A Study on the Successfulness of Mobile Game: The Case of Angrybirds

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Abstract— This research is to study on the successfulness of the mobile game. An Angrybirds game has been chosen as a case study. One of the reasons of using Angry Birds as a case study is due to its high popularity worldwide, including our country Malaysia. It is so popular that even children at the age of 5-12 years old are also very familiar with this title. Due to that matter, a model adopted majorly through the adaptation of mobile game features stated by Mark Overmars and some little combination the Nielsen's Ten Heuristics were used in order to design questionnaire for surveys. This study would identify the relationship among Games Design, Controls, Social Features, Assets and Navigational Features in determining mobile game successfulness. Based on the finding, it seems that there is a significant relationship between Games Design, Controls, Social Features, Assets and Navigational Features in Mobile Game Features.

Index Terms—Mobile Game, paper-based survey , online survey

I. INTRODUCTION

In today's world, we have loads of choice for entertainment. This includes television, radio, computers and other devices that are developed for entertainment purposes such as the MP3 player that we used to listen to our favourite music. Nowadays, it is quite acceptable to say that entertainment is quite hard to be separated with our life. Let us have a look on our cell phone, instead of just being used to communicate with the others, cell phone's today also work as a media player.

Cell phone today works more than just as a telecommunication device. A sophisticated cell phone, or the so-called Smartphone also works as a mobile camera, recorder, and at the same time as an entertainment tools, which include mobile games. Mobile games are broadly defined as games that are played on mobile platforms such as cell phones, PDAs and dedicated gaming devices (Ola Davidsson, Johan Peitz, Staffan Bjork, 2004).

Mobile phones have been game-enabled since 1997, it is the time when Nokia introduced games in their mobile communication for the first time. Less than 10 years later, Smartphones came into the market and in 2001, they were reaching critical mass, evolving games from a modest add-on to mobile phones to being a whole new and lucrative market (Maura Bouca, 2012).

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The market for mobile games change radically with the launch of the Apple App Store in 2008, giving a big boost to develop power in particular and broadening the market from niche proposition to virtually every Smartphone owner downloading mobile games (European Games Developer Federation, 2010).

Among of all mobile games available on the market, Angry Birds game has been one of the great runaway hits of 2010. The game topped the iTunes charts for most of the year – the price tag on the Apple marketplace was only a buck, making Angry Birds very attractive to casual gamers – and a free version for Android phones has also proved popular (Matthew Shaer, 2010). On 9th May 2010, the developer (Rovio) announced that downloads of all of its Angry Birds titles have topped 1 Billion.

Thus, due to this notable achievement of this phenomenon, it is relevant for us as a researcher too look into this mater, with focus on the reasons of this game popularity in terms of its usability, design and other relevant features that are related.

II. LITERATURE REVIEW AND THEORETICAL PERSPECTIVES

2.1 The Angry Birds

"The survival of the Angry Birds is at stake. Dish out revenge on the green pigs who stole the Birds' eggs. Use the unique destructive powers of the Angry Birds to lay waste to the pigs' fortified castles. Angry Birds features hours of gameplay, challenging physics-based castle demolition, and lots of replay value. Use logic, skill, and brute force to crush the enemy", that is what is Angry Birds being described by the developer, Rovio (Apple App Store). Well, what is actually an Angry Birds game is all about? What is the classification that suits well for this game?

Angry Birds is a physic based puzzle video game, which is developed by Rovio (Scott Rogers, 2012). It was first released for iOS in 11th December 2009 (IGN), and on 9th May 2012, Peter Vesterbacka announced at CTIA 2012 that the game hit 1 billion cumulative downloads (Matt Brian, 2012). This leads the company to launch various versions of Angry Birds for different platforms: Angry Birds, Angry Birds Seasons, Angry Birds Rio, Angry Birds Space, Angry Birds Friends, Amazing Alex, Bad Piggies and Angry Birds Star Wars (Rovio).

The original idea for the Angry Birds characters was actually coming up from Rovio's Senior Game Designer, Jaakko Iisalo. Back in the early 2009, when toying around with numerous game concepts, Jaako contributed his idea regarding the character design. Later, as the concept evolved and the Birds needed some opponents, the pigs were born. Due to the swine flu pandemic at that time, this inspired the pigs to look sick and green in colour (Jon Mundy, 2010).

This game is basically relying on the simple concept. Players are intended to destroy all the pigs on the playing field

stationed on or within various structures by using a slingshot to launch birds. As mentioned by Vesterbacka him, "The simplicity and addiction of Angry Birds is somewhat reminiscent of Tetris" (Erik Holthe and Azamat Abdymomunov, 2011). As players advance through the game, new types of birds become available. Some of them are also included with special abilities that can be activated by the player (Angry Birds v3.1.0, 2013).

A. Theories of Games Usability study

According to Mark Overmars 2011, there are several features that should be considered while designing a successful mobile game. However, it seems that there are a total of five crucial features that should be given more focus. They are the Game's Design, Controls, Social Features, Assets and Menu Screens/Navigational Features. Below are the explanations of each Usability Features:

i. Game's Design

For the Game's Design, it is important for designers to know that people play games differently than on a console or PC. For mobile games, it is important to design the game which allows players to play in brief bursts that can be short as 2-5 minutes and are rarely longer than 30 minutes. Moreover, estimate that players could be having a long break time between play sessions, which means they are eager to forget what happened in the previous session. Thus, it is important to design the game with a natural point to interrupt playing the game, and save the state at such a moment. One of the best methods is by breaking the game into many different levels.

Besides, in order to avoid bigger problems, the game shouldn't be very complex and the learning curve mustn't be steep. Begin the game with ease and slowly increase the difficulty. Support each level with nice graphics and animations, surprising game elements so players with high playability skills won't get bored although the game is too easy for them at the beginning.

Include tutorials, but not in the form of manuals. It is better to start the game with an in-game tutorial, make the first levels extremely easy and introduce additional elements in further levels.

Collecting Stuff is another good thing to be included in a game, as people love to collect things. However, it is not supposed to be as the main goal of the theme, use this as a powerful extra in a game, which will considerably increase playing time, and provides an additional challenge for players. Stimulate the player to start collecting hidden item, by giving some sort of rewards or achievements.

Another tip for the Game's Design would be that the game has enough content. Create lots of levels in the game, and design them for replayability. Moreover, design for extensions or additional content to the game.

Final tips for this part would be the multiplayer modes. It is quite a good choice to include this mode in order to stimulate them to buy this game, as it allows players to play with others or friends. However, in Angry Birds case, this doesn't seems to be the issue, but multiplayer is not a bad choice to be included with.

ii. Controls

Controls must be defined carefully as the iPhone and Android phones today mostly do not own buttons, and the screen is relatively small. So, design large buttons to avoid player misses them, and react/respond to the mouse press event (while tapping the screen) as the button will eventually cover by finger.

Make sure to have only a small number of buttons in order to make the game easier to play, as the game is also being played casually.

Despite of using virtual buttons, another particular control would be the swipe. It is used for example while scrolling through options or to indicate a particular direction. Thus, it is easy for player to implement swipes, mouse press, down and release events.

Allowing tilt control is another good option for designing games. However, this can be frustrating when precise control is required unless, this is the real challenge of the game.

So, once again it is crucial to choose and design the controls carefully. Make sure that controls used are efficient enough and relevant to the theme and game's design.

iii. Social Features

This feature is considered as important nowadays, as people want to let their friends know what games they play and how good are they at them, and at the same time competing against other players. Most mobile games today are connected to worldwide leader boards. For Angry Birds case, it is connected to the Game Center Leaderboards, which also a feature includes in IOS devices. Within Game Center, the player can see their ranks overall in the world and also ranks among his/her friends. Besides of viewing the ranks, a player could also shares scores to Facebook using the Game Center. Moreover, achievements are also another way in which players can show others how good they are in the game. Achievements generally based on the basic progress aspects of the game such as the number of levels solved or others. However, there are also funny achievements included in a certain game today. Anyway, Achievements create replay value as certain player might try to reach all the achievements available.

iv.Assets

Assets can be divided into two parts:

i) Art and visual design

No matter how good the gameplay in the game is, without nice art and good visual design, the game won't get noticed by people. Begin with designing a great game's icon and screen shots to attract customer. Then, the game should also have an effective style of art, as this can considerably enhance the gameplay experience and immerse the player in the game world. A good visual design will also make the game clear and easy to play.

ii) Sound and music

Although mobile devices often play in noisy environments, that doesn't mean that this feature is not important. At least, put some effort into this to make the game effectively. Use a consistent style of effects and use background music that players could easily remember. It also supposed to sound good on earphones.

iii) Fonts

Fonts should be consistent with the look and feel of the game. Besides, it should also large enough and easy to read.

v. Navigational Features

The navigational menu structure should be logical and easy to navigate. Less is better here. All screens should have a consistent style and layout that look beautiful. Moreover, there shouldn't be many options in the game. Finally, the game should also has a Credits screen.

As presented above. It is quite acceptable to say that usability study is one of the important thing for designing a mobile game. However, this usability study which was introduced by Mark Overmars could also be connected with some ofthe HCI principles. For this paper, we generally focus on relating the Mark Overmars principles with Nielsen's Ten Heuristic (Alan Dix, Janet Finlay, Gregory D. Abowd, Russel Beale; 1993). Below are the Nielsen's Ten Heuristic and its explanations:

i. Visibility of system status

This is important as it keeps users informed about what is going on through appropriate feedback within reasonable time. Example implementation on mobile game's design purpose, would be the "Loading" screen, which tells player that the game is currently loading.

ii. Match between system and the real world

The system (game) should speak the user's language, with words, phrases and concepts familiar to the user. In mobile game's, example implementation can be seen on the Assets part, instead of focusing just on the fonts used, it is also important to focus on the language, words and phrases used in the game. Moreover, the use of virtual buttons, slide, drag and touch controls are another example of concepts obtained from the real world.

iii. User control and freedom

This part emphasizes on supporting redo and undo on a system, as users often choose system functions by mistake. Moreover, a clearly marked "Emergency Exit" would be necessary to leave the unwanted state. In mobile game, example implementation can be seen in the "Home" icon button, presented in Angry Birds game.

iv. Consistency and standards

It is important to avoid users wondering whether words, situation or actions mean the same thing in different contexts. Follow platform conventions and accepted standards. For mobile games, this can be seen crucial in navigational designs, the use of the assets (art, visual design and sounds) which includes the graphic to fonts. Everything should be consistent to avoid player's misunderstanding.

v. Error prevention

In simple words, make it difficult to make errors. In games, the prevention can be done by stating clear navigations and a good choice of controls design. Once again, the simplicity is the key to prevent unwanted actions from player. This is because game's only requires a particularly chosen type of input from the player. Unlike a real life system (for example a web based system), user's input could be in various form, such as words, numbers and others. Wrong input being keyed-in into a certain field could leads to unexpected errors. Error prevention is much easier to implement for games design.

vi. Recognition rather than recall

Make objects, actions an options visible. Everything in the game should be visible for player to see. For example, the options in the game are visible for the player to see. Another example is when a user taps on a button, the actions should trigger the game to go for next event. Then, this should be supported with sounds and visual or animations.

vii. Flexibility and efficiency of use

The original usage for this part is actually to allow users to tailor frequent action, such as the accelerators, which is unseen by novice user but may speed up interaction for the expert users. For mobile game, there is not much thing to do with this part. However, the term flexibility and efficiency of use can be interpreted for example in the use of the game controls, where it supposed to work efficient enough to user's actions, and easy to use.

viii. Aesthetic and minimalist design

For general use in information systems, it emphasize on the use of information on dialogs, where it support only relevant and important information. For mobile game interpretation, this could be used in ther terms of overall game's design where it the navigations, controls and gameplay should be as simple as possible.

ix. Help users recognize, diagnose and recover from errors

Error messages should be expressed in plain language. For mobile games, this is possibly seen whenever the game is failed to load or while the game failed to connect to the leaderboards server.

x. Help and documentation

For the use of general interactive system, it is suggested to include it with help and documentation. However, in mobile game tutorial are both in-game and also retrievable anytime needed.

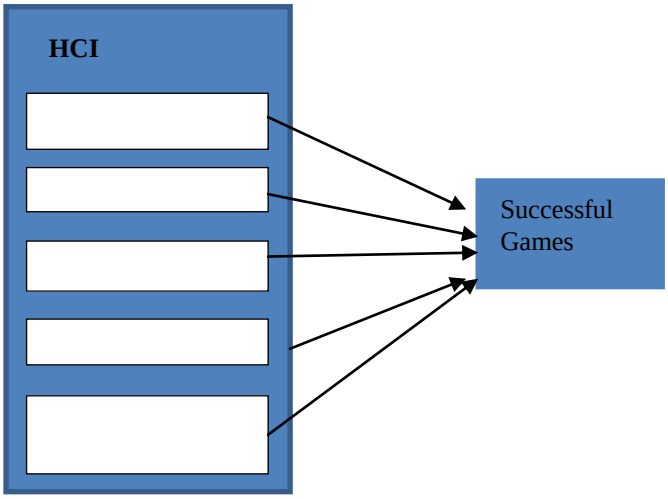

Figure 1: The use of Successful Game Features in Developing Successful Games.

III. METHODS

3.1 Population and Sampling

As this research requires information from people as respondents, therefore this research falls under the category of descriptive survey study.

The targeted people for this research to are known as the population. For this research, the populations used are students' from Unisel, employees from Unisel, Coway's Cheras Employees, HKL staffs, Hospital Sungai Buloh's staffs. However, all of the populations are randomly selected due to avoid Bias.

In order to obtain relevant results, the questionnaire was also designed for identifying which respondents play the "Angry Birds" and which respondents don't. As the questionnaires were being distributed randomly, this would be the best way to identify which user really plays Angry Birds and which one does not.

The researcher selected 83 respondents from the target population. These selected people were the actual samples for the researcher and they are called the accessible population. Throughout this research, the accessible population is referred to as respondents.

3.2 Instrument and data analysis

3.2.1 Questionnaire

The instrument used to collect information from the respondents was the questionnaire. These questionnaires were distributed randomly to students and employees at selected venue. It was quite easy for distributing the questionnaire due to the co-operations given by most lecturers and friends.

3.2.2 Online Questionnaire

Similarly to the paper based questionnaires, these questionnaires consist of exactly the same questions and distributed randomly. Designed on KwikSurveys (kwiksurveys.com), these questionnaires were then distributed randomly through Facebook (majorly), and also through e-mails. Shown below in the Figure 3.2, 3.3 and 3.4 are the layout for the website and the online questionnaire.

The questionnaire was developed based majorly on the Mark Overmars mobile games design principles and at the same time combined with the Nielsen's Ten Heuristic, and was divided into two Sections, with Section A, a multiple choice questions that focused on respondent's information, and Section B, a likert scale questions that focused on the five features of Mobile Game. The likert scale was used to measure the respondents' opinions'. Using the 5 points scale "strongly agree = 1" "agree = 2" "neutral = 3" "disagree = 4" "strongly disagree". Responses from the obtained were then analyzed using the (SPSS) software which stands for stastical for social sciences (SPSS).

IV. FINDING AND DISCUSSIONS.

The finding is presented in three sections. First, the demographic data are presented, which is then followed by the correlation table of relationship among Games Design, Controls, Social Features, Assets and Navigational Features in determining mobile game successfulness.

4.1 Demographic data

There are 32 (38.6%) males and 51 (61.4%) females who participated in this study. These figures are almost representative of the general population (in term of gender) in Malaysia. In terms of age, it can also be seen that there were 16 (19.3%) from the age of 17 to 20 years old, 20 (42.6%) from the age of 21 to 24 years old, 47 (56.6%) from the age 25 and above years old. This indicates that the female population is the highest in percentage of involve in this research. Majority of handheld users can get the mobile games either Pay or Free download. Based from the survey, it shows that the "Pay" has the frequency of 6(7.2%) and "Free" has the frequency of 77(92.8%). In addition to that, most of the respondents are using Android, with 55 frequencies (66.3), iOS with 20 frequencies (24.1%) and less use for Symbian platform.

4.2 The relationship between Games Design, Controls, Social Features, Assets and Navigational Features in determining mobile game successfulness.

Pearson Correlation Testing was carried out in order to measure the relationship among all the Mobile Game Features. The entire hypothesis of this research suggest that there is the positive and strong relationship among all Mobile Game Features, which are the Games Design, Game Controls, Social Features, Assets and Social Features.

Table 1: *The relationship between Games Design, Controls, Social Features, Assets and Navigational Features in determining mobile game successfulness.*

	Score A, Games Design	Score B, Controls	Score C, Social Features	Score D, Assets	Score E, Navigational Features
Score A, Games Design	1				
Score B, Controls	0.528**	1			
Score C, Social Features	0.380**	0.188*	1		
Score D, Assets	0.565**	0.603**	0.420**	1	
Score E, Navigational Features	0.553**	0.523**	0.293**	0.665**	1

(**) Correlation is significant at the 0.01 level

(*) Correlation is significant at the 0.05 level

All results obtained through the analysis are showing a strong yet positive relationship among all the Mobile game Features. Thus, showing that Mobile Game Features are important features for a mobile game developer to be considers about. All then values for each correlation are supposed to be the same, where n = 83.

Based on the correlation analysis, it seems that the majority of the variables used in this research is linear both positive and negative of the significance value of 0.01 (2-tailed) and 0.05 (1-tailed). First correlation, which is between Score A and Score B returns the values of r = 0.528. Second correlation, which is between Score A and Score C returns the values of r = 0.380. Third correlation, which is between Score A and Score D gives the value of r = 0.565. Fourth correlation, which is between Score A and Score E gives the value of r = 0.553. Fifth correlation, which is between Score B and Score C returns the values of r = 0.188. Sixth correlation, which is between Score B and Score D returns the values of r = 0.603. Seventh correlation, which is between Score B and Score E gives the value of r = 0.523. Eighth correlation, which is between Score C and Score D returns the values of r = 0.420. Ninth correlation, which is between Score C and Score E returns the values of r = 0.293. Tenth correlation, which is between Score A and Score B returns the values of r = 0.665.

V. CONCLUSION AND FUTURE RECOMMENDATIONS

As being shown in all of the correlation results, it is clear to reject the null hypothesis that there is no significant relationship between Games Design, Controls, Social Features, Assets and Navigational Features in Mobile Game Features, thus supporting the Hypothesis that there is a significant relationship between Games Design, Controls, Social Features, Assets and Navigational Features in Successful Mobile Games. The highest correlation is r = 0.665, where the correlation between Score D (Assets) and Score E (Navigational Features). It shows that the Asset element such as art, visual design, sound, music and font having a strong positive relationship with the Navigational Features such as easy to navigate which could contribute to the successfulness of the mobile game. However, the lowest correlation is r = 0.188, where correlation between Score B

(Controls) and Score C (Social Features). The relationship between the controls used towards connected to worldwide leader boards have a weak positive relationship.

These situations might be caused by factors which include small number of respondents, Model used for this research is not suitable and methods for distributing the questionnaires via random in order to avoid bias. So, it is suggested to have more respondents which exceed 80 persons (it'd be better to have more than 100 persons), find a more suitable model which still relates to the Game Usability issues and respondents should be selected based on their tight background with video games (however, this might be consuming loads of time in order to determine whether the respondents are suitable or not to be part of this research). Moreover, it would be better if the future research includes o Qualitative Data to support the quantitative approach. While quantitative data is useful in determining whether the Mobile Game Features and Demographics have an impact towards Games Selection, qualitative data could be helpful in explaining the anomalies in the survey data.

Due to this matter, it is suggested a future research should be done in order to improve the results in supporting the relations between Mobile Game Features and User's Acceptance in Games Selection.

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