"Cooking With Kiah" Malaysian Mobile Cooking Game

by

Nik Nornadiah bt Mohd Izani

Dissertation submitted in partial fulfilment of

the requirements for the

Bachelor of Business Information System (Hons)

(Business Information System)

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Universiti Teknologi PETRONAS

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Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

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Approved by,

_____

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UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

SEPTEMBER 2012

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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NIK NORNADIAH BINTI MOHAMMAD IZANI

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ABSTRACT

Malaysian desserts reflect the multicultural and multiracial aspects of Malaysia. From Chinese dumpling (pau) to dhoti and to traditional Malay dessert, as the country consisting of various races and ethnic, there are hundreds of local dessert dishes created by Malaysians for Malaysians. Most of the dessert dishes nearly hundreds years old and the recipes are kept to spread throughout generations until now.

As the years go by, the traditional dessert food begins to fade. Today's generations tends to consume dishes that are instant. In order to maintain the Malaysian tradition, government especially the National Department for Culture and Arts has done a lot to keep the tradition alive. They organized food fairs like Malaysia food Fair 2012 held on 6-8 January this year, promotions and also not to mention lots of competitions.

The main objective of this project is to develop an interactive mobile game that will tutor the user on how to prepare Malaysian dessert in their mobile devices, which are phones and tablets. This interactive game will include features such as ingredients identifiers, recipes and also steps on how to prepare the desserts. This project paper will provide detailed discussion and also the development process on this project.

CHAPTER 1

INTRODUCTION

1.0   Chapter Overview

This chapter briefly explain the introduction on the project which includes background of study, problem statement, objective and scope of study.

1.1   Background of Study

Malaysian desserts are one of the best signatures to represent Malaysia true beauty. As a country of multiracial citizens, various kinds of the traditional desserts can be found. Its taste and presentation in each dessert are unique and has their own unique story behind it. Each also has their own traditional method to prepare.[1]

Problem arises due the complexity of preparing them and lack of traditional desserts classes and hands on tutorial, thus, resulting lack of appreciation on the traditional desserts.

This project is briefly about developing an interactive tutorial or also known as game that can able to assists the audience to prepare a local Malaysian dessert dishes virtually in their mobile gadgets such as phones and tablets. The idea of this project inspires from the lack of appreciation of our local dessert dishes. One of the many reasons that this occurs is due to the difficulty and failure of the people to understand the process of making them. [2] This application will

provide the interactivity with the audience to participate in the virtual culinary and also additional information on the dishes inside the game.

1.2   Problem Statement

The information on local dessert recipes are everywhere whether it is offline or online, from TV shows to recipe websites. All of these media are providing and presenting the recipe and steps, however, for instance, cookbook or recipe book and websites, although the information on how to prepare it are printed on the book, they are lacking of guidance and proper real-time tutorial to prepare them. On the other side, TV shows has weaknesses whereby, the audience failed to capture the information displayed and there is no interactivity between the two medium. For instance like the names and visual of the ingredient and even any complex steps or procedure when making the dessert dishes. Most of the Malaysian dessert dishes consist of complex method to prepare which resulting the audience to fail understand them.

Another addition is that the lack of appreciation towards the traditional food and by all means Malaysian traditional desserts are included. This issue was brought up by the Member of Parlimen Beluran Datuk Ronald Kiande [3].

1.3   Objective

The objective of this project is to develop a mobile interactive tutorial application to tutor the audience on how to prepare Malaysian desserts virtually. The tutorial will developed in such a way it resembles as an interactive game whereby the user gets to participate in simple real life culinary procedure and there will be

additional information on the dishes displayed for the audience's information. The game will be end by grading the audience's culinary skill.

1.4   Scope of Study

This project focused for all categories of user including children and adults and the aim of this project is to explore suitable methods and ways to assists the audience in preparing local dessert. Therefore, audience will be fully involved in this project. The audience too will be able to acknowledge some of information and additional facts on every dessert regarding recipes and additional facts.

1.5   Significance of Study

In order to avoid the confusion and not being able to understand the procedure of preparing the Malaysian dishes, such interactive tutorial or game able to help. Certain audience need to purchase cookbook or tutorials video, however, there still no interaction between the media and the audience. Thus, from this too, audience may tend to lose interest. The significance of this study to deliver information and facts on the local recipes in terms of recipes and how to prepare them yet provide the interactivity to do so virtually.

CHAPTER 2

LITERATURE REVIEW

2.0   Chapter Overview

This chapter consists of literature reviews that are extracted from existing studies in the same field to this proposed project.

2.1   Definition of Multimedia Games

"Multimedia" and "game" are different definitions but when combined it gives bigger impact to the meaning of game. The meaning of "game" usually defines as an entertainment to several people and brings no benefits. According to Wikipedia, game is a structured playing whereby it can be for entertainment or education purpose.[4]

The purpose of multimedia is to allow the interaction between use in many ways in order to make their learning to be more meaningful [5].Multimedia defines as combination of several medias such as graphics, animations, videos, and audio. On the other hand, Greenlaw & Hepp describes that multimedia is information in the form of graphics, audio, video, or movies. A multimedia document contains a media element other than plain text.[6]

Thus, when both definitions combined it gives a new meaning as multimedia games is structured playing whereby it has several medias such as graphics, audios or videos whether for entertainment or education purpose.

2.2   Multimedia Games in Facilitate Learning Process

According to Romana and Mikaili, their study demonstrates that when students are learning effectively and faster through multimedia games [7] . This was proven when they conducted an experiment to students who are in language schools. Below are the summary of the experiment extracted from the report:

The students were divided into 2 classes of 35 students each. Control group consisted of 35 students and they had undergone normal teaching lessons while the treatment (Experimental) group consisted of another 35 pupils and undergone a different teaching method that is using the language games to teach specific vocabulary items. Four same lessons were conducted and same amount of time is given however both learning style are different. Lastly, the student will be given a test.

Table 3: Post test of control group.

Score	Control group	
	No. of students	No. of pupils in percentage
0-10	6	17%
11-20	8	23%
21-30	15	43%
31-40	4	11%
41-50	2	6%
50-100	0	0%
Total	35	100%

Table 4: Post test of experimental group.

Score	Experimental group	
	No. of Students	No. of pupils in percentage
0-10	0	0%
11-20	1	3%
21-30	4	11%
31-40	13	35%
41-50	11	30%
50-100	8	21%
Total	Total	100%

Figure 2.1 Result of the Multimedia Learning Experiment

Figure 1 shows the results of the student test score. It is obvious that the group of students who are learning using multimedia games learns and develop faster and effectively. Researchers studied that one of the other positive effect of using game

as teaching material is that the game give them an opportunity to be in the control of the lessons and made them learn faster implicitly.

To support this theory, according to a study carried out by Mayer, he made a multimedia learning theory model as below [8]:
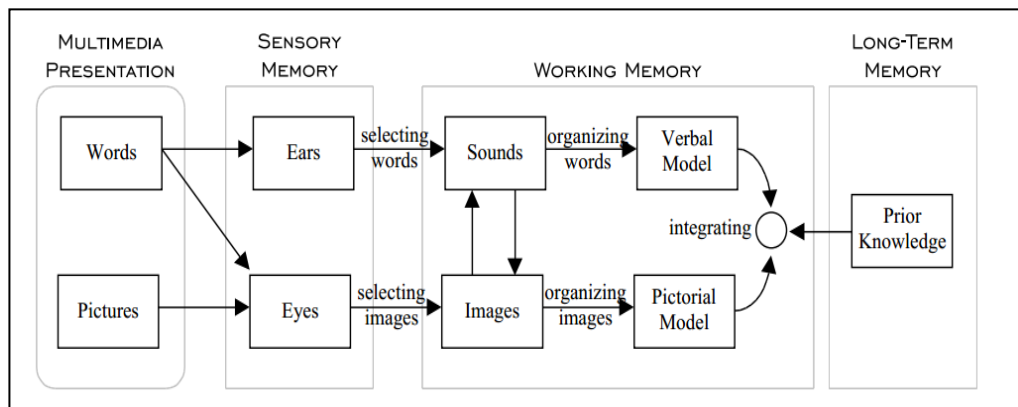
Figure 2.2 Mayer's multimedia learning theory

This model was upon three primary assumptions which are:

-   Visual and auditory experiences/information is processed through separate and distinct information processing "channels."

-   Each of the information processing channels is limited in its ability to process experience/information.

-   Processing experience/information in channels is an active cognitive process designed to construct coherent mental representations.

Thus, this model was constructed into five steps:

1.   Selecting relevant words for processing in verbal working memory

2.   Selecting relevant images for processing in visual working memory

3.   Organizing selected words into a verbal mental model

4.   Integrating verbal and visual representations as well as prior knowledge.

One of the major example that implement multimedia games for learning purposes is the British Council where they used multimedia games as a part of their learning development. They developed word games and put into their websites for their student to experience the learning in their control.

2.3   Assessments on Multimedia Games

When developing a game application, one must consider the convenience and usability for the audience when using the application. According to e4e.com, the common areas for feedbacks from the audiences are [9]:

- Game balance and mechanics.

  According to Jeannie, a balance gameplay need to provide:

    - Consistent challenges, where each level will gradually become more challenging when the user keeps on proceed from a level to another.
    - Perceivably fair playing experiences, for example, the user should not be doomed from the start through their mistakes.
    - Low stagnation, where the user should never get stuck with nowhere to go on.
    - Lack of trivial decision, meaning that the user should only be required to make important decisions.
    - Difficulty level, as the user able to get to choose the difficulty level and the level should match with the user's ability throughout the game.

  Game mechanics are the sets of rules programmed inside the game which make the game more enjoyable such as, take Super Mario Bros© for example, walk, run and jump.

- Usability, interactivity and immerse qualities.

  This implies on how the game interacts with the users. It is important that the testing of these three attributes because through this testing, the developers able to see how the game users will deal with the interfaces and gameplay before they spend much money on developing it. (Chris Swain) Due to the fact the game will eventually involve user

participation; immersion should be implemented inside the game, for example, the save-game option.

- Playability and re-playability.

    Game playability is related to the user's motivation. If the game satisfies a user's motivation and capture their interest, it would most likely to be fun and worthwhile to them.

- Game design and concept.

    Game design and concept does not only comprises the visual aids inside the game, but also storyboards, interfaces, character and background concept art, level design and game engine. These attributes are the key elements to attract the user's interest and motivation to play the game.

- Story and narrative flow/pace.

    In order to maintain a smooth gameplay, the flow of narrative and the story-telling of the game should be easy for the user to understand and out of the box, which by means, containing plots and conflicts rather than boring plain storyline.

- Localization and cultural issues.

    If the game will be sold to other market that contains other language than the place that originally developed (e.g. American market sold to Japanese), the developers need to make sure that the game's content has been localised for each respective markets.

- General quality and design.

    Users tend to "judge the book by its cover" and to easily get attracted by the visual aids of the game at the first glance rather, and then they would check the content and the gameplay. It is important the

developers enhancing and maintaining the quality of the presentation of the game to obtain that kind of attraction.[10]

As addition, referring to the article wrote by E-Zone, the 4 Golden Rules when creating a game application is [11]:

- Simple and fun

  In any game, the simpler the gameplay, the better and more fun. User would tend to play the game immediately after the game start without even looking any lengthy instructions or tutorials.

- Lots of short levels

  When developing game especially mobile game, one of the things that needs to consider is that some people that will be playing the game may in the short bursts and to kill some time, like, waiting for bus or even as a distraction for children. For example, Angry Birds [12] is consists of many short and simple levels.

- Content

  One of the main attractions of the game is that the content. Content in this case means elements like audio, graphics, and concept of the game itself. The higher quality of the content would result the game to be more interesting and attractive to the eyes of the users.

- Depth

  Having a simple gameplay and attractive graphics not only makes the game a success, but also how the gameplay is being carried out, else, they would get easily bored and leave for another game. Users tend to go for challenging part of the game and willing to learn new skills.

2.4   Studies on Related Works

For better understanding of the literature review, studies on the related works have been made by selecting few well-known multimedia games that are available in smartphones. For each game, SWOT (Strength, Weakness, Opportunities (not applicable), and Threats (not applicable)) analysis will be briefly discussed. The purpose of this strength and weakness analysis is to implement the strength into the developed game and overcome the current games' weakness as an improvement for the game.

Plus, analysis is done by picking out 20 reviews of the game itself and chart will be formed to display the percentages of the feedbacks. The reviews will be analysed according to three attributes which are:

o   **Gameplay:** How the game is being played
o   **Content:** Mainly focuses on the presentation of the interface, visual aids and levels available inside the game.
o   **Depth:** How well the game able to maintain user's interest for long time period.

2.4.1   Study on Related Works: Cooking Mama

Figure 2.1 Cooking Mama logo

Cooking Mama is a culinary simulation that was developed firstly for Nintendo DS and Wii platform and now also available for mobile application. The game is simply enables the user to be able to participate in a real life culinary activities in a game form. It consists of combination of short and simple cooking activities such as chopping, frying, mixing baking and more. The game is grade-based gaming as the audience needs to achieve the highest grade (A+) to unlock the next recipe. The menu inside the game provides the mixture of both Western and Asian dishes.[13]

Figure 2.4 Screenshot of Cooking Mama gameplay

However, the game developed has flaws and weakness. Smartphonetracker.co.uk has made a review on the game and listed out the game's strengths and weakness [14]. (Note: The review is based on the iPhone version)

Cooking Mama's strength is:

- Involving real life recipe

    The recipes list inside the game are most of them real and maybe be found outside of the game.

-      Colourful visual aids

    The visual are attractive and eye-catching.

-      Relentlessly joyful

    The game is fun and easy to play for any ages of users.

However, the drawbacks of the Cooking Mama game are:

- Repetitive

  There are no new recipes and if the user finished all the recipes available, they just play the same recipe all over again.
- Short game play

  There are only few recipes and the gameplay for each recipe is too short.
- Relatively expensive

  The cost of the game is USD6.99 and some of the recipes are limited and need to purchase.

The game was also being played and being properly reviewed as below. The strength of Cooking Mama is:

- Attractive visual aids

  The visual aids including the sound are attractive and matched with the visual interface.
- Simple gameplay

  The gameplay are short, simple and fun to play.
- Practice mode available

  This mode is for those who wished to train and practice themselves before start the real thing.

However, the game contains some drawbacks which are:

- Short and few recipes are available

  The recipes are limited and some are needed to be purchase.
- No bonus feature after finish the gameplay

  There are no new recipes available when the user finishes all the recipes.
- No additional information on the recipe

For clearer view on the strength and weakness, a table has been made following the attributes in assessing the game.

Attributes	Description on Cooking Mama
Gameplay balance and mechanics	The game applies the interactivity where the user able to cut, cook, mixing and baking. However the game is absence of balance since all the recipes does not define the level of difficulty.
Usability, interactivity and immerse quality	Interactive and the progress of the game can be saved. Option for resetting game is also available.
Playability	The gameplay is too short and easily get bored. Plus, the game is too expensive as well as the updates.
Game design and concept	Applicable for interface, characters, level design and game engine. Except for storyboard.
Story and narrative flow/pace	No story or narrative involved.
Localization	Options for other language are available.
General quality and design	Very high quality and very eye-catching for first time user.

Table 2.1 Attributes analysis on Cooking Mama

To support the table above, review analysis is made by selecting 20 reviews and all the review will be analyse in terms of gameplay, content and depth. The reviews are taken from the iTunes App Store and below are the result of the analysis [15]:
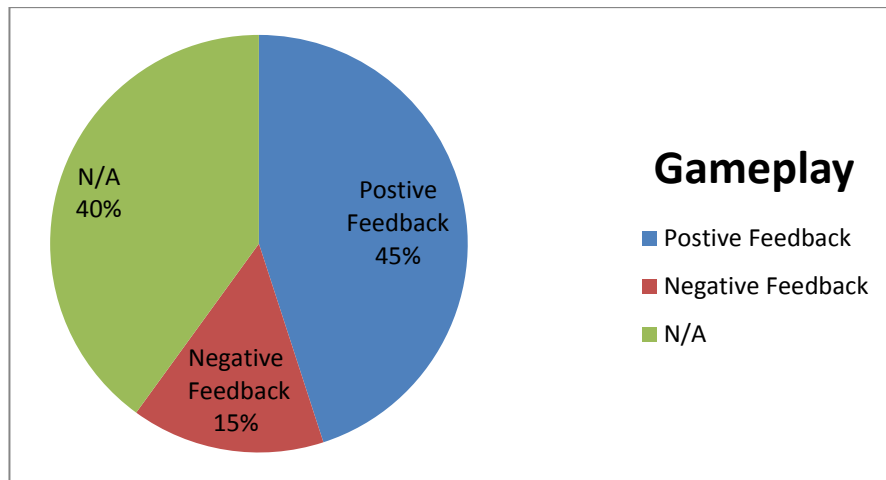
Figure 2.2 Percentage on Cooking Mama gameplay assessments

45% of the review collection commented that Cooking Mama has a great gameplay and fun while 15% gave negative feedbacks due to error inside the game and the game sometimes crashes until it unable to save the current progress.
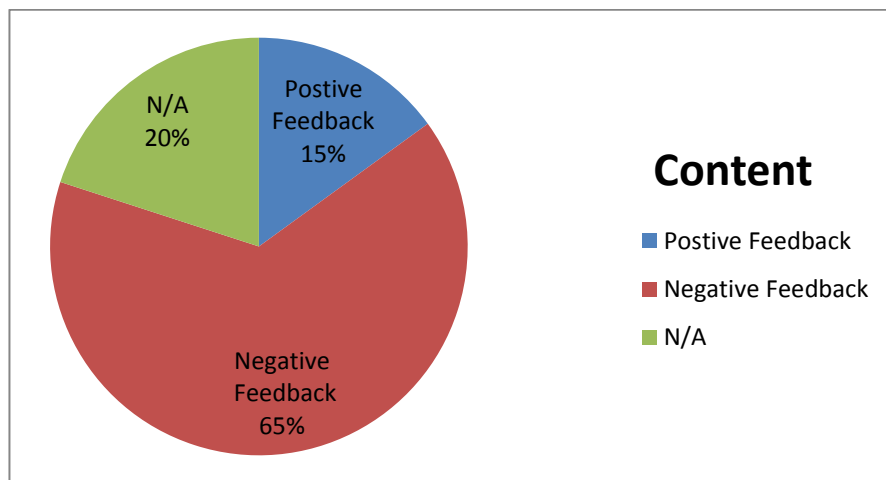
Figure 2.3 Percentage on Cooking Mama content assessments

65% of the chart displayed negative feedbacks and in the review, most of the reviewers commented that the game lack of level and no updates are available. In order for the user to play more recipes, they need to purchase another recipe at USD 0.99 each. Plus, the game contains glitch where it crashes during the gameplay.
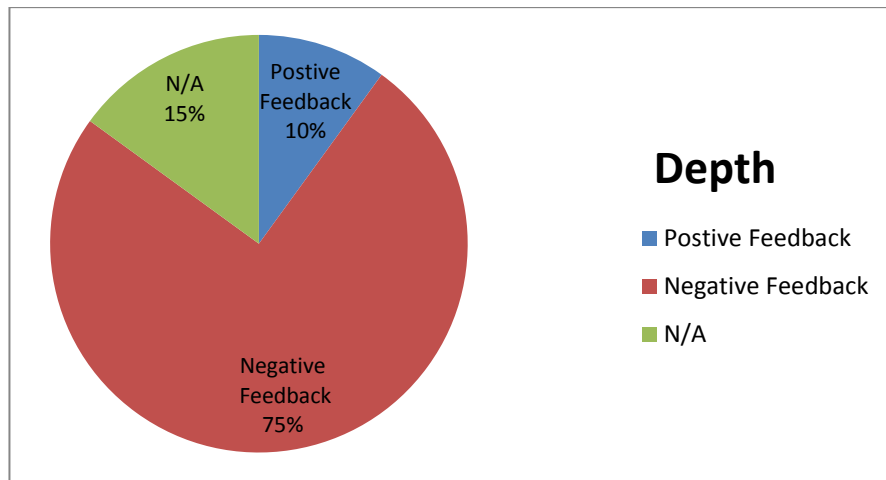
Figure 2.7 Percentage on Cooking Mama depth assessments

75% of the reviews gathered gave negative feedback as the game, according to the reviews, easily gets bored and lose interest due to errors and drawbacks of the game.

Surprisingly, despite of having an attractive interface and good gameplay, Cooking Mama received quite huge amount of negative feedbacks because of its price and also lack of content.

2.4.2 Study on Related Works: Cooking Academy

Cooking Academy, on the other hand, is another cookery simulation for both desktop and mobile application where the audience gets to participate in the cooking procedures. Same as Cooking Mama, it consists of activities such as chopping, mixing, baking and much more. The game has around 70 variety of menu and they are a mixture of dishes around the world and are categories according to breakfast, lunch and dinner. The game will be end by grading the audience's cooking skill.[16]

Figure 2.4 Screenshot of Cooking Academy gameplay

The game received almost average rating due to some pros and cons which are, stated by an audience named Lisa Haasbroek[17].

The pros of Cooking Academy are:

- Good pacing

   The game contains smooth and simple storyline.
- Large variety of recipes

   The game contains at least 50 different recipes.
 - Fun and detailed recipe

   For every recipe picked, there will be extra information on the recipes.

On the other hand, the cons of Cooking Academy are:

- Almost the same as Cooking Mama

   Although the recipes are different from the Cooking Mama, however, the gameplay is almost the same.
- Some task are not clearly presented

   There no proper instructions given which makes the user lost their way in the game. For example: Shake the phone to flip the cooking pan.
- Easy to beat

   The recipes are simple and easy for the user to finish the game quickly.

Similar to the previous study on Cooking Mama, the game has been played and reviewed.

The strength of Cooking Academy are:

 - Displays additional information for every dishes

   For every recipe picked, the game will show extra information about the recipe.
 - Simple gameplay

   The gameplay is short yet easy.

- Wide variety of dishes available

  The game consists of 10 different recipes for every category.

The weaknesses of this game are:

- Moderate illustration and layout

  The visual aids are not eye-catching enough to attract user especially for first timers.

- No bonus feature after finish gameplay

  When the user finishes the game, it would consider as game is over as every recipes are completely done. Plus, no update is done by the developers.

- Easy to finish the game

  There no difficulty set inside the game which makes the game easy to beat and get bored at some point.

For clearer view on the strength and weakness, a table has been made following the attributes in assessing the game.

Attributes	Description on Cooking Academy
Gameplay balance and mechanics	The game applies the interactivity where the user able to cut, cook, mixing and baking. However the gameplay balance is absent since all the recipes does not define the level of difficulty.
Usability, interactivity and immerse quality	Interactive and the progress of the game can be saved. Option for resetting game is also available.
Playability	The game contains at least 50 short gameplay but it tends to get bored when all of them are completed. No updates are available.
Game design and concept	Applicable as interface, characters, level design, game engine and storyboard are present.
Story and narrative flow/pace	Story and narrative are involved.
Localization	Only available in English.
General quality and design	Good quality but not attractive enough.

Table 1.2 Attributes analysis on Cooking Academy

To support the table above, review analysis has been made by selecting 20 reviews and all the review will be analyse in terms of gameplay, content and depth.[18]
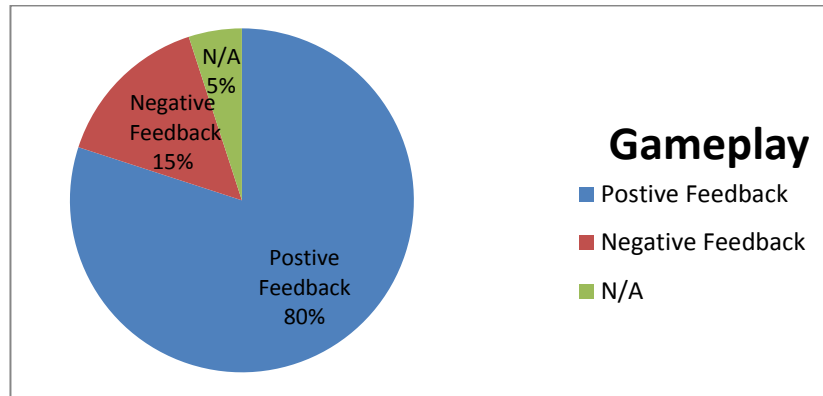
Figure 2.5 Percentage on Cooking Academy gameplay assessments

80% of the review collection gave positive feedbacks on the game. The game, according to the overall reviewers, is fun to play and it is very enjoyable. Negative feedbacks which are resulting 15%, commented that the game is too easy and most task are repetitive.
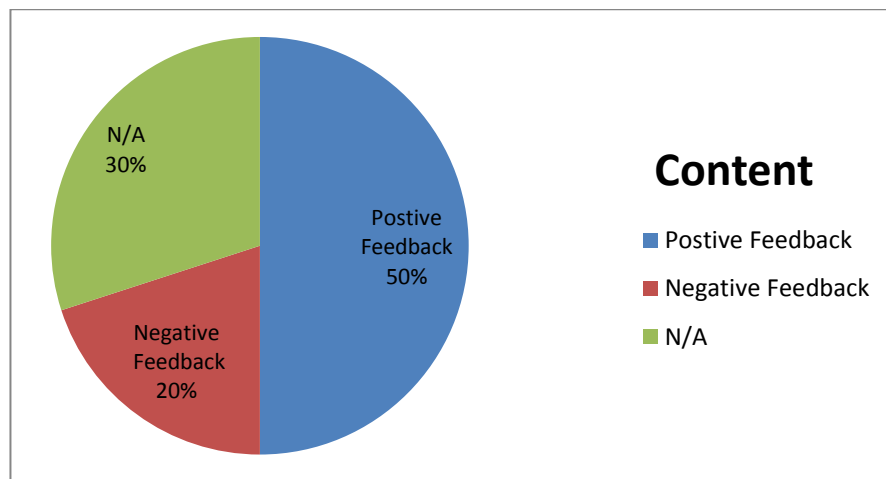
Figure 2.6 Percentage on Cooking Academy content assessments

Large percentages of positive feedbacks received, which is at 50% and the reviewers are much enjoyed the game content and 20% of the reviewers gave negative feedbacks due to lack of new recipe updates and recipe content.
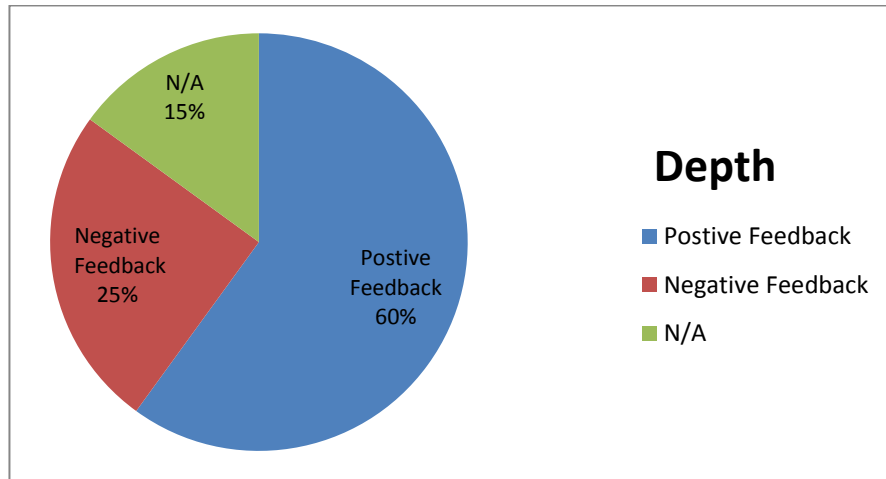
Figure 2.7 Percentage on Cooking Academy depth assessments

60% of the review collections gathered is positive feedbacks and the reviewers commented that the game is addictive and able to maintain the user interest in replaying the game all over again.

2.4.3 Study on Related Works: Toca Kitchen Monsters

Figure 2.8 Toca Kitchen Monsters home screen

TOCA's Kitchen Monsters is another mobile application that introduces culinary interactivity, especially for children. The gameplay is simple as it allows the young audience to play freely by taking any ingredients from the refrigerator and they can boil, cut, grind, fry and heat them up with microwaves. The gameplay is judged by offering the monsters the food which already cooked and these monsters will eventually show expression whether it is delicious or bad.[19]
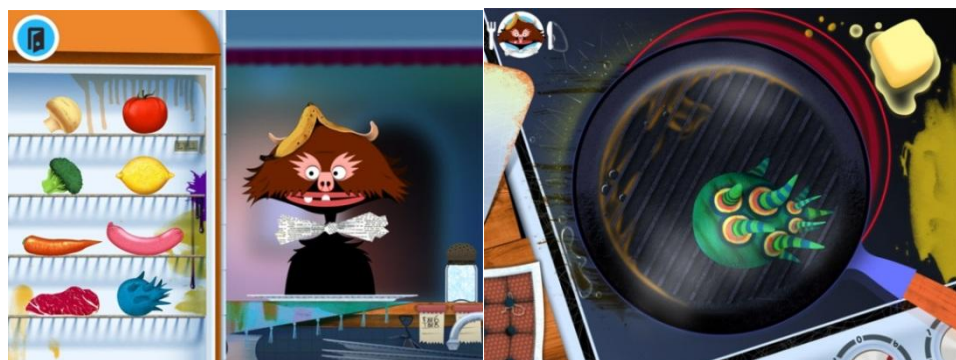
Figure 2.9 Screenshots of Toca Kitchen Monsters gameplay

To analyse the game's strength and weakness, the game is played and reviewed. As for the game's strength:

- Attractive visual aids

    The graphics and sound are attractive and makes the game fun to play.
- Simple gameplay

    The objective of the game is to cook, cut or blend the food then gave to the monster to eat it. The monster will react if the food is drag towards them.
- Freely gameplay

    The user is free to do anything with the food inside the inventory, including frying, boiling, blend or preheat with microwave.

However, the drawbacks of the Toca Kitchen Monsters:

- Easy to lose interest to the game

    Since the game is a freely gameplay, the user starts to get bored at some point.
- Limited ingredients

    The user gets to play with ingredients that are only available inside the food inventory.
- No tutorials on preparing a real dish

    The game is a freely gameplay and does not requires any instructions on how to cook the food.

For clearer view on the strength and weakness, a table has been made following the attributes in assessing the game.

Attributes	Description on Toca Kitchen Monsters
Gameplay balance and mechanics	The game applies the interactivity where the user able to cut, cook, mixing and baking. However, there is no gameplay balance as the user is free to do anything to the food and no levels are involved.
Usability, interactivity and immerse quality	Only interactive between user are present. Options for saving progress are not available.
Playability	The gameplay easily get bored since no level design is implemented or recipes listed that needed to be cooked.
Game design and concept	Applicable for interface, characters and game engine. Except for storyboard and level design.
Story and narrative flow/pace	No story or narrative involved.
Localization	Only available in English language.
General quality and design	Very high quality and very attractive for young users.

Table 2.2 Attributes analysis on Cooking Academy

Then, review analysis has been made by selecting 20 reviews and all the reviews will be analysing in terms of three attributes: gameplay, content and depth. [20]
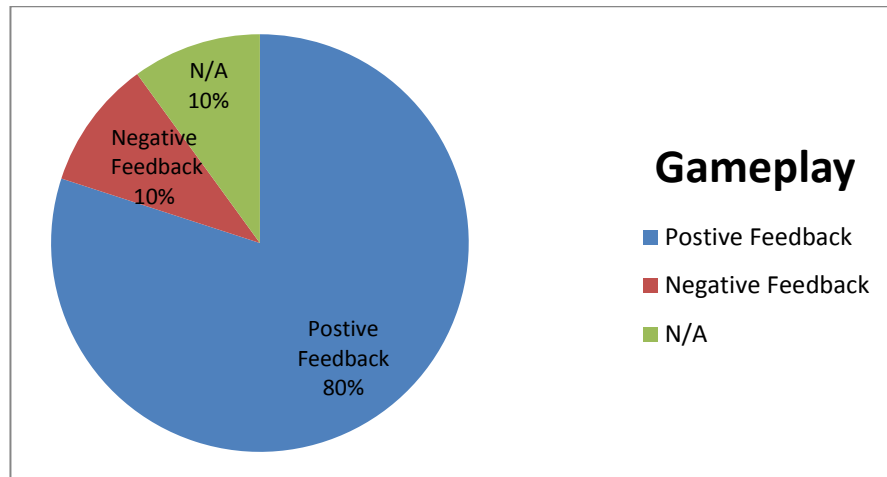
Figure 2.10 Percentage on Toca Kitchen Monsters gameplay assessments

A huge percentage of 80% from the reviewers gave positive feedback and commented that the gameplay is simple and yet fun especially for young users.
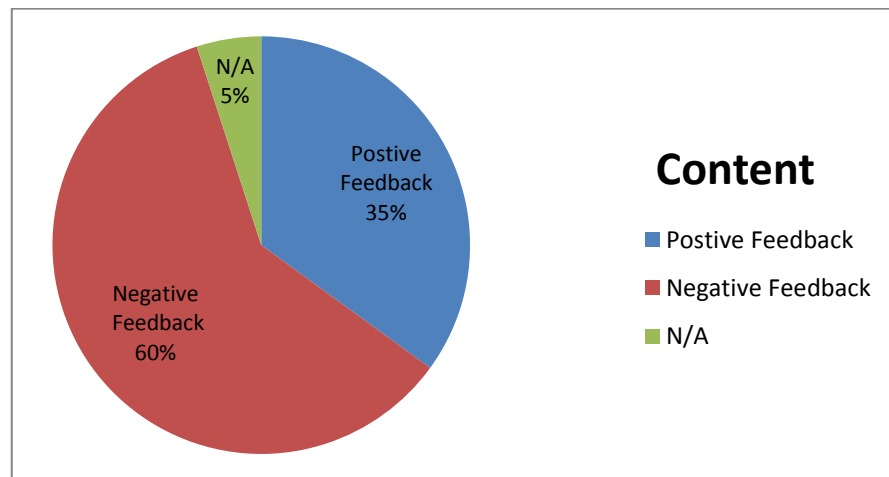
Figure 2.11 Percentage on Toca Kitchen Monsters content assessments

The drawback of this game is that the game is lack of ingredients and the users can only cook one ingredient at a time only. This is the overall review from the collection gathered which result to percentages of 60%. 35% of the reviewers are commented that they have satisfied with the ingredients available.
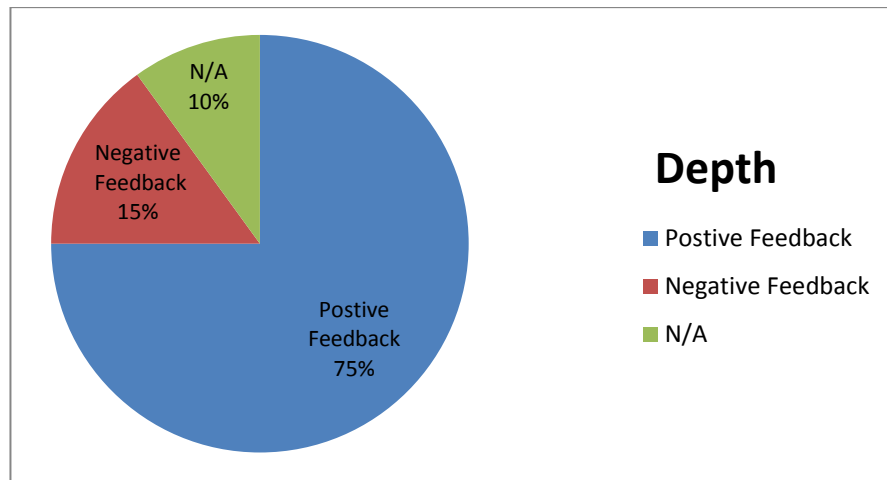
Figure 2.12 Percentage on Toca Kitchen Monsters depth assessments

75% of the reviews are positive feedbacks as the reviewers commented that they enjoyed the game so much as the game is simple and very interactive and they are still maintain their interest to play the game. The remaining feedbacks are due to the result of the lack ingredients and lose interest to the game.

Table below shows the overall review analysis from the three related works according to number of reviewers.

Attributes	Percentages for Positive Feedback(person)			Percentages for Negative Feedback(person)		
	Cooking Mama	Cooking Academy	Toca Cooking Monsters	Cooking Mama	Cooking Academy	Toca Cooking Monsters
Gameplay	9	16	16	3	3	2
Content	3	10	7	13	4	12
Depth	2	12	15	15	5	3
Total	14	38	38	31	12	17

Table 2.3 Overall review assessments

As a result, both Cooking Academy and Toca Cooking Monsters receives a huge amount of positive feedbacks recording 38 reviewers with positive feedbacks while Cooking Mama records with highest 31 negative feedbacks .

2.4.4 Comparison between "Cooking with Kiah" and current related works

From the Table 9, it demonstrates that the three main basic attributes which are gameplay, content and depth are important to each other as it will affect the loyalty and motivation of a user to play the game.

Any games that involve participation from the user should implement gameplay balances, so does these three related works and including "Cooking with Kiah". Gameplay balances that will be involved are such as cutting, baking, frying and even dragging ingredients. This also includes the game design and its concept. The game should consist of interface, characters, game engine, story board, and level design.

Unlike the other games in the related works, "Cooking with Kiah" applies the gameplay mechanics whereby the difficulty will be set when the user starts to proceed to further chapters which involve more obstacles and challenges. By doing this way, the user will not get easily bored with the same level of difficulties.

Usability, interactivity and immerse quality attributes are related to user friendliness and how the interface interacts the user. The purpose of the user interface is functionality, and if the interface functions, it would eventually consider usability. In "Cooking with Kiah" for every interface developed, there will be interactions between the users, such as options for "Recipe list" and "Let's Cook". The interactivity plays the role when the user wants to proceed with cooking game.

"Cooking with Kiah" is built in chapters and there will be new chapters updated for certain period of time to ensure that the user does not get easily bored by the current chapters available in the game. In the chapters, there will be story and

narrative for the users to experience as the main character and easier for them to understand the objective of the game.

Attributes	Cooking with Kiah	Related Works		
		Cooking Mama	Cooking Academy	Toca Kitchen Monster
Gameplay balance	Applicable	Applicable	Applicable	Applicable
Gameplay mechanics	Applicable. Difficulty gradually increase by levels and chapters	Not applicable	Not applicable	Not applicable
Usability	Applicable	Applicable	Applicable	Applicable
Interactivity	Applicable	Applicable	Applicable	Applicable
Immerse quality	Applicable	Applicable	Applicable	Not applicable
Playability	- Level design in chapters - New recipes and new chapter will be updated	- Less than 20 short gameplay - Rather expensive - New recipes need to be purchase	- 50 short gameplay - Free - No new updates	- Freely gameplay - Free - No level or recipe list to cook - No new updates
Game design and concept	Available: Interface Characters Game Engine Storyboard Level design	Available: Interface Characters Game Engine Level design	Available: Interface Characters Game Engine Storyboard Level design	Available: Interface Characters Game Engine Storyboard
Story and narrative flow/pace	Story or narrative are involved	No story or narrative involved	Story or narrative are involved	No story or narrative involved

Localization	Only in English language	Available for other language	Only in English language	Only in English language
General quality and design	- Moderate quality visual aids - Attractive	- Very high quality visual aids - Attractive	- Good quality visual aids - Not attractive	- Very high quality visual aids - Attractive for young users

Table 2.4 Comparison between all related works and "Cooking with Kiah"

according to its attributes.

CHAPTER 3

METHODOLOGY

3.0   Chapter Overview

In this chapter, the project methodology is explained as well as project flow from start to the end. Steps involved is described in figure form and also written form in order to keep track on what need to be done and accomplished within the period of time allocated.

3.2   Game Development Methodology

To execute the development phase, methodology is used as a guideline during the development and also for tracking purpose. Figure below demonstrates how the development stage is being carried out.
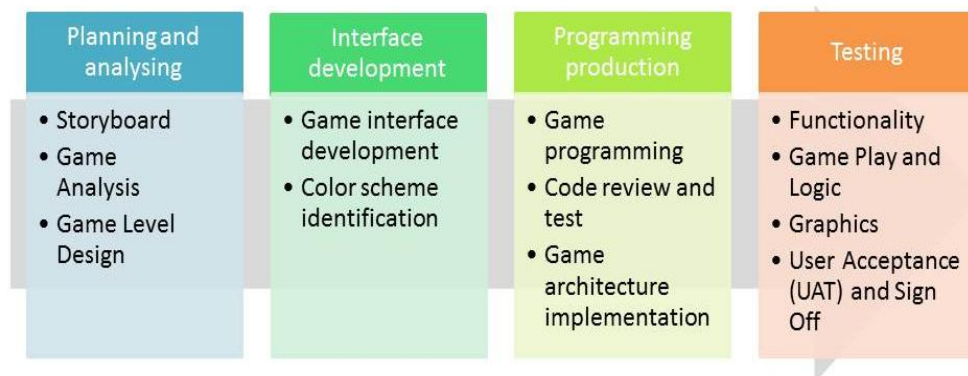
Figure 3.1 Game Development Methodology

3.2.1 Planning and analysis

Storyboarding - As the first stage of game development, storyboard is created and the synopses as well as flow of the gameplay of the game are carefully written in order to give the animate and smooth flow into the game and able to give a feel of what being presented into the screen. The story will be constructed by using the "Hollywood 3-Act" that consists of simply beginning, middle and end. [10]

Figure 3.2 Hollywood 3 Act

o **Beginning (Act I)**

This is the stage where the characters are being introduced along with their backstories and the goal to capture the user attention. In this act, the character's problem will be immediately introduced.

o **Middle (Act II)**

The middle act will focuses on obstacles that will stand in their way while solving the problem they are facing. This act comprises tensions and suspense in the story.

o **End (Act III)**

The story ends when the character has successfully solved the problem introduced during the Act I.

Game analysis - From the information gathered which is, for instance, from related studies and journals, the information will be analysing thoroughly and strength and weakness analysis on the related works is conducted as well. Then, the attributes from the user game assessment will be used as a comparison table between all the related works to make the analysis much clearer. The purpose of the strength and weakness analysis is to apply the strength part of the other games into this game development.

Game level design – This was done along with the storyboard so that both are synchronized. Game level is designed by dividing each level named "Chapters", making the game much easier to develop and well-planned. According to Jeannie, when designing the game level, these are the elements needs to consider [10]:

- **Goal:** Each level must have a set of objectives to accomplish it.
- **Flow:** To prevent the user to proceed to next level without accomplishing the current level is to create a barrier until the user accomplish the level objective.
- **Duration:** How much time should the player be spent on each level.
- **Availability:** How many levels that will include in the game.
- **Relationship:** The connectivity between one level to another.
- **Difficulty:** How will the level difficulty relates with user's progression
.

3.2.2 Interface development

Game interface content - Draft is created to plan the content of the interface such as images, animation, graphics, and sound effects. Once the objects of the content are created, they will be combined into one interface and properly arranged according to the plan. Then, prototyping is properly done as well as maintenance will be done during the development if there are any conflicts or errors. Below is the chart of the designing phase.
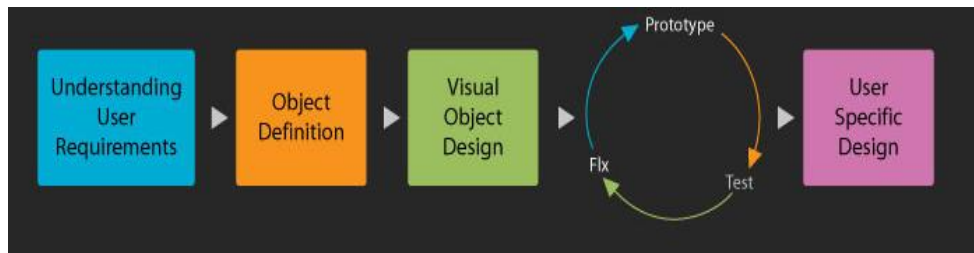
Figure 3.3 Designing phase chart

Colour scheme identification– Choosing the right colour combination for interfaces is important as it would set the mood of the user when playing the game. Thus, proper researches to find the best colour combination for the interface are performed. Once the suitable colour pallets are chosen, the chosen colour will be applied into the game interface.

Websites that are utilized to help with the suitable colour combination for each background of the interface are:

o Tumblr (http://color-palettes.tumblr.com/)
o Color Combo (http://www.colorcombos.com/)

3.2.3 Programming production

Game programming - After the user interfaces drafts are done, the programming of the game will be carried out in order to apply the right function for content inside the interface. Simple programming will be done as the online Android application inventor is meant for basic applications.

Code review and test - Code review and on-going test will also be performed to make sure that the code has no bug or any errors that could affect its functionality and ensure the code is easy to read and maintain.

Game architecture implementation – Architecture of the game is how game will be operated when the user starts the game. In this case, game application consists of user input, game logic, phone frameworks, audio, and graphics. These elements, then, will be implemented into the game. Activity diagram will be utilized during the phase in order to give clearer view of how the game will run.

3.2.4   Testing

Once all the previous phase is done, game testing will be performed to ensure that all the content functioned properly and meet their expectations. There will categories of tests that need to be done during this phase, which are:

-       Functionality and usability

-       Game Play and Logic

-       Graphics

-       User Acceptance (UAT) and Sign Off

3.3   Key Milestone

Figure 3.4 Key Milestone

Refer to this timeline of the report submissions and presentation, Gantt chart (refer to Appendix) is created to ensure that the required material is being submitted and presented on time.

3.4   Tools

Below listed are the tools that will be used for the project development which will be conduct during Final Year project II (FYP II):

Software

o Google AppInventor

This online application developed by Google for creating applications for Android OS and it is now maintained by the Massachusetts Institute of Technology (MIT). The application uses the concept of drag and drop and connecting blocks of functionalities to make the application work. This application is focused for those who are not familiar with Java programming or C languages. The application then tested using an emulator or phone to ensure the function is programmed correctly.

o Adobe Photoshop

This software is the professional image-editing standard and graphics editing program developed by Adobe Systems Incorporated. Adobe Photoshop also has the ability to support various types of image files such as .EPS, .PNG, .GIF and .JPEG. Photoshop is also able to alias with other Adobe Creative Suites for media editing, animation and authoring. This software will be utilized throughout the whole project for illustration and design purpose. [23]

Hardware

o DELL XPS

o Samsung Galaxy Mini

CHAPTER 4

RESULT AND DISCUSSION

4.0   Chapter Overview

This chapter demonstrates the result from the researches and study which is translated into a process flow diagram of the project as well as the concept design of the proposed application.

4.1   Introduction to Cooking with Kiah

4.1.1   Synopsis

The game "Cooking with Kiah" tells a story about a typical girl who has a special gift that enables her to analyse every each ingredients in a food she ate. Despite of her passion in culinary arts, the only thing that stands in her way is her sight loss ever since she was born. As time goes by, there will be challenges and obstacles that required her special ability.

4.1.2   Theme and Genre

The theme of this game is slice-of-life, whereby the story consists of the main character's life and the genre of this game is simulation and mini-games.

4.1.3 Setting

The setting in the game portrays the current Malaysian setting.

4.1.4 Gameplay and Features

The game is interactive culinary simulations and tutorials whereby the user will be interacting with their smart phones or tablets to complete a set of culinary tasks preparing a certain Malaysian dessert. The game will divided into chapters and each chapter will have storylines and a signature Malaysian dessert .The users need to score the highest grade in order to proceed to next chapters.

To get the highest grade, the user will have to battle with time and the faster the user accomplish the task, the higher score they will get thus easier for the users to achieve high grades.

In the game, as Kiah unable to perform the culinary task and only has the ability to identify the ingredients as well as procedure to make it, the user will act as her assistant and follow the instructions she gave.

The game will also provide a special features where the users able to view the recipe for the signature Malaysian desserts inside the chapter. User can always proceed to cooking simulation if they want to proceed with the gameplay.

4.2   Game Storyboard

Using the Hollywood 3-Acts, which consists of three act story structure, below figures demonstrates on how the storyline of a chapter in the game.

<u>**Chapter 1**</u>

Act I: Beginning

Figure 4.1 Storyboard for Act I: Beginning
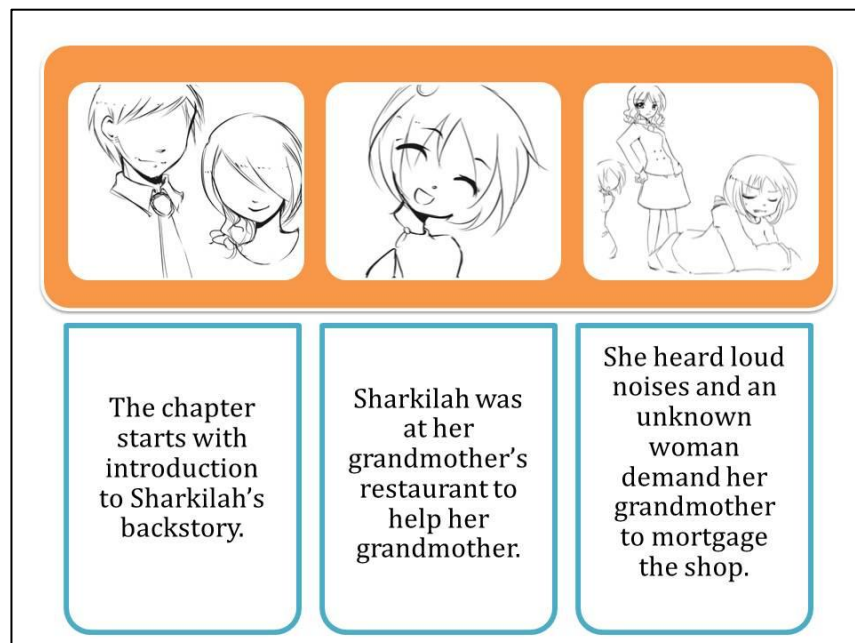
The first chapter will start as Sharkilah (Kiah) explains her backstory and her story life. The story continues when Kiah was at her grandmother's restaurant to help her grandmother and look after the shop. The conflict starts when she heard a loud noise coming from the back and an unknown woman voice demanding at her grandmother to mortgage the shop for newly restaurant.

Act II: Middle

Despite of being helpless, Kiah was devastated that her beloved grandmother's restaurant would be shut down after years of business. The conflicts even begin to rise when Kiah challenges the woman (named Caroline) to a culinary challenge. If she wins, Caroline would withdraw the mortgage of her grandmother's restaurant.

The game will start in this Act, where the users need to successfully accomplish a set of culinary simulations.

Act III: End (If the user able to finish the gameplay)

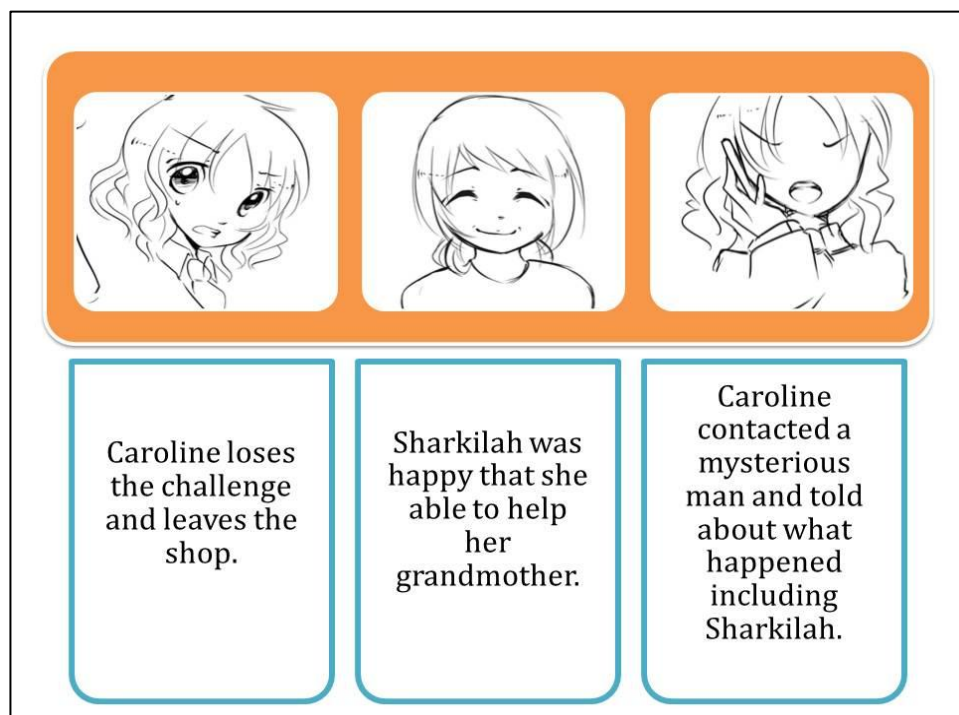*Figure 4.2 Storyboard for Act III: End*

As the gameplay ends and the result of the gameplay already shown, the end part of the Chapter 1 storyline will appear.

Caroline loses the challenge and with disappointment and anger, she leaves the shop. Kiah and her grandmother were happy that the shop did not have to undergo shutdown. Not very long after the incident, Caroline contacted a mysterious man,

who related to mortgaging the shop. She told about the withdrawal of the mortgage and also Kiah. The man did not reveal his identity. This marks end of Chapter 1.

The user will eventually directed to the second chapter and so on until there are no chapters available and they need to wait for an update.

4.3   Game Level Design

In the "Cooking with Kiah" game, there will be chapters with sets of culinary tasks that needed to be completed. For every level, there will be a signature dessert. By using the level designing structure, a table is done for each chapter that will be created and it will be briefly described according to the elements.

Elements	Chapter 1
	Description
Story	Kiah challenges Caroline to protect her grandmother's restaurant from being mortgage.
Signature dessert	Currypuff *(Karipap)*
Objective	Accomplish every task without fail
Requirement	-
Duration	No timer
Difficulty	Beginner

Table 4.1 Template for chapter or level design for Chapter 1.

Elements	Chapter 1.5: Mini game
	Description
Story	Kiah helps her brother to cook.
Signature dessert	Baked Currypuff *(Karipap gulung bakar)*
Objective	Accomplish every task within time duration, without fail
Requirement	Pass Chapter 1
Duration	5 minutes
Difficulty	Beginner

Table 4.2 Template for chapter or level design for Chapter 1.5.

This will become a template for the next chapters that will be creating.

4.4 Game and Character Concept

Name	Elya Sharkilah	Izzahtul Syuhada	Caroline Brigate
Role	Protagonist	Supporting Character	Antagonist (Chapter 1)
Gender	Female	Female	Female
Age	16	65	34
Background	Born blind since birth. She loves food and culinary. Wished to open a restaurant and become a great chef like her grandmother. Her parents quite over protective	Has wide knowledge of traditional Malaysian dishes. Opens a business for past 40 years	Co-owner of a well-known restaurant. Chef. Wished to build new restaurant on Kiah's grandmother's restaurant. Also has wide knowledge on Malaysian dishes
Personal Characteristic	Very outgoing and cheerful person. Helpful	Calm and very patient	Spoiled. Impatient person
Physical apperance	Thin, quite small, young. 160 cm tall	Short and old. 154 cm tall	Tall and middle age-woman. 170 cm tall

Table 4.2 Character with descriptions

Figure 4.313Full body image of characters

4.5   Characteristics of the Game

The objective of the game is to win as highest grade with highest score as possible to proceed to the next story. The characteristic of this game is that how much time that the user is able to finish up the tasks in short period of seconds, thus, the score will be calculated by grade that will resulting whether the user passed or failed. The game is a single player gameplay.

Result	Grade	Score (%)
Win	A	90-100
	A-	80-89
	B	70-79
Lose	C	60-69
	D	50-59
	F	<40

Table 4.4 Result chart

4.6   Prototype

The prototype of this project named "Cooking with Kiah" that will consists of components which are:

o   **Chapter List**

In this interface, the users get to choose the available chapters.

o   **Start gameplay/ "Let's cook!"**

User will able to start the gameplay.

o   **Recipe**

Use will be able to view the recipe of the signature dessert in the chapter.

4.6.1   Activity Diagram

Figure 4.4 Activity Diagram of "Cooking with Kiah"

The figure demonstrates the activity diagram of the game. First, the user starts by executing the game. Once the game displayed the title screen, the user will press on story mode to proceed. There will be story sequences and plots, then, a window screen will appear displaying options of starting the game or view the recipe. Even though they chose view the recipe, they are able to play the game play afterwards. The users are only needed to follow the instructions given and continue until the end of the game. Once it finished, the game will displayed the result on their cooking performance.

① If the user achieved grade of B and above, it means that the user have succeeded and they are able to move on to the next chapter and gameplay.

② If the user fails to achieve the grade of B and above, it means that they have failed that stage. They need to restart the same cooking gameplay all over again until they achieved B grade and above. By that they are able to proceed to the next chapter and gameplay.

4.6.2 Game Architecture

Below figure is the game architecture that has built as a guide during the development.
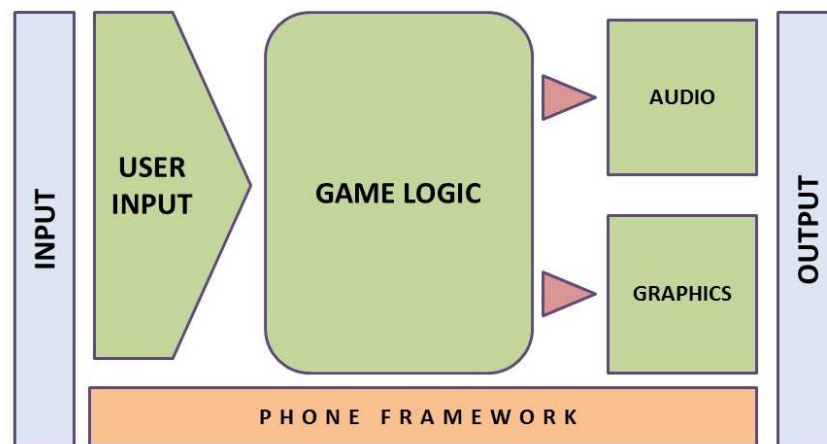

Figure 4.5 Basic Game Architecture Diagram

To summarize, once the user plays the game application, the application will eventually triggers as user input. When the user enters or touch or clicks on anything, it will automatically process through the game logic, resulting an output of graphics and audios.[24] To relate with the game developed, every elements inside the architecture is used as references.

Input - The input device.

In this case of the developed game, the input would be the touch screen as the game specialized for smart phones and tablets.

User Input - When user touch, drag, type, shakes the screen of the phone especially smart phone would be considered as a user input and it will direct to the game logic to process and triggers an event.

The gameplay of the developed game requires of multiple user inputs from the user such as touch and drag.

Game Logic - The backbone of the game application and it consists of set of functions when the user enters an input. It will automatically process and managed its events according to the type of input.

The game logic in the developed game is carefully configured inside the coding editor in App Inventor.

Audio - The sound output.

Graphics/image - The visual output.

Phone Framework - It will reveal the event or any reaction when the input is performed.

Output - The result after the input undergo the game logic which are basically in the form of visual or graphics and sounds or even vibration. Similar to the this, this is fully implemented into the game as visual and sound will be the main output of the game.

4.6.3 Interface
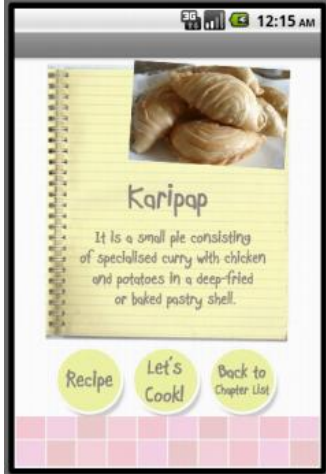
Figure 4.6 Home Screen	*Figure 4.7 Chapter List Screen*	*Figure 4.8 Chapter Home Screen*
The first screen when the users execute the application. The screen consists of two buttons: Start game, to start the game; Quit, to quit the game application.	<u>Directory</u>: Home screen > "Start game" The screen will display all the available chapters and each chapter will have its own storylines.	<u>Directory</u>: "Start game' > "Chapter *"(* chapter number) The screen will show the signature dessert of the chapter and consists of three options: "Recipe" to view recipe, "Let's Cook" to start the gameplay and "Back to Chapter List" to quit the chapter.

Figure 4.9 Recipe Screen

Figure 4.10 Example of Cooking Tasks
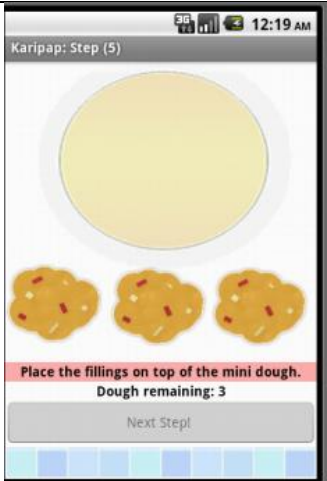
Directory: "Chapter *" > "Recipe" The screen will display the real life recipe of the signature dessert of the chapter.	Directory: "Chapter *" > "Let's Cook!" There will be sets of cooking tasks and the users will only need to follow the instruction in the pink bar to proceed to the need tasks until the end. The game will be graded.

4.7   User testing

To ensure the game application meet its right functionality and logic, user acceptance testing (UAT) is conducted online and a form is distributed along with the game file to the participants (Refer to Appendix II). The form contains functionality and usability testing and feedback survey on the overall game. There were 10 participants involved in this UAT.

There are two section usability testing: Menu testing and gameplay testing. The participants needed to follow all the instruction given and write down whether the actions instructed meet the expected result.

Menu testing is testing for functionality of commands such as "Start game" or "Back".

Action/Event	Expected Result	No. of participants		Note
		Pass	Fail	
Main Menu	Sound played.	10	0	-
Main Menu: Select "Start game"	Chapter List menu screen displayed. Sound played.	10	0	-
Main Menu: Select "Quit"	Execute application. Sound played.	10	0	-
Chapter Menu: Select "Chapter 1"	Chapter 1 Introduction comic strip displayed. Sound played.	10	0	-
Chapter Menu: Select "Back to Title"	Main Menu displayed. Sound played.	10	0	-
Introduction: Select "Skip"	Chapter 1 home screen displayed. Sound played.	10	0	-

Chapter 1: Select "Recipe"	Recipe screen displayed. Sound played.	10	0	-
Chapter 1: Select "Let's Cook!"	Gameplay start. Sound played.	10	0	-
Chapter 1: Select "Back to Chapter List"	Chapter List menu screen displayed. Sound played.	10	0	-
Recipe >> Select "Back"	Chapter 1 home screen displayed. Sound played.	10	0	-
End: Select "Skip"	Result screen displayed. Sound played.	10	0	-
Result: Select "Back to Chapter List"	Chapter List menu screen displayed. Sound played.	10	0	-
Result: Select "Retry"	Gameplay start. Sound played.	10	0	-
Result: Select "Next Chapter"	Notification displayed. Sound played.	10	0	-
Next Chapter >> Tap/click "(x)"	Notification disappeared.	10	0	-

Table 4.5 Result of the Menu Testing in Usability Testing

Table 14 demonstrate that all of the participants have no trouble in perform all the actions listed as they have met the expected result.

Another section is the gameplay testing, proposed to test the game logic such as enabling "Next" Button or calculating remaining task to be done.

Action/Event	Expected Result	No. of participants		Note
		Pass	Fail	
Task 1: Drag the small bowl into big bowl.	Sound played.	10	0	-
Task 1: Task finished.	"Next Step!" button enabled. Sound played.	8	2	Button enabled before the last task is done.
Task 1: Select "Next" button.	Task 2 screen displayed.	10	0	-
Task 2: Drag the small bowl into big bowl.	Sound played.	10	0	-
Task 2: Task finished.	"Next Step!" button enabled. Sound played.	8	2	Button enabled before the last task is done.
Task 2: Select "Next" button.	Task 3 screen displayed.	10	0	-
Task 3: Move the rolling pin upwards and downwards for multiple times.	The dough image stretch. Sound played.	10	0	-
Task 3: Task finished.	"Next Step!" button enabled. Sound played.	5	5	No sound.
Task 3: Select "Next" button.	Task 4 screen displayed.	10	0	-

Task 4: Tap on dough.	White circles formed. Sound played. "Mini dough left:" decreases its number.	10	0	-
Task 4: Task finished.	"Next Step!" button enabled. Sound played.	10	0	-
Task 4: Select "Next" button.	Task 5 screen displayed.	10	0	-
Task 5: Drag the fillings image towards the dough.	The fillings dough disappeared. "Dough remaining:" decreases its number. Sound played.	9	1	The number decreases until -1.
Task 5: Task finished.	"Next Step!" button enabled. Sound played.	9	1	Sound played twice.
Task 5: Select "Next" button.	Task 6 screen displayed.	10	0	-
Task 6: Slide down following the arrow.	The dough is closed. Sound played. Instruction changed.	10	0	-
Task 6: Tap on the below edges of dough.	Dough pattern appeared. Sound played.	10	0	-
Task 6: Task finished.	"Next Step!" button enabled. Sound played.	10	0	-
Task 6: Select "Next" button.	Task 7 screen displayed.	10	0	-
Task 7: Drag the mini dough towards the frying pan.	Mini dough changed image after 3 seconds.	10	0	-

	Sound played.			
Task 7: Drag the mini dough from frying pan towards the plate.	Mini dough placed on plate. Sound played.	10	0	-
Task 7: Task finished.	"Done!" button enabled. Sound played. Victory bubble displayed.	10	0	-
Task 7: Select "Next" button.	End screen displayed.	10	0	-

Table 4.6 Result of the Gameplay Testing: Chapter 1 in Usability Testing

Table 15 shows that some of the participants faced glitch and error while playing. The notes commented will be used as references to fix the error and glitch.

Feedback form, on the other hand, a section whereby the participants will give review and ratings on every criterion.

The first question, Question 1, purposed to determine of the attributes the participants look forward when downloading the game application.
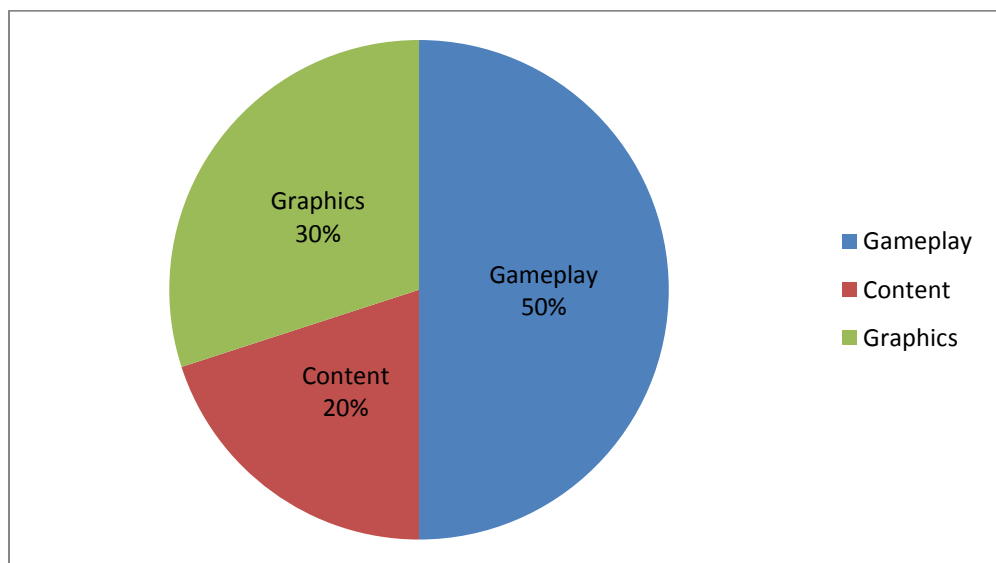

Figure 4.11 Percentage on Question 1

Figure 33 show that almost a half of the participants involved stated that the gameplay is the first priority when it comes to downloading game applications. The participants are more captured towards the graphics of the game application than the content.

The second question, Question 2, is asking the participants for the overall review and ratings on the "Cooking with Kiah!" game application. The question is divided into 4 sub questions and they are ratings for criteria such as gameplay, content, graphics and for overall rating.
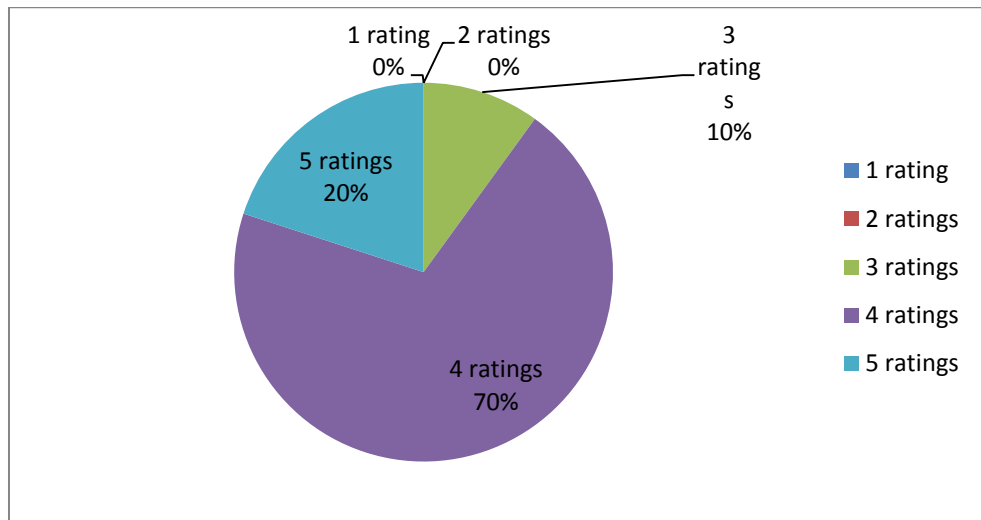

Figure 4.12 Percentage of Question 2(a) on Gameplay Rating

For Question 2(a), the question ask for the rating on the game's gameplay and Figure 34 demonstrate that 70% of the participants gave 4-ratings on the game's gameplay while 30% of them gave 5-ratings.
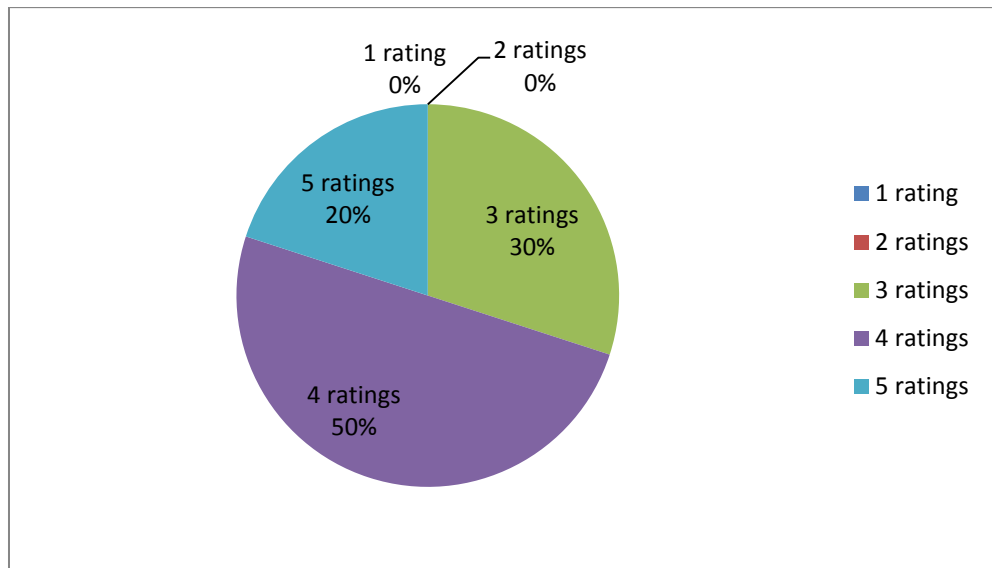
Figure 4.13 Percentage of Question 2(b) on Content Rating

Question 2(b) questioned the participants for the rating on the game's content whether the game's content is meaningful. Figure 35 show that 50% of the participants gave 4-ratings and 30% of them gave 3-ratings.
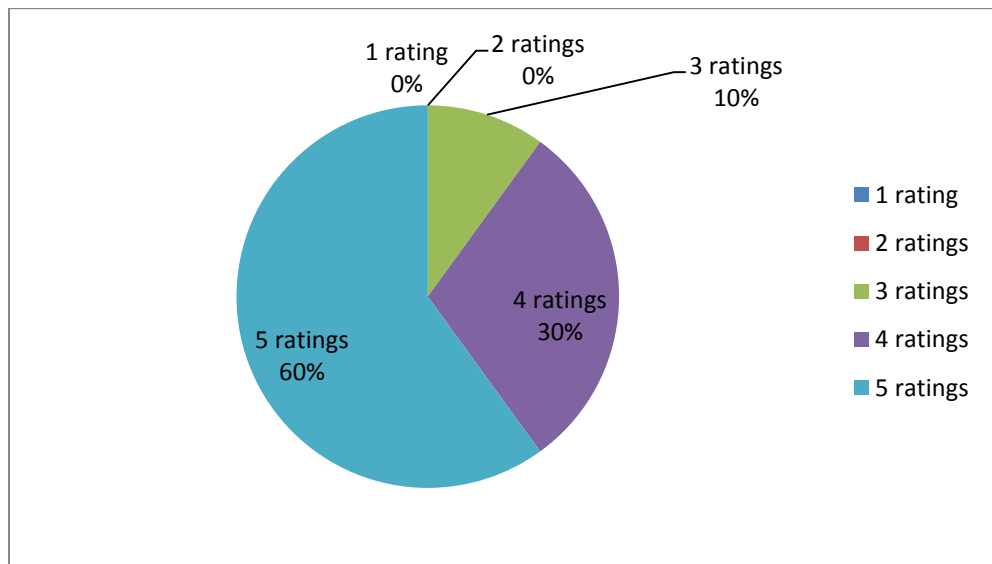

Figure 4.14 Percentage of Question 2(c) on Graphics Rating

On the other hand, Question 2(c) is asking for ratings on "Cooking with Kiah!" graphics. Figure 36 show that 60% of the participants gave 5-ratings,

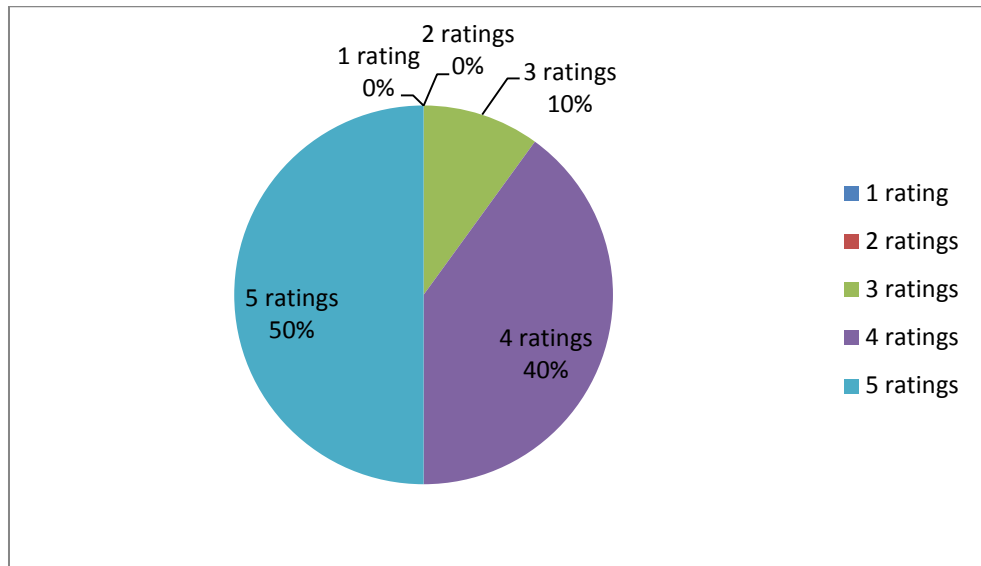demonstrating positive feedbacks. 30% of them gave 4-ratings while 10% gave 3-ratings on the graphics.

Figure 4.15 Percentage of Question 2(d) on Overall Rating

The last question, which is Question 2(d), is proposed to determine whether the participants interested with the game and willing to play again with the game. As a result, half of the participants giving 5-ratings on the game and they are willing to play the game again.

Below are some of the comments and suggestions recorded from the participant:

① "Great interface and game! Hope that you could add more cooking tasks."
② "I love how you emphasize Malaysian *kuih*(dessert) into an interactive game! Looking forward for more!"
③ "The game is less colourful and cherish. Try to put any colour background."
④ "Suggestion: Make Bahasa Malaysia as an option for language."

⑤ "My suggestion if you could make the comic strip into a movie clip, making easier for us to keep with the story!"

⑥ "The game is fun and interactive! I enjoyed it!"

CONCLUSION AND RECOMMENDATION

As a conclusion, this project is expected to help the user to learn and understand the process of preparing traditional Malaysian desserts through virtual culinary. As technology grows advance, it is the best that the technology integrates with the old Malaysian tradition as a new approach to attract more current generation to appreciate the true beauty of Malaysian culture and tradition.

The objective of this project is developing an interactive tutorial or game that helps teaching the audience on how to prepare the Malaysian dessert dishes.

Since Malaysia has these unique characteristics especially when it comes to dessert dishes, it is essential to keep the tradition continue its legacy before it fades from time to time. Hopefully, this project will, not only to give attention towards the Malaysian users, but also to foreign and international users to experience the process of preparing Malaysian desserts.

Therefore, recommendations and future plans are being planned well for future enhancement:

- Effective grading

  The game currently is graded by using the timer and how fast the user is able to finish up all the cooking tasks in the given period of time. The game will evaluated the user on how accurate the user able to complete the tasks as well.

- Variety language

  Currently, the game is only available in English language. For further enhancement, other language such as Bahasa Melayu will be included into one of the language options in the game.

- "Practice mode" gameplay

  Instead of user went through all the story mode stages all over to experience the gameplay again, the game will provide another mode called the "Practice Mode" so the user gets a quick play on recipe they liked to.

- Update on new recipes and chapters

  New recipes and chapters will be updated for certain period of time to avoid the user getting bored with the current recipe available in the game.

- Set on difficulty (Easy, Moderate, Hard) as option

  Consideration is taken on this because there will be some users who are consists of different ages. Therefore, difficulty of the game will be For example, "Easy" mode for young children, which the gameplay will consist of simple and short cooking procedure. On the other hand, "Hard" mode will be much challenging than the normal gameplay as it will consists of many cooking procedure and requires extra gameplay skills.

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