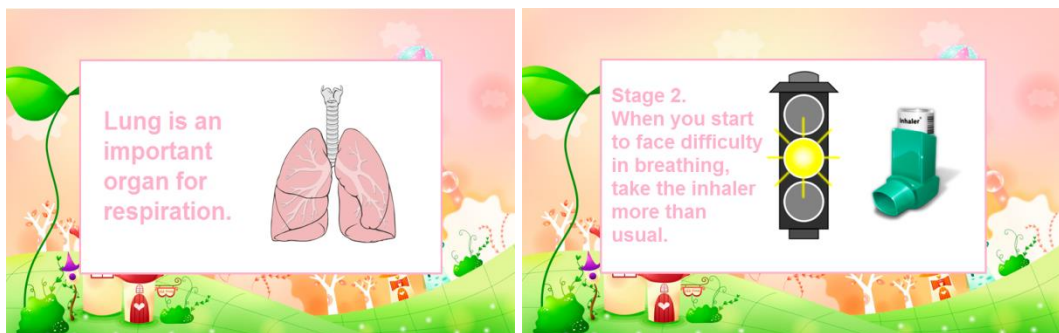


Figure 4: Information Scene

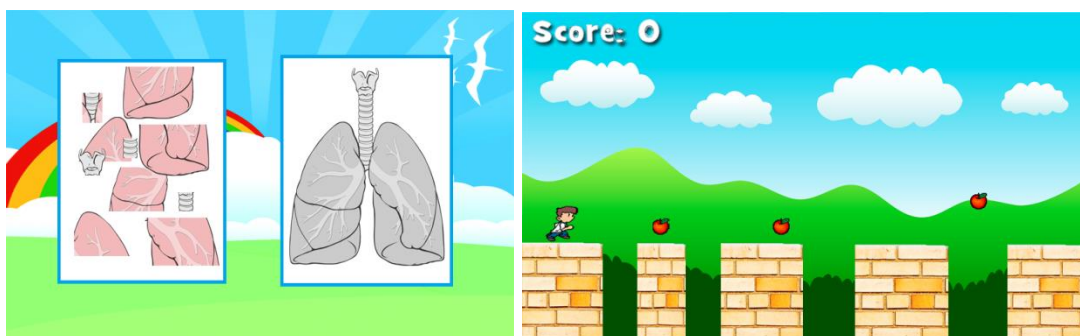


Figure 5: Game Scene

## **2.5 Extended version of Bronchi Talisman**

For the extended version of Bronchi Talisman, the user interfaces will be changed and the game will be divided into two: Game 1 and Game 2. For the Game 2, the game is actually taken from the previous version of Bronchi Talisman.

In addition, this extended version will include guides for the parents to learn more about asthma.

For Game 1, the user will be able to learn about:

- Types of asthma triggers
- The location where the triggers are normally found
- What the user needs to do with the asthma triggers

In addition, this extended version will include guides for the parents to learn more about asthma. The guides will include basic information about asthma, asthma triggers; asthma symptoms and what to do during asthma attack.



## CHAPTER 3

### METHODOLOGY

#### 3.1 Application Architecture

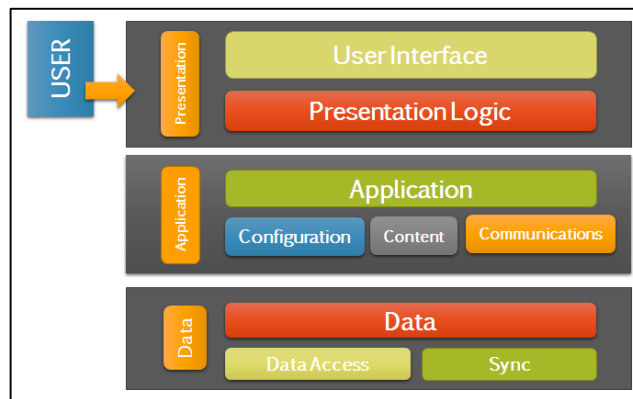


Figure 6: Architecture of the application

Figure 6 shows the architecture for the game based mobile application, Bronchi Talisman. The architecture consists of several layers. They are Presentation, Application and Data layer. The presentation layer consists of user interface and presentation logic. This is the layer that will be presented to the user of this game.

For the application layer, it consists of configuration, content and communications. This layer acts as the middle layer between the presentation and data layer. Plus, this layer transfers data from the data layer to the presentation layer.

For the data layer, it consists of data access and sync. All the data will be kept and synced by the server.

#### 3.2 Project Methodology

The project is developed using the agile methodology as it is the most practical methodology in mobile development. Unlike the traditional software development approach, in agile the developer can revisit the complete Software Development Life Cycle as a result of providing iterative incremental work that is shippable at the end of

every iterative piece. Thus, it saves cost, time and efforts by following iterative incremental work delivery and thereby identifying deviations early.

The agile methodology comprises of four vital components, namely:

- Incremental  
Working software over comprehensive documentation.
- Cooperation  
Customer collaboration over negotiation.
- Straightforward  
Individuals and interaction over process and tools.
- Adaptive  
Responding to change over following a plan.

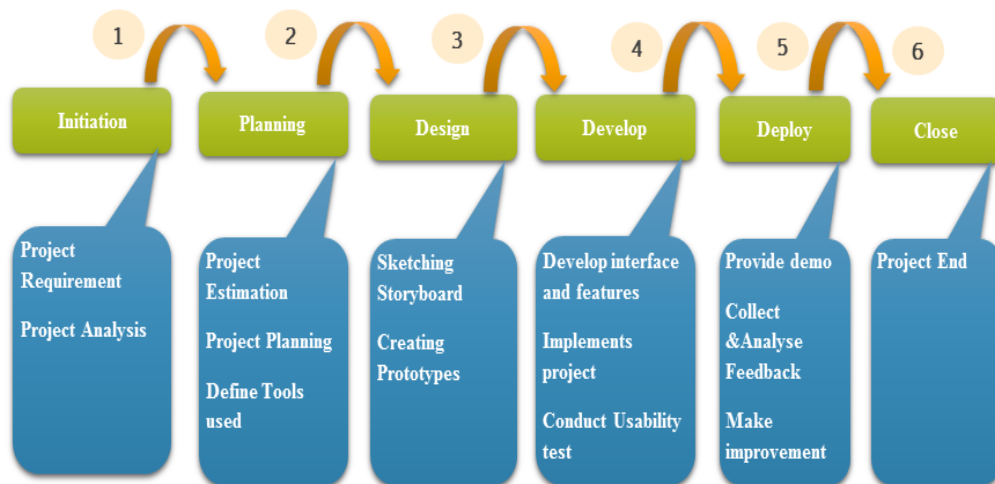


Figure 7: Agile Methodology

### 3.2.1 Project Initiation

Project initiation is the first phase of the methodology. In project initiation the requirements of the projects were discussed and were documented. During this phase, the target user and the scope for this application were defined and analysed.

The analysis of the project is done in the project initiation phase to find out the requirements for developing this application.

Categories	Requirements
Mobile Application	<ul style="list-style-type: none"><li>• The applications should be supported by the various type of Android</li><li>• There are no bugs or errors exist in the game developed</li></ul>
Design	<ul style="list-style-type: none"><li>• The image and language should suit the children of age 5-11</li><li>• The animation should be interactive and understandable</li><li>• The target user should be able to solve the game</li><li>• What application can do? – Play games, provide asthma guides to the parent</li></ul>
Additional	<ul style="list-style-type: none"><li>• The games application can be played by the kids and teenagers</li></ul>

Table 5: Project Requirements

### 3.2.2 Project Planning

Project planning is the second phase for the project described in the methodology. In this phase, the estimated time and cost for the project, the software used and the software language was defined.

#### 3.2.2.1 Time Estimation

The project was estimated to be completed by in May 2014.

#### 3.2.2.2 Cost Estimation

Google Apps Accounts = 25 USD (RM75)

Documentation = RM50 (Printing, binding, hard cover)

### **3.2.2.3 Software used**

#### a) Eclipse

Eclipse is being used as the main software for the mobile development. This is because Eclipse provides a better environment and plug in for the mobile development compared to other mobile development software. This software is open source software thus it is free to be downloaded. The project will use Eclipse Indigo version 3.7 with Mobile Plugin for Android.

#### b) Java

The project is developed mainly using Java. Java was designed to enable the applications of the developers' runs flexibly regarding any platform they used. This is called as the WORA abbreviations which mean "write one, run anywhere". This means the compilation of the applications will only occur once and the applications runnable on any platform as mobile platform.

### **3.2.3 Project Design**

The third phase of the project is to come out with a proper design for the game based mobile application. Suitable background music and sound effect for this game were selected in this phase as well.

The project used Storyboard to show the flow of the games, Photoshop to create the multimedia image and Popup application to create the simple prototype of the game. There were 12 stages planned for this game. This game used the concept of adventure where there is a story behind for each stage. Current games that use the same concept and became tremendously popular are Angry Birds and Candy Crush.

### 3.2.3.1 Use Case Diagram

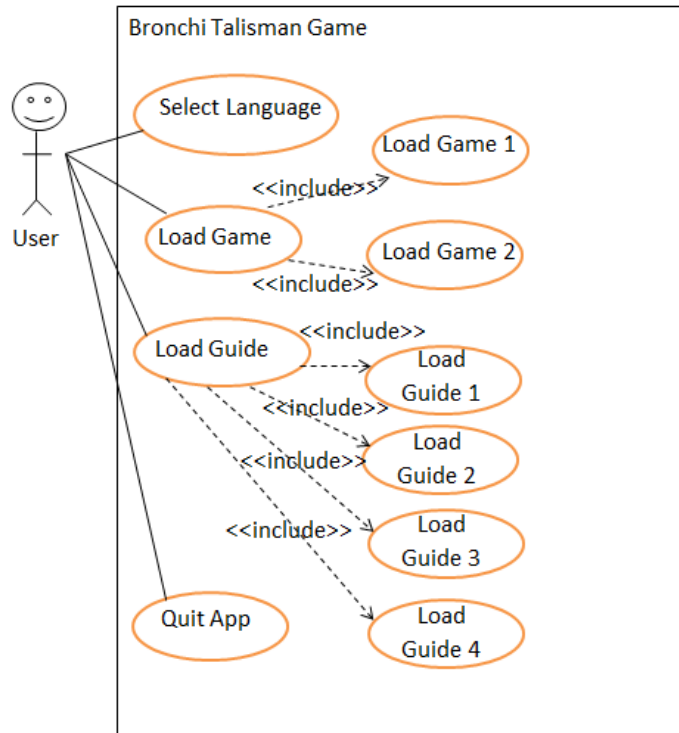


Figure 8: Use Case Diagram

### 3.2.4 Project Development

The fourth phase of the project is to start developing the system. Firstly, the author started by creating the General User Interface (GUI) of the game. After the interface has been completed, the author proceeded with the coding of the game.

#### **AndEngine**

As previously mentioned, the author is using Eclipse for Android to develop the application. However, Eclipse only is not enough for a game development as it is still considered as new to Android. Hence, the author used an extension known as AndEngine to ease the development of the game.

## Flow of Scene

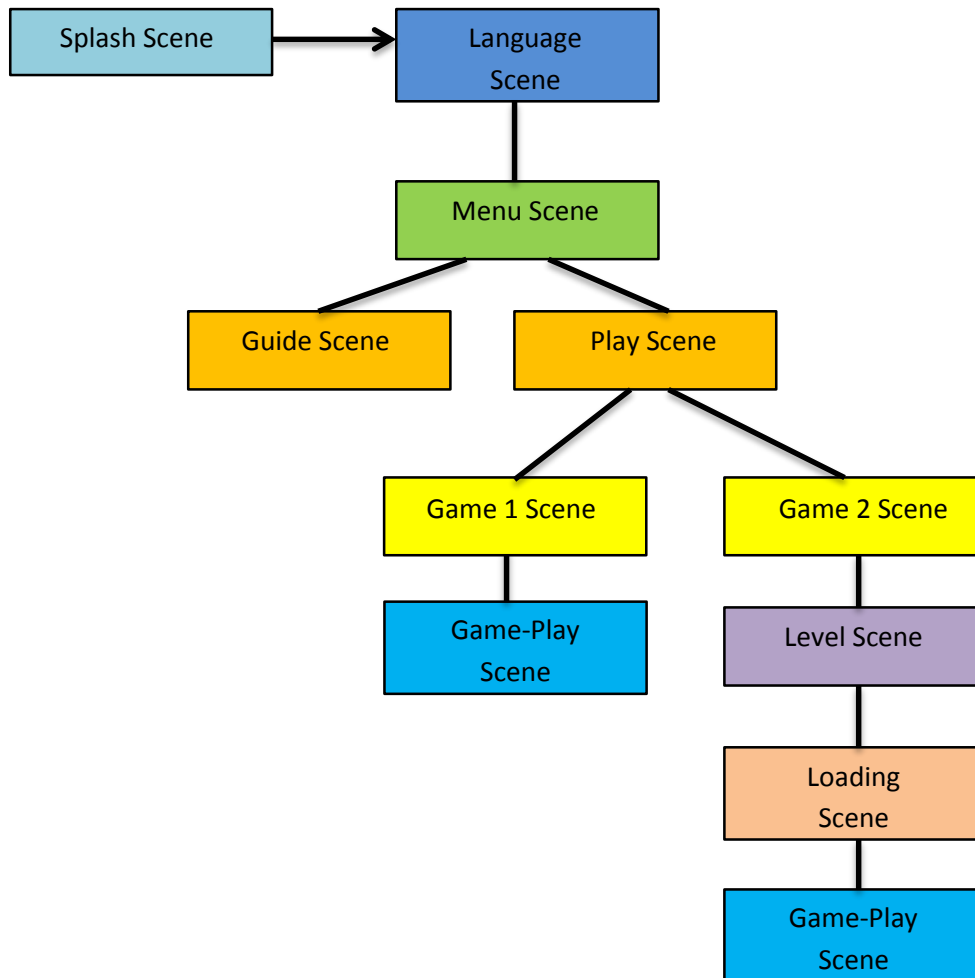


Figure 9 : Flow of Scene

Splash scene is the first screen that will appear when the user opens the game. It will show the logo of UTP. The language scene will then ask the language of the game. Menu scene will show the menu with two buttons which is Play and Guide. The play scene will lead to game 1 scene and game 2 scene. Game 2 scene will lead to level scene where the levels are shown while loading scene will show the loading of the game. Game-Play scene is the screen for playing the game.

### **3.2.5 Project Deployment**

For this phase, two types of test were done for the project which are system and usability test. The system test was done individually by the author while the usability test was done with the selected target users which include the parents and the asthmatic kids.

Once they have tested the game, a survey was conducted to meet the second objective. The purpose of the survey to be carried out is to study the effect of using mobile game application to the asthmatic children and parents.

A group of 5 respondents will be identified and will be approached to do the survey. The group of respondent are the asthmatic kids (age range from 5 to 11 years old). The survey will include questions about basic knowledge of asthma, asthma symptoms, triggers and asthma prevention and treatment. This is to find out whether this mobile game application has been to help them be more aware about asthma and the ways to manage this disease. The findings of the survey will be analysed and necessary information will be gathered and will be evaluated.

Based on the data gathered from the survey, improvement will be made to the application. This is to fix any defect found by analysing the data from the survey. The updated version of the mobile game will be released through the Google Play application on Android.

### **3.2.6 Project Closing**

The closing phase was done in April 2014. All the discussion and findings were documented. All the documentation were compiled and submitted as in dissertation.

## **CHAPTER 4**

### **RESULTS AND DISCUSSION**

#### **4.1 Application's Overview**

For the extended version of Bronchi Talisman, the user interfaces will be changed and the game will be divided into two: Game 1 and Game 2. For Game 2, the game is actually taken from the previous version of Bronchi Talisman. This game consists of several stages where the user needs to collect things that are good for asthma and avoid the triggers which are bad for asthma.

In addition, this extended version will include guides for the parents to learn more about asthma.

##### **4.1.1 Splash Scene and Language Selection Scene**

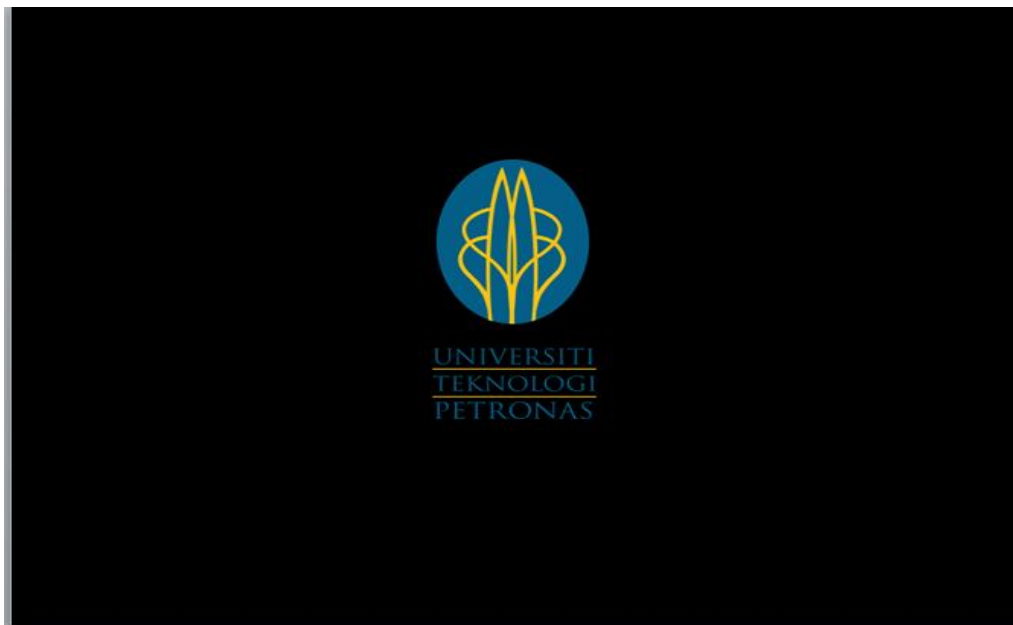


Figure 10: Splash Scene



Splash scene appears when the game started. The existence of the splash scene is to hide the process of loading resources that happened behind the scene. After the resources is successfully loaded, the splash scene dispose and language scene appear.



Figure 11: Language Scene

Figure 10 above shows the language page for the application. For this version, two languages are available for the user to choose from: English and Bahasa Melayu. Once the user had chosen the language preferred, the application will load the language and proceed to either the Options for Game Page or Guide for Parents Page, depending on the previous option that had been chosen by the user.

#### 4.1.2 Application Home Scene and Guide Scene



Figure 12: Application Home Scene and Guide Scene

The figure on the left shows the home page for the extended version of Bronchi Talisman. As the main target user is kids from the early age of 5 until 11 plus the parents, no login page is included in this version to make it user-friendly. The interface is more straightforward and the navigation is easier to be used even for the first time user. For the home page, the user can choose to play the game or go the guide for the parents. Hence, this application is suitable to be used by the parents of the asthmatic kids as well. After the user had chosen either one of the two options, the application will load all the information needed and proceed to the language page.

### 4.1.3 Game Selection Scene, Game 1 and Game 2 Scene

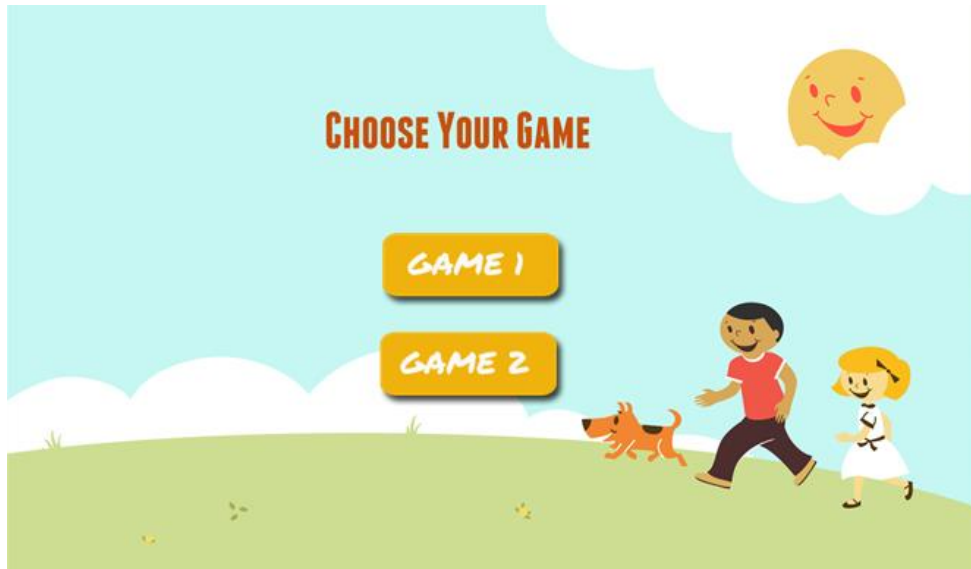


Figure 13: Game Selection Scene

For the game selection scene, there will be two options can be chosen. The users can choose to either play Game 1 or Game 2.



Figure 14: Game 1 Scene

For the Game 1 Scene, it will be showing a house with several places: Office, Den, Bedroom, Bathroom and etc. For this game, the user will need to drag the icons of asthma triggers located at the bottom of the page to the right location where they are normally found.

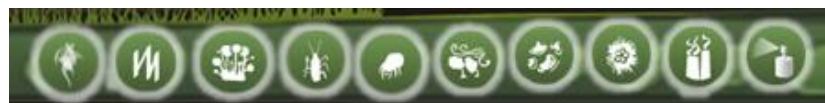










Figure 15: Icons of asthma triggers

Icon of asthma trigger	Explanation
	Name : Smoke Location : Outside and inside the house
	Name : Chalk Dust Location : Around chalkboards at home or school
	Name : Mold Location : Damp areas in the bathroom or kitchen
	Name : Cockroach Location : Behind refrigerators, under sink, anywhere that food is left out
	Name : Dust mites Location : Pillows, sheets and blankets, rugs, carpets, furniture, stuffed animals
	Name : Cold air Location : The air, cold weather
	Name : Pet Dander Location : Wherever furry animals and birds are found
	Name : Pollution Location : Outside


	Name : Strong smells Location : Household cleaning products, hairspray, perfume, air freshener
---	---

Table 6: Icons of asthma triggers and the location where the triggers are usually found

Once the user managed to drag the icon to the right location, a pop-up will show the name of the trigger and the location it is normally found. Then, a pop-up box will show what the user needs to do with the trigger.



Figure 16: Pop-ups showing the name and location of the trigger and what to do with the trigger

For Game 2 scene, there will be about 12 stages of this game. This Game 2 is taken from the previous version of Bronchi Talisman and included in the current version.

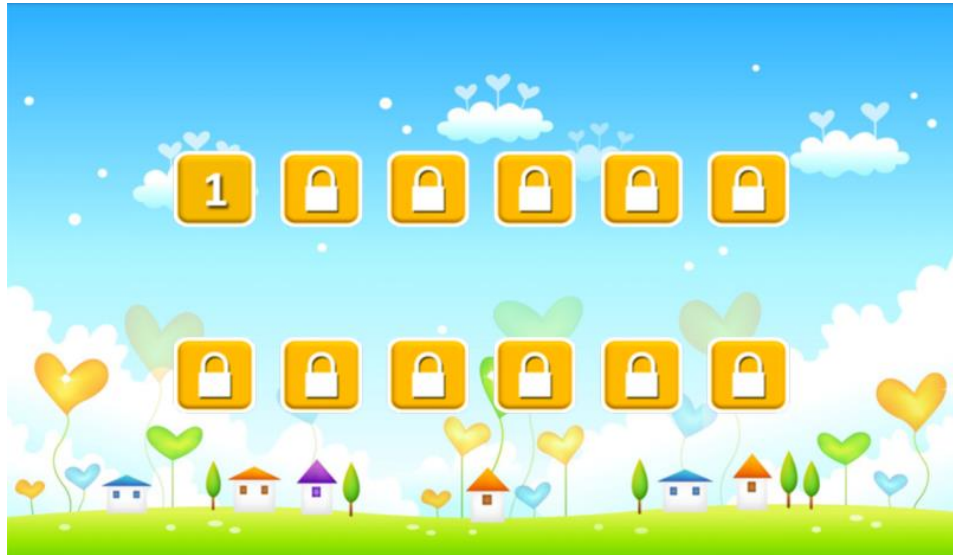
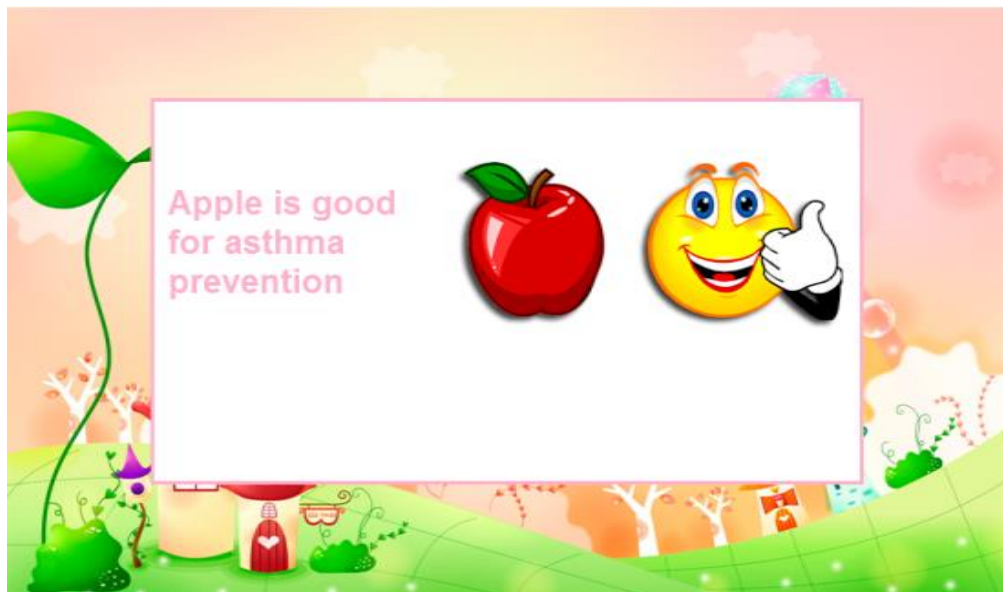


Figure 17: Level Scene



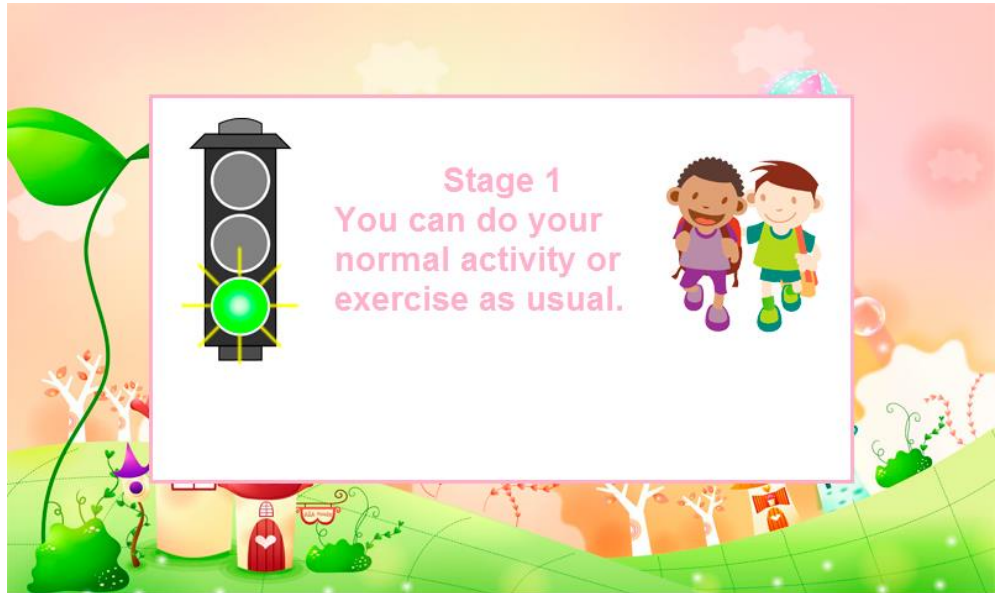
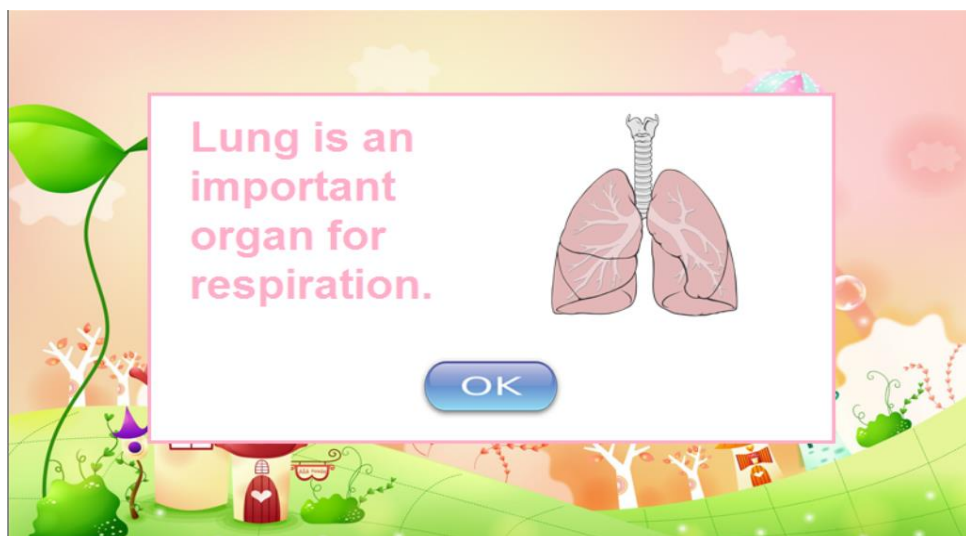


Figure 18: Information Scenes

The information scene shared the information about the asthma management plan and asthma action plan. The scene appears before the game scene and will disappear after the stipulated time ends. Each of the information scenes is related with the mission of each game accordingly.



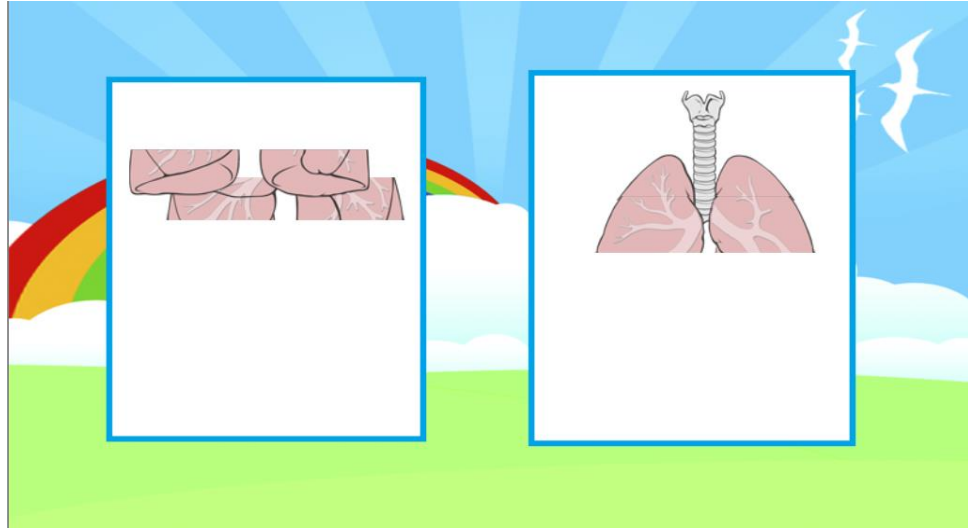


Figure 19: First Stage Game Scene

Figure above shows the first stage of the game. The player needs to match the picture in the left box with the right box to complete the lung diagram. The main reason for this game is to introduce the basic information about asthma to the user as for this stage, the user were introduced with the most important organ for respiration that is lung.

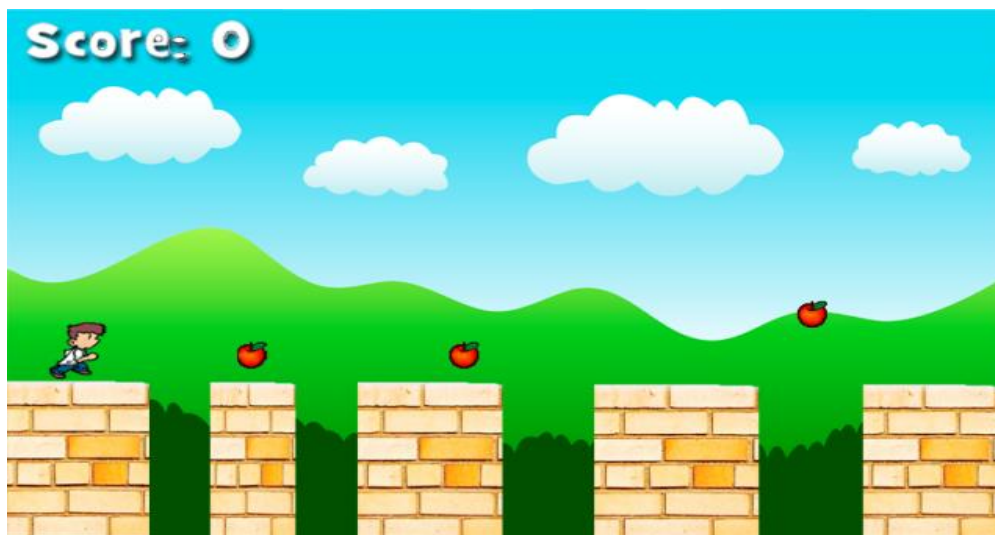


Figure 20: Stage 1 Scene

For early stages of the game, the player will be given a mission to collect things which are good for asthma (e.g. apples). In order to complete each mission, the



player needs to collect the talisman that exists at the end of the stage. The player also needs to jump to avoid himself from falling into the cliff. If the player falls, the user failed to complete the mission and need to repeat again.

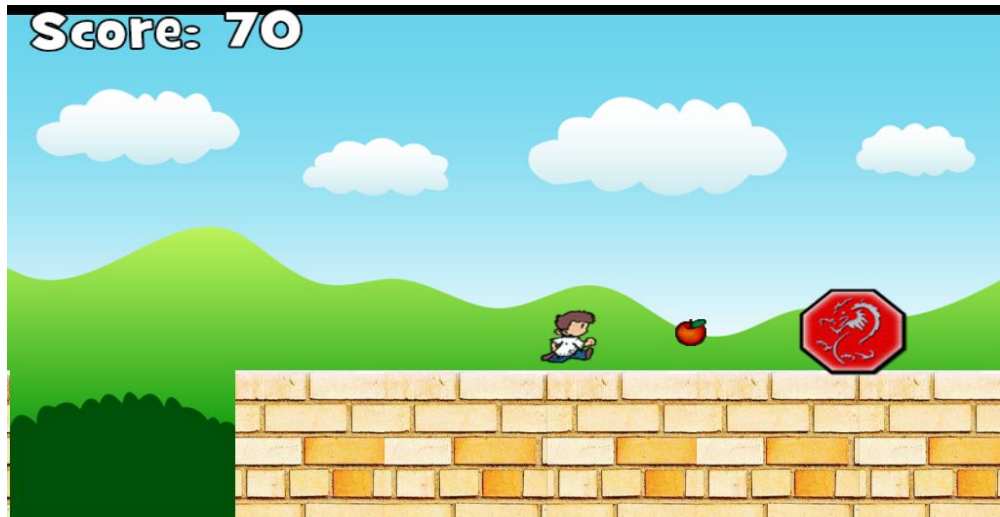


Figure 21: Getting the talisman

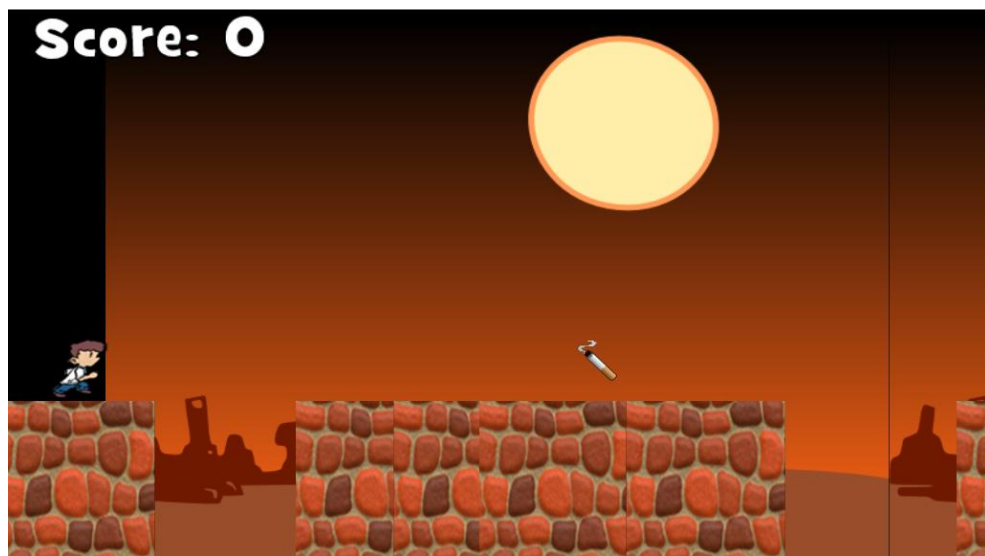


Figure 22: Stage 4 Scene

Then, as the player proceeds to the later levels, a different mission will be given where the player will need to avoid from triggers which are bad for

asthma (e.g. cigarettes). If the player hits the trigger, the user failed the mission and needs to repeat again.

#### 4.1.4 Guide for Parents Scene



Figure 23: Guide for Parents Scene

Figure 21 shows the guide for parents page which can be referred by the parents of the asthmatic kids. The guides will include basic information about asthma, asthma triggers; asthma symptoms and what to do during asthma attack.

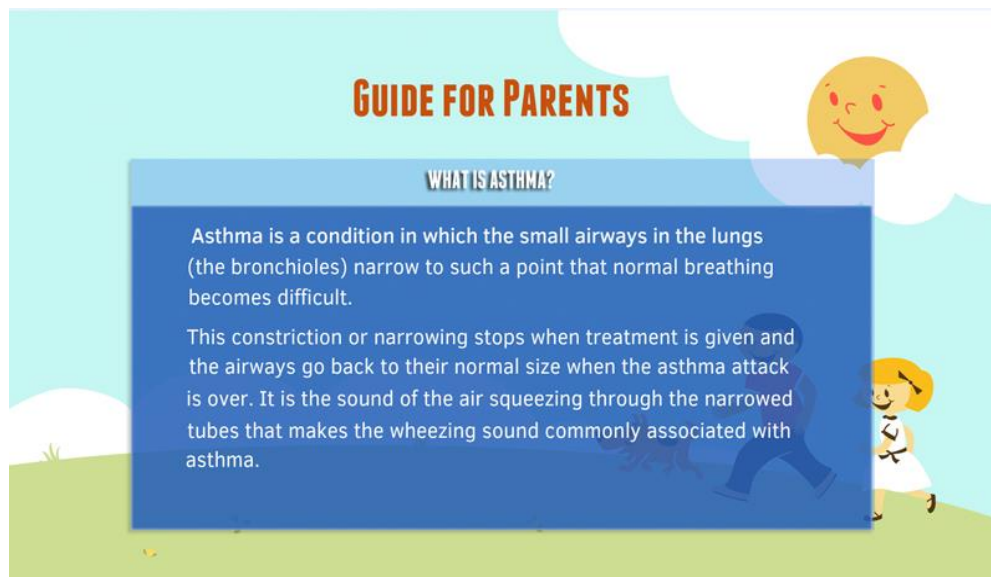




Figure 24: Scenes about asthma and asthma triggers

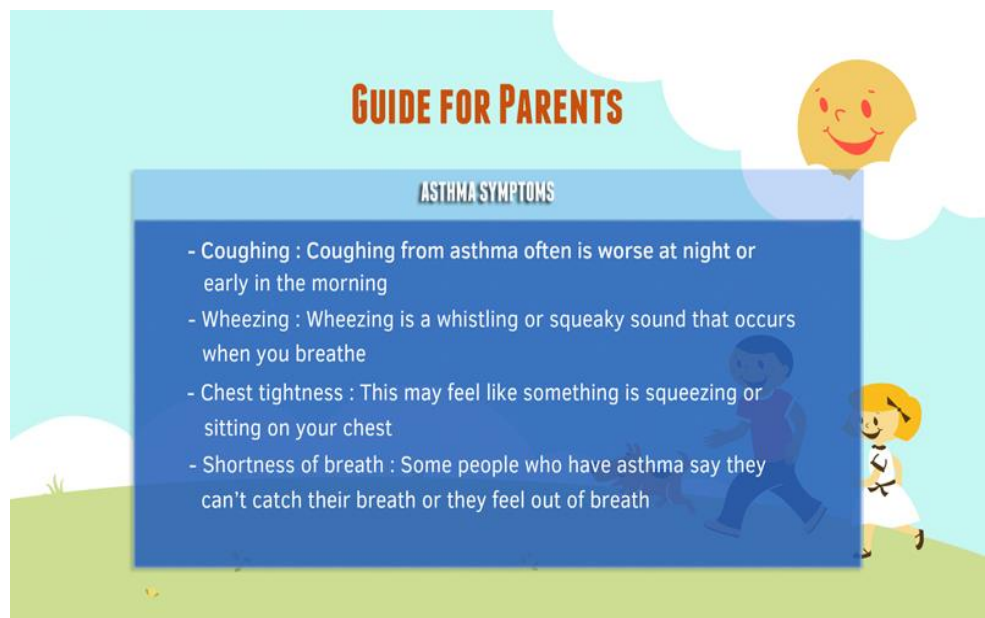




Figure 25: Scenes about asthma symptoms and what to do during asthma attacks

#### **4.2 Discussion of Findings**

A set of questionnaire were distributed to 5 participants on the 9<sup>th</sup> week at Tronoh, Perak and via online form. There are two sets of questionnaire (see appendix 5 and 6). One set is for the parents who have asthmatic children, while the other set is for the asthmatic children. The result of the survey are discussed in the next point.

#### 4.2.1 Age and gender of the Asthmatic Children

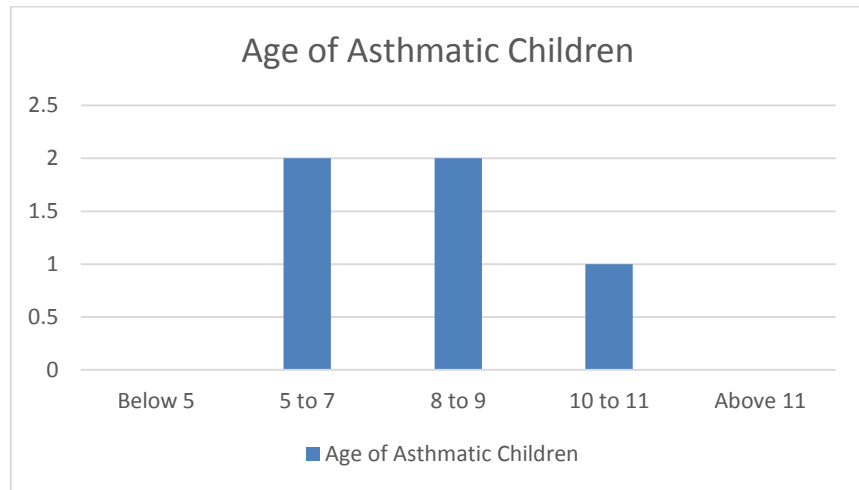


Figure 26: Age of Asthmatic Children Graph

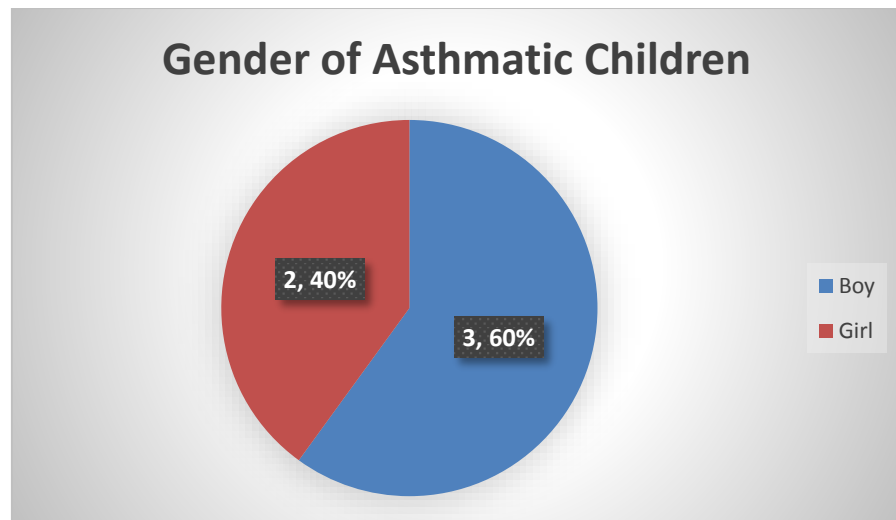


Figure 27: Gender of Asthmatic Children Chart

The results were from the sets of questionnaire for the asthmatic children. As shown, most of the asthmatic children are from the range of 5-11 years old. This is because, most of the cases were only found during that period due to the activity

of the children. At that age, the children are more active and their curiosity level is high. Hence, the symptoms are clearer to detect as they are prone to the triggers on the surrounding. Plus, from the survey conducted, the number of boys are greater than the girls.

#### 4.2.2 The Asthmatic Children Knowledge about Asthma

The results were from the sets of questionnaire for the asthmatic children. The question asked simple information about asthma that the asthmatic children should know. Some of the questions are

1. Do you have asthma?
2. What is the organ related with asthma?
3. Do you know about asthma triggers?

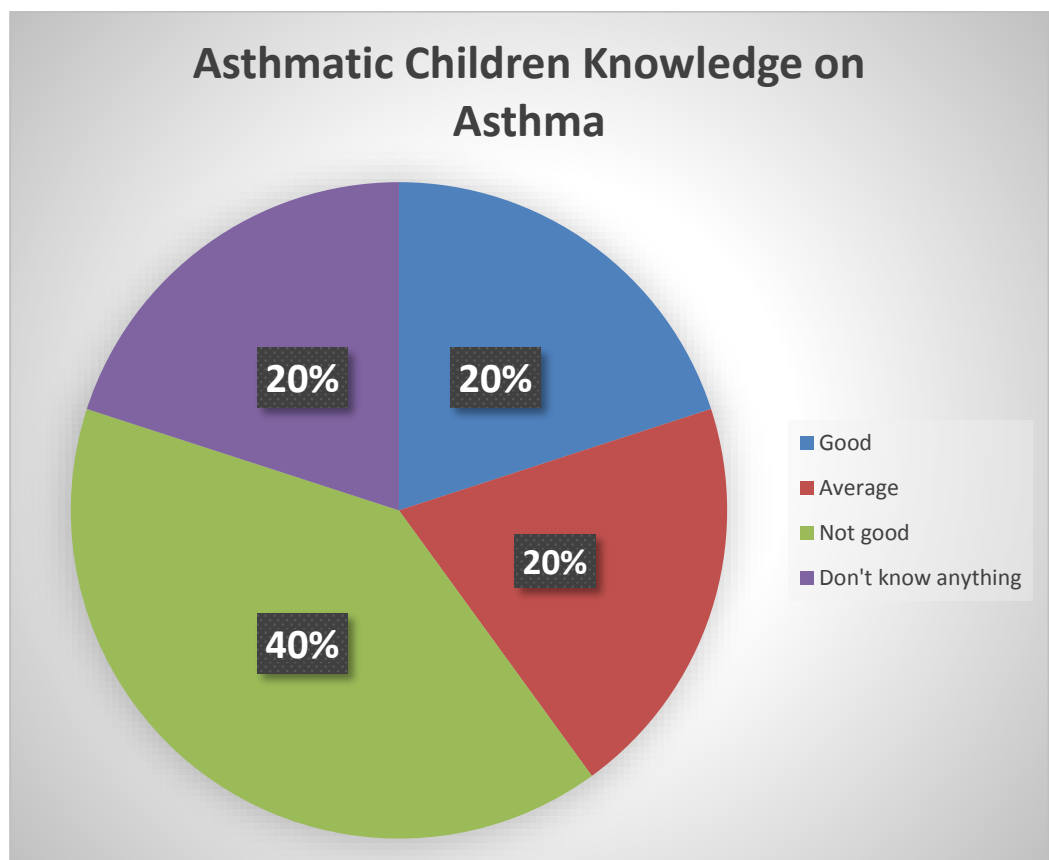


Figure 28: Asthmatic Children Knowledge on Asthma Graph

Based on the chart, the percentage of children that have lack of knowledge in asthma is more than 50%. 40% of them do not know much about the disease and 20% of them have no idea at all about asthma. Only 20% of them have good knowledge in asthma and the other 20% know average information about asthma.

#### 4.2.3 The Parents Opinion about Education Mobile Games to Children

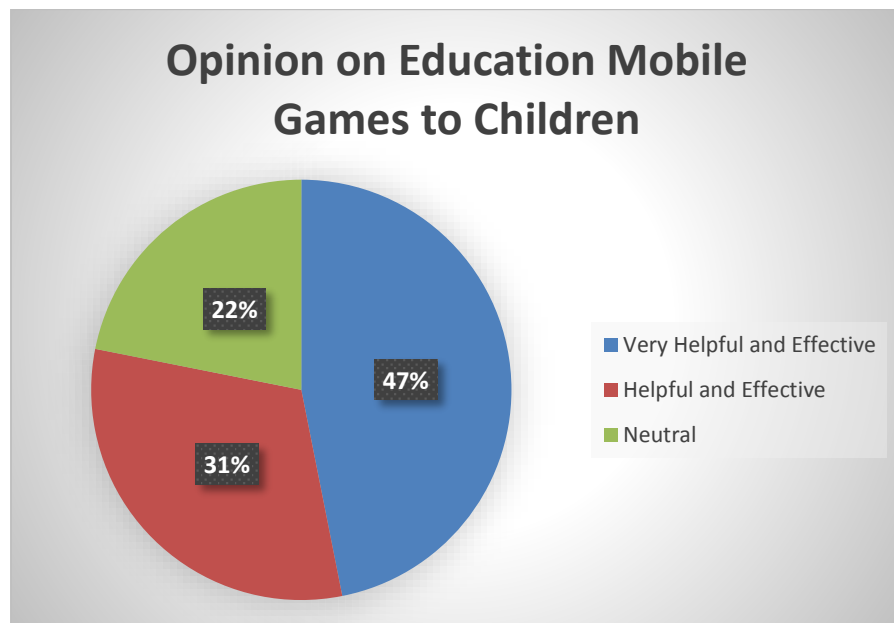


Figure 29: Opinion on Education Mobile Games to Children Graph

According to the survey, 78% of the respondent agree that education mobile games are beneficial in helping them to teach their children about asthma. Moreover, they also agree that education mobile games is one of the effective medium for education in this era where technology are much more advanced than before. 22% of the respondents have neutral opinion about education mobile games. This is because, for them any method for teaching is good and the results of the teaching depend on the learner itself.

### 4.3 System Evaluation

There are two types of testing that has been done in the project that are system and usability testing.

#### 4.3.1 System Testing

System testing is done after the integration of the all the scenes which are the splash, menu, guides, stages, loading and game scene. The game was run on the Samsung Galaxy S Advance with Gingerbread Android Version. The results of the test are shown below

Types of testing / Result	Pass	Fail	Remarks
<b>Scene Movement</b>			
Splash -> Menu	/		
Menu -> Play	/		
Play -> Loading	/		
Loading -> Game 1	/		
Loading -> Game 2	/		
Game 2 -> Stages	/		
Menu -> Guide	/		
Guide -> Guide 1	/		
Guide -> Guide 2	/		
Guide -> Guide 3	/		
Guide -> Guide 4	/		
<b>Resources Loading</b>			
Loading of item for each scene	/		
Item loaded from resource folder	/		
<b>Design</b>			
All buttons are functioning	/		
Image appear correctly	/		

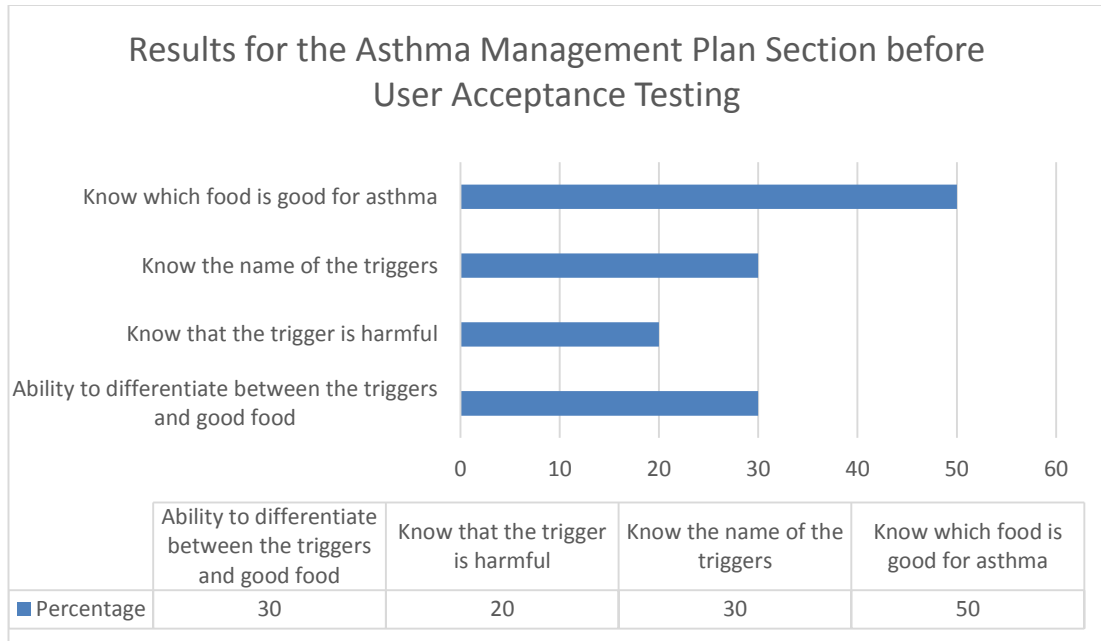


Image does not get distorted	/		
Location of all the items appeared correctly	/		
<b>Game</b>			
All finished game are playable	/		
The flow of the stages move in correct order	/		
Manage to go to the next stage after mission accomplished	/		
<b>System</b>			
Can exit the game properly	/		
No system crash	/		

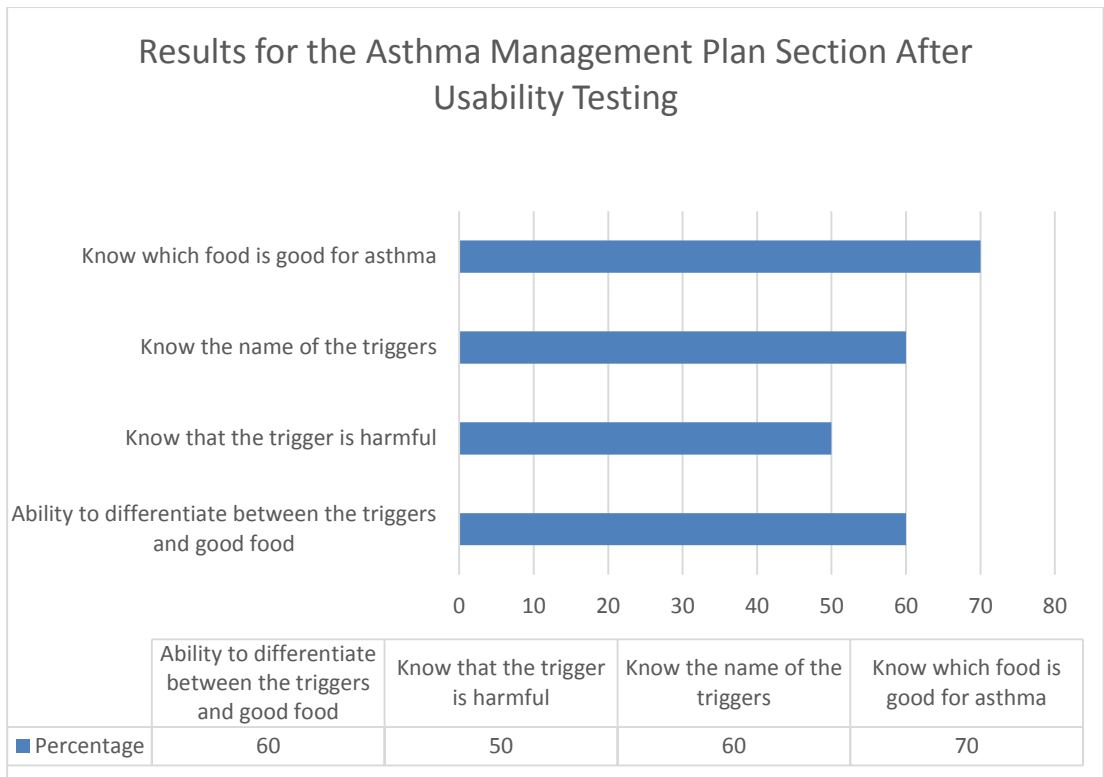
#### 4.3.2 Usability Testing

The testing was done with the asthmatic kids. Each of the asthmatic children was given a specific time for them to play the game based from their age. Children aged 5-7 of age were given maximum of 1 hour and 20 minutes, children aged 8-9 were given maximum of 1 hour and children aged 10-11 of age were given maximum 40 minutes. The differences in time were meant to suit their ability to understand and learn how to play the game. Within the stipulated time, they were able to play the game from stage to stage and repeat any stage that they want. The parents were also involved in testing the application. After that, the children and the parents were given the questionnaire to be answered. The questionnaire was meant to test again their knowledge on asthma prevention and treatment and consisted the questions related to asthma action plan, asthma management plan, and design of the game and the attractiveness of the game. The result of the testing is as follow.

## Effectiveness



**Figure 30: Results for the Asthma Management Plan Section before User Acceptance Testing**



**Figure 31: Results for the Asthma Management Plan Section after Usability Testing**

The section of asthma management plan asked the children to differentiate the triggers with the food that is good for asthma. Hence, based from the results gathered, it can be seen that the project managed to improve the knowledge about asthma. They learned about the existence of triggers and know what food to eat to manage their asthma.

## Design and Attractiveness of the game

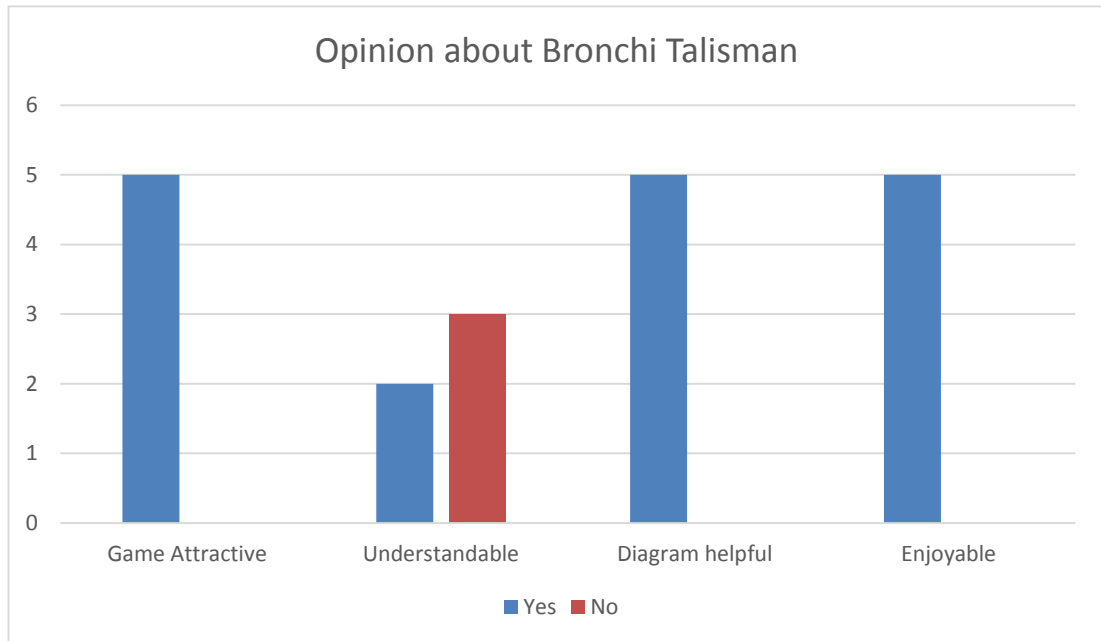


Figure 32 : Results for the Opinion on Bronchi Talisman

This section asked about the children opinion about the design and attractiveness of the game. Since the children are aged from 5-11 years of age, the author decides to use yes or no question which is easier to be answered by them. All of the children and parents agreed that the game is joyful, attractive and the diagram is helpful for them.

The last question found out that all of the children would like to continue to play the game. Therefore, the author took the email address of the children or their parents in order to share the link of the full version game once the game is uploaded in the Google Play.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATION**

With the alarming number of asthma cases, particularly in Malaysia, knowing the symptoms and how to get better control of asthma is important. Learning about the disease itself or asthma education is not only crucial for the person diagnosed but also for everyone involved in the patient's life. Having mobile applications that can educate about this disease would be able to assist the patients, especially the kids so they are able to obtain deeper understanding of this chronic disease.

Thus, Bronchi Talisman is seen to be a tool to educate and boost the awareness of the community starting from their childhood about asthma prevention. As stated, there are two objectives that will be achieved in the project. The author succeeds in achieving the first objective that is to develop the asthma mobile application game. The game is in progress of adding more stages and being improved technically in order to solve the loading resources lag. The second objective is to study the effect of using mobile game application to the asthmatic children and parents. To meet the second objectives, the author had conducted a user acceptance testing session with selected asthmatic kids and their parents. Before the session started, a survey was given to them which included questions about basic information about asthma, asthma symptoms, triggers and asthma prevention and treatment. Once the user acceptance testing was done, another survey was given to test again about their knowledge on asthma treatment and prevention. The results shown that, after the users played the game, their knowledge on asthma treatment and prevention increased significantly.

The future plans for this project is too add animation videos that would teach the kids about using the asthma devices and other crucial information about asthma. Moreover, the games could also be expanded to cover other diseases like diabetes as it is one of the chronic diseases in Malaysia as well.

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## APPENDICES

### Appendix 1 - Project Gantt chart FYP 1

Task	Start Date	End Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Project Title Confirmation</b>	11-Oct-13	11-Oct-13		*												
<b>Project Initiation</b>	11-Oct-13	25-Oct-13														
Define and analyze the target user and objectives of project	12-Oct-13	14-Oct-13		*												
Selecting the suitable platform for the project	14-Oct-13	15-Oct-13														
Selecting the suitable type of project delivery	15-Oct-13	16-Oct-13														
Define project scope	16-Oct-13	19-Oct-13														
Determine application outline	19-Oct-13	22-Oct-13														
List down project requirements	22-Oct-13	24-Oct-13														
<b>Project Planning</b>	24-Oct-13	31-Oct-13														
Estimating the time taken to complete project	24-Oct-13	26-Oct-13				*										
Selecting the tool to be used	26-Oct-13	27-Oct-13														
Selecting the programming language to be used	27-Oct-13	28-Oct-13														
Prepare Extended Proposal	28-Oct-13	30-Oct-13														
<b>Submission of Extended Proposal</b>	30-Oct-13	30-Oct-13					*									
<b>Project Design</b>	31-Oct-13	8-Dec-13														
Sketching the storyboard for the game	31-Oct-13	10-Nov-13														
Designing the interface using Photoshop	10-Nov-13	1-Dec-13							*							
Prepare for Proposal Defense	1-Dec-13	4-Dec-13														
<b>Proposal Defence</b>	4-Dec-13	4-Dec-13										*				

\* **Project Milestones**



Task	Start Date	End Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Continue designing the interface using Photoshop	5-Dec-13	9-Dec-13														
Selecting the background music and sound effect for the game	9-Dec-13	12-Dec-13														
Prepare Interim Report	12-Dec-13	18-Dec-13														
<b>Submission of Interim Report</b>	18-Dec-13	18-Dec-13												*		
<b>Project Develop</b>	19-Dec-13	29-Dec-13														
Creating improved prototype of the game	19-Dec-13	23-Dec-13														
Finalizing the storyboard flow	23-Dec-13	28-Dec-13														
Start developing the interface of the game	28-Dec-13	5-Jan-14														

\* **Project Milestones**

## Appendix 2 - Project Gantt chart FYP 2

Task	Start Date	End Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
<b>Project Develop</b>	5-Jan-14	23-Feb-14	█																	
Continue developing the interface of the game	5-Jan-14	6-Feb-14	█																	
<b>Submission of Progress Report</b>	6-Feb-14	6-Feb-14				*														
Continue developing the interface of the game	7-Feb-14	16-Feb-14					█													
Insert audio to the game	16-Feb-14	23-Feb-14						█												
<b>Project Deployment</b>	23-Feb-14	23-Mar-14								█										
Make the system testing	23-Feb-14	25 Feb 14								█										
Release the Beta version for user acceptance testing	25-Feb-14	26-Feb-14								*										
Gather feedback and results from the test	26-Feb-14	28-Feb-14									█									
Evaluate the response	28-Feb-14	1-Mar-14										█								
Find the defect and the improvement that could be made	1-Mar-14	16-Mar-14											█							
Fix the defect	16-Mar-14	19-Mar-14											█							
Release the updated version	19-Mar-14	19-Mar-14											█							
Prepare for pre-SEDEX presentation	19-Mar-14	24-Mar-14											█							
<b>Pre-SEDEX</b>	24-Mar-14	24-Mar-14													*					

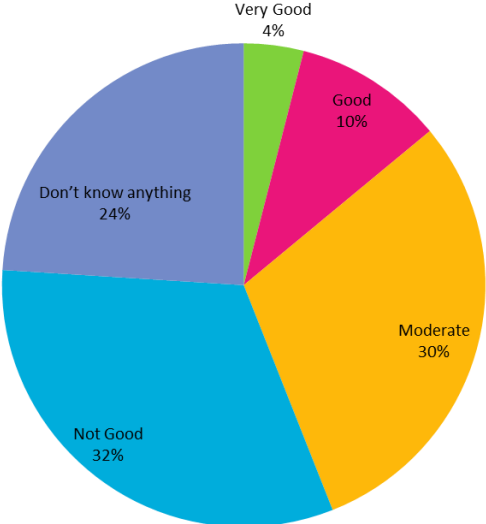
\* **Project Milestones**

Task	Start Date	End Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>Project Closing</b>	25-Mar-14	30-Apr-14																
Documents all the results and discussion made	25-Mar-14	27-Mar-14																
Conclude the findings	27-Mar-14	27-Mar-14																
Final checkup for any error in the report	27-Mar-14	28-Mar-14																
Compile all the reports into one dissertation	28 Mar 14	31-Mar-14																
<b>Submission of Draft Dissertation</b>	31-Mar-14	31-Mar-14												*				
Finalize the dissertation and technical paper	1-Apr-14	7-Apr-14																
<b>Submission of Dissertation and Technical Paper</b>	7-Apr-14	7-Apr-14													*			
Prepare the slide for final presentation	8-Apr-14	13-Apr-14																
Prepare the pitch for the final presentation	13-Apr-14	22-Apr-14																
<b>Viva</b>	22-Apr-14	22-Apr-14															*	
<b>Submission of Final Dissertation and Hardbound</b>	30-Apr-14	30-Apr-14																*

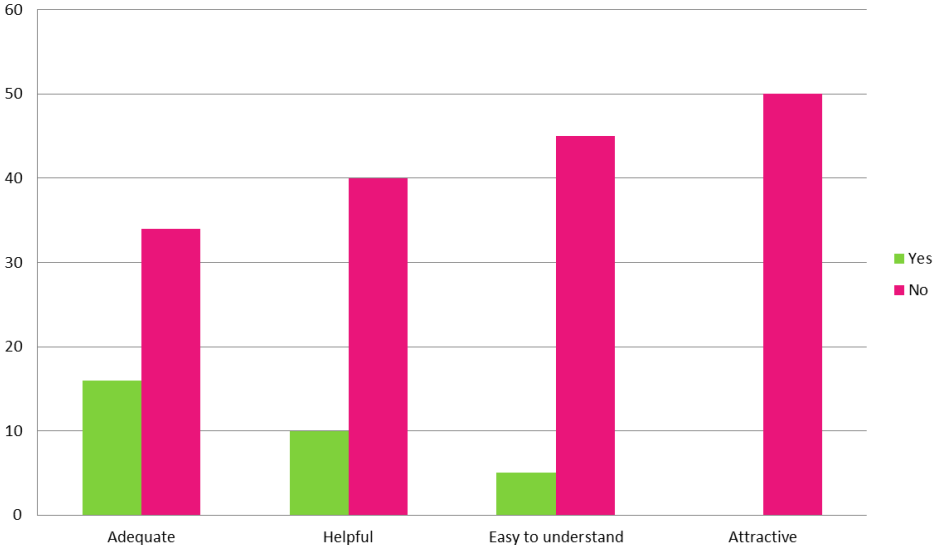
\* **Project Milestones**

**Appendix 3 – Results of survey done for previous version of Bronchi Talisman**

**Asthmatic Children Knowledge on Asthma**



**Opinion on Existing Asthma Material for Children**



## Appendix 4 – Asthma Action Plan

Asthma Action Plan

For: \_\_\_\_\_ Doctor: \_\_\_\_\_ Date: \_\_\_\_\_  
 Doctor's Phone Number: \_\_\_\_\_ Hospital/Emergency Department Phone Number: \_\_\_\_\_

**GREEN ZONE**

**Doing Well**

- No cough, wheeze, chest tightness, or shortness of breath during the day or night
- Can do usual activities

**And, if a peak flow meter is used,**

**Peak flow:** more than \_\_\_\_\_  
(80 percent or more of my best peak flow)

My best peak flow is: \_\_\_\_\_

Before exercise  \_\_\_\_\_  2 or  4 puffs \_\_\_\_\_ 5 minutes before exercise

**Take these long-term control medicines each day (include an anti-inflammatory).**

Medicine	How much to take	When to take it
_____	_____	_____
_____	_____	_____
_____	_____	_____

---

**YELLOW ZONE**

**Asthma Is Getting Worse**

- Cough, wheeze, chest tightness, or shortness of breath, or
- Waking at night due to asthma, or
- Can do some, but not all, usual activities

**-Or-**

**Peak flow:** \_\_\_\_\_ to \_\_\_\_\_  
(50 to 79 percent of my best peak flow)

**First** Add: quick-relief medicine—and keep taking your GREEN ZONE medicine.

\_\_\_\_\_  2 or  4 puffs, every 20 minutes for up to 1 hour  
(short-acting beta<sub>2</sub>-agonist)  Nebulizer, once

**Second** **If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:**

Continue monitoring to be sure you stay in the green zone.

**-Or-**

**If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:**

Take: \_\_\_\_\_  2 or  4 puffs or  Nebulizer  
(short-acting beta<sub>2</sub>-agonist)

Add: \_\_\_\_\_ mg per day For \_\_\_\_\_ (3–10) days  
(oral steroid)

Call the doctor  before/  within \_\_\_\_\_ hours after taking the oral steroid.

---

**RED ZONE**

**Medical Alert!**

- Very short of breath, or
- Quick-relief medicines have not helped, or
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone

**-Or-**

**Peak flow:** less than \_\_\_\_\_  
(50 percent of my best peak flow)

**Take this medicine:**

\_\_\_\_\_  4 or  6 puffs or  Nebulizer  
(short-acting beta<sub>2</sub>-agonist)

\_\_\_\_\_ mg  
(oral steroid)

**Then call your doctor NOW.** Go to the hospital or call an ambulance if:

- You are still in the red zone after 15 minutes AND
- You have not reached your doctor.

**DANGER SIGNS** ■ Trouble walking and talking due to shortness of breath ➔ ■ Take  4 or  6 puffs of your quick-relief medicine AND

■ Lips or fingernails are blue ➔ ■ Go to the hospital or call for an ambulance \_\_\_\_\_ NOW!  
(phone)

See the reverse side for things you can do to avoid your asthma triggers.

## Appendix 5 – Questionnaire for Parents (Data collection before development of the game)

# Asthma Education Mobile Game for Children

This survey is proposed in order to gather the information for the Final Year Project of a student in Universiti Teknologi PETRONAS.

The objectives of the study is

- a) To study the importance of asthma education in parents.
- b) To develop a mobile game application that will increase the awareness of the people starting from their childhood about asthma management.

### Basic Information

**1\*** Please select your relevant age of group

- 18 to 25
- 26 to 32
- 33 to 39
- 40 or above

**2\*** What is your gender?

- Male
- Female

**3\*** Please state your occupation.

- Government workers
- Private workers
- Own business

Other (Please Specify)

**4** How many children do you have?

**5** How many of them are asthmatic?

## Knowledge of Asthma Management Plan

**6** Rate the questions below.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Do you know how asthma happens?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you know about the asthma triggers?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you know about asthma symptoms?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Do you really know what to when your child has an asthma attack?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**7** Do you think that asthma education is essential to be taught for your asthmatic children?

- Yes
- No

**8** Does the doctor or health professional provide you with asthma management plan?

- Yes
- No
- Not sure

**9** Do you think the information in the asthma management plan is adequate?

- Yes
- No

**10** Does the asthma management plan is really helpful for you?

- Yes
- No

**11** Is it easy to understand the asthma management plan?

- Yes
- No

**12** Is it the asthma management plan attractive? (in terms of design, the flow)

- Yes
- No

## Mobile Application Option

**13** Do you or any of your family own a smartphone?

- Yes
- No

**14** Do you think that mobile application is good as an emerging medium for learning/ teaching?

- Yes
- No

**15** Rate the question below.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
What is your opinion if asthma education is taught using a game based mobile application?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**16** Comments / Suggestions

**Thank you.**



## Appendix 6 – Questionnaire for Children (Data collection before development of the game)

### Asthma Education Mobile Game for Children

This survey is proposed in order to gather the information for the Final Year Project of a student in Universiti Teknologi PETRONAS.

The objectives of the study is

- a) To study the importance of asthma education in children
- b) To develop a mobile game application that will increase the awareness of the people starting from their childhood about asthma management.

#### Basic Information

**1\*** Please select your relevant age of group

- Less than 5
- 5 to 7
- 8 to 9
- 10 to 11
- Above 11

**2\*** What is your gender?

- Male
- Female

#### Asthma History

**3** Do you have asthma?

- Yes
- No

**4** When was the last time you faced difficulty to breath?

- Yesterday
- Last week
- Last month
- Last year
- Other (Please Specify)

**5** Have you been admitted to hospital because of asthma?

- Yes
- No

## Basic about Asthma

**6** Do you think that asthma education is important for you?

- Yes
- No

**7** What is the organ that is related with asthma?

- Heart
- Brain
- Lungs
- Liver
- Other (Please Specify)

## Asthma triggers and protectors

**8** Do you know about the asthma triggers?

- Yes
- No
- Not sure

**9** Is trigger good?

- Yes
- No
- Not sure

**10** Please give at least one name of the asthma triggers that you know.

**11** Is smoking good or bad for you?

- Good
- Bad
- Not sure

**12** Is cockroach good or bad for you?

- Good
- Bad
- Not sure

**13** Is apple good or bad for you?

- Good
- Bad
- Not sure

**14** Is ice good or bad for you?

- Good
- Bad
- Not sure

**15** Is carrot good or bad for you?

- Good
- Bad
- Not sure

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## Asthma Action Plan

**1\*** Do you know how to use inhaler?

- Yes
- No

**2\*** How many step that you should follow to use the inhaler?

- 4
- 5
- 6
- Not sure

**3** Can you exercise like a normal person? (e.g. swimming, running)

- Yes
- No

**4** What you should do before you start exercising?

- Take the inhaler
- Drink a lot of cold water
- Wear improper attire
- Dont do anything
- Other (Please Specify)

**5** What do you do if you have an asthma attack? (Stage 3 of action plan)

- Sleep
- Take inhaler within 3 hours
- Call ambulance
- Other (Please Specify)

### Basic about Asthma

**6** Do you think that asthma education is important for you?

- Yes
- No

**7** What is the organ that is related with asthma?

- Heart
- Brain
- Lungs
- Liver
- Other (Please Specify)

### Mobile Application Opinion

**8** Do you or any of your family own a smartphone?

- Yes
- No
- Not sure

**9** What do you/ they usually do with their smartphone?

- Play games
- Social networking (Facebook, Twitter)

Other (Please Specify)

**10** Do you like to play game?

- Yes
- No

**11** If there is a game created especially for you about asthma education, will you play it?

- Yes
- No

Thank You.

## Appendix 7 – Usability Testing to the target user

### Basic Information

**1\*** Please select your relevant age of group

- Less than 5
- 5 to 7
- 8 to 9
- 10 to 11
- Above 11

**2\*** What is your gender?

- Male
- Female

### Asthma History

**3** Do you have asthma?

- Yes
- No

**4** When was the last time you faced difficulty to breath?

- Yesterday
- Last week
- Last month
- Last year
- Other (Please Specify)

**5** Have you been admitted to hospital because of asthma?

- Yes
- No

### Basic about Asthma

**6** Do you think that asthma education is important for you?

- Yes
- No

**7** What is the organ that is related with asthma?

- Heart
- Brain

## Asthma triggers and protectors

**8** Do you know about the asthma triggers?

- Yes
- No
- Not sure

**9** Is trigger good?

- Yes
- No
- Not sure

**10** Please give at least one name of the asthma triggers that you know.

**11** Is smoking good or bad for you?

- Good
- Bad
- Not sure

**12** Is cockroach good or bad for you?

- Good
- Bad
- Not sure

**13** Is apple good or bad for you?

- Good
- Bad
- Not sure

**14** Is ice good or bad for you?

- Good
- Bad
- Not sure

**15** Is carrot good or bad for you?

- Good
- Bad
- Not sure

Next Page

## Asthma Action Plan

**1\*** Do you know how to use inhaler?

- Yes
- No

**2\*** How many step that you should follow to use the inhaler?

- 4
- 5
- 6
- Not sure

**3** Can you exercise like a normal person? (e.g. swimming, running)

- Yes
- No

**4** What you should do before you start exercising?

- Take the inhaler
- Drink a lot of cold water
- Wear improper attire
- Dont do anything
- Other (Please Specify)

**5** What do you do if you have an asthma attack? (Stage 3 of action plan)

- Sleep
- Take inhaler within 3 hours
- Call ambulance
- Other (Please Specify)

## Basic about Asthma

**6** Do you think that asthma education is important for you?

- Yes
- No



**7** What is the organ that is related with asthma?

- Heart
- Brain
- Lungs
- Liver
- Other (Please Specify)

### Design

**8** Do you enjoy this game?

- Yes
- No

**9** Does this game is attractive to you?

- Yes
- No

**10** Do you understand the instruction given?

- Yes
- No

**11** Does the diagram help you learn more about asthma?

- Yes
- No

**12** Will you tell/share to your friends about this game?

- Yes
- No

**13** Do you want to continue to play this game?

- Yes
- No

Thank You.

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