

# Analysis on Types of Mobile Games Played among the IHL Students in Malaysia

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*Abstract:* - Mobile phones are no longer a luxury but are now considered a necessity by its users. Many applications are developed to replace electronic devices and extra 'baggage' that people used to carry around with them. A mobile phone now also serves as a planner, camera, music player, video player, gaming console, calculator and other useful gadgets. Mobile gaming is getting more attention from gamers as one of the most preferable type of digital games. One good reason that contributes to the success of mobile game is because of its mobility, which means gamers can play games anytime and anywhere. In this paper, we examine the usage of mobile games as compared to other types of digital games such as console or arcade games in Malaysia. We also perform a series of analysis regarding to students preferences in every gaming phase from console or arcade games to mobile games. A survey on user preferences among students of Institute of Higher Learning (IHL) has been done to gather useful information and relevant data to support this paper. The survey showed that an overwhelming majority (60%) of the respondents prefer to play games on mobile phone. The data that have been gathered from the survey were analyzed using Statistical Package for Social Science (SPSS), Release 13.0.0, to investigate the number and percentage of students that use mobile games. The future direction of this study is discussed at the end of the paper.

*Key-Words:* - Mobile game, mobile learning, mobile phone, programming

## 1 Introduction

Be it online, offline or on a mobile device, gaming is an industry that is growing and catching up speed. At the same time, mobile phones which are being used as a platform for games are becoming a necessity for the public. A growing body of research [1] indicates that mobile technologies can be an effective tool in catering for students in a digital age and there are signs of the motivating potential and possible learning gains of games played on mobile devices with young adult audiences. The market for mobile games is an important growth area for the games industry. There are estimated to be 1.5 billion mobile phones in the world today [2]. This is more than three times the number of personal computers (PCs), and today's most sophisticated phones have the processing power of mid-1990s PC. The market for mobile games is an important growth area for the games industry. The market is predicted to grow rapidly with the convergence of mobile technologies and as mobile applications become less constrained by device limitation. Last generation of mobile devices have

higher definition color screen, enhanced memory and many more functionalities, which in turn makes mobile gaming more appealing. The development cost which is lower for mobile games than for games on traditional platforms contributes to its popularity. Furthermore, most new phones now include preloaded games, and all but the cheapest models offer downloading additional games. There are large numbers of games available on the market to be purchased and downloaded for only a few Ringgit Malaysia (RM) each. Mobile phone companies are competing with each other to provide the latest and most sophisticated mobile phone models to users. With the increasing number of mobile phone models, the number of mobile games is also getting higher. With this growing interest in mobile gaming, phone companies are starting to develop mobile phone which doubles as a gaming device. The ultimate example is the Nokia N-Gage QD game deck, which is primarily a portable games machine but can also be used as a phone.

Therefore, with the sophistication and affordability of mobile technologies and applications, it also gives a good impact on the educational area. Mobile phone is

getting popular for the role as a new learning tool which is known as the m-Learning (Mobile Learning). However in seeking to cater for the learning needs of young audiences, who in general have high relation to mobile technologies, merely trying to adapt e-learning approaches for use with mobile technologies will not be sufficient. Young adults in particular need m-learning opportunities that are not only cognitively accessible but that also engage them in effective learning.

The paper is organized as follow, Section 2 discusses on the survey methodology. Section 3 describes the major findings drawn from a survey done on a group of IHL students. Section 4 will present future direction of the research and lastly section 5, the concluding part, summarizes key issues of paper.

## 2 Survey Methodology

The data for this paper came mainly from a survey conducted in Jun 2006 at University Malaya (UM). A survey was formulated to include questions on the use of mobile phones among students in IHL. In this study both quantitative and qualitative data were collected. The survey was done based on interviews with 129 students by questionnaires. They were asked questions in four major areas:

- Their preferences for playing digital games either on mobile phones or not (on PCs and consoles)
- Their frequency in playing games in a day
- Their preferences for downloading game/s using SMS
- Their favorite type of mobile game

Possible correlations of these aspects are discussed in Section 3.

The questionnaire consists of two parts. The first part investigates more on the use of mobile phone among students whereas the second part investigates student profile (demographics). Again, possible correlation will be made between major areas as below:

- Gender
- Age
- Degree of education

They were asked several questions in order to answer this research question:

- Do students like to play more than one type of mobile game?

## 2.1 Survey Method

Before questionnaires were distributed to the target respondents, a systematic checking or prior testing of the questionnaire was carried out. The purpose of this prior test is to ensure that the questions are clear and arranged in a logical order so that the respondents are able to answer them without difficulty [3]. The test concentrates on the ease with which the questions flow, the word chosen in the questionnaire, the appropriateness of the number of questions and the issues presented in the questionnaire. The modified questionnaires were then handed over to University of Malaya (UM) students.

The questionnaire used was a mix of open-ended ("how frequent do you play mobile games in a day?") and close-ended ("Do you play games on your mobile phone?") types of question with ordered response option which is easy for the respondents to answer. The SPSS software has been used for calculating the percentage of results obtained from the questionnaires.

## 3 Survey Outcomes

In this section, we present some of the most significant findings of the study, which lead to a more substantial discussion of our observations in the subsections. The discussion is all about defining correlation between students who play mobile games and students who do not prefer to play mobile games at all.

Correlation is one of the most common forms of data analysis because it can provide an analysis that stands on its own, and also because it underlies many other analyses. Correlation measures the linear relationship between two variables. The correlation table displays Pearson correlation coefficients, significance values and the number of cases with non-missing values (N). A correlation coefficient has a value ranging from -1 (a perfect negative relationship) to +1 (a perfect positive relationship). A value of 0 indicates no linear relationship. A correlation coefficient of 1 describes a perfect relationship in which every change of +1 in one variable is associated with a change of +1 in the other variable. A correlation of -1 describes a perfect relationship in which every change of +1 in one variable is associated with a change of -1 in the other variable. A correlation of 0 describes a situation in which a change in one variable is not associated with any particular change in the other variable.

In other words, knowing the value of one of the variables gives you no information about the value of the other.

The significance of each correlation coefficient is also displayed in the correlation table. The significance level (or p-value) is the probability in obtaining results as extreme as the one observed. If the significance level is very small (less than 0.05) then the correlation is significant and the two variables are linearly related. If the significance level is relatively large (for example 0.50) then the correlation is not significant and the two variables are not linearly related.

### 3.1 Students Preferences on Playing Mobile Game

Table 3.1 shows the percentage of students who prefers to play games on mobile devices (mobile phones). A percentage value is given to these categories: “play games”, “gender”, “age”, “educational games”, “type of payment” and “RM0.50 download cost”. The survey shows that 54 percent prefers and are already playing games on their mobile phone. From the histogram, it is found that 54 percent out of 129 respondents are female who do play mobile games whereas the rest are male which is about 59 respondents. Although gaming is synonymous with the male gender, the histogram proofs that a significant number of female do play mobile games as well.

This survey is distributed among the target respondents of different ages. Among them are students aged between 16-25, from Certification, Diploma and Degree education background, students aged between 26-40 from Masters education background and those aged 41 and above are PhD students and higher. The table above shows that as age increases, the passion for gaming decreases. Here we may conclude that the higher the educational background the students have and the older they get, they are less willing to play games on mobile devices.

As indicated from the result, most of the respondents, both male and female choose to download games using their mobile phone although most of them are using prepaid credit rather than monthly billing tariff. Most of the respondents choose to download their games via mobile phone as it is cheaper and easier.

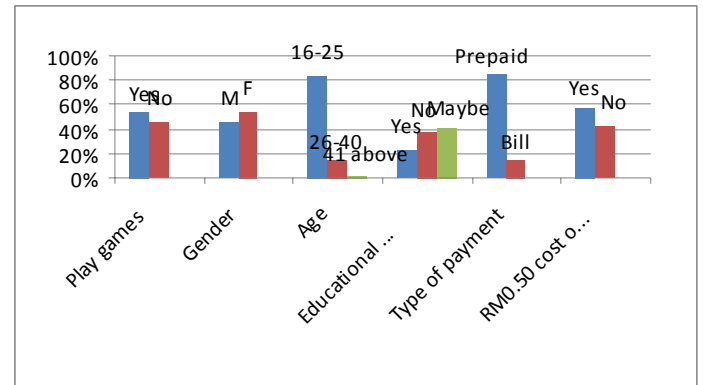


Table 3.1 General survey result

#### 3.1.1 Relationship between Play Mobile Games and the Types of Mobile Games

From Table 3.2, it shows that only 68 respondents play mobile games from its total respondents which are 129. There are five main types of games that were being used in the survey which are strategic thinking games, reflex games, eye focus games, edutainment games, and war games. Among them, eye focus game type is played by students the most. Games that fall under this type are, for example, Snake, Skill Ball Lingo, and Worms’07.

#### 3.1.2 Relationship between Strategy Games and Other Types of Game

From the table, the relationship between students who play reflex games and strategy games is not significant and acceptable. This is because it is less than 0.05. Most students who do not play strategy games also do not play edutainment and war games as well. The significance of both relationships is more than 0.4. However, students who play the strategy games also play eye focus games. The correlation is far from 1 which is only 0.066. This relationship is confirmed by its significance which is more than 0.05. These two types of games need different skills which are thinking and physical movement.

#### 3.1.3 Relationship between Reflex Games and Other Types of Game

From 3.1.2, the relationship between strategy games and reflex games is not acceptable. The correlation between reflex and eye focus games, edutainment, and war games is negative. This means that any students who do not play reflex games do not usually play other games as well. Reflex games are one of the basic type of games

players start of with before they move on to play other games. Basically, in this type of game, the players do not have to think much but just concentrate on their hand or fingers movement to interact or react with the game. Reflex games are also considered or categorized as a game that focuses on the hand-eye coordination.

### 3.1.4 Relationship between Eye Focus Games and Other Types of Game

The correlation between eye focus games and strategy and edutainment games is positive. Students who prefer to play eye focus games will prefer both games too. The significant of both relationships is more than 0.5, which means they are strong.

		Play Mobile Game (yes)	Strategy Games	Reflex Games	Eye Focus Games	Edutainment Games	Strategy/War Games
Play Mobile Game (yes)	Pearson Correlation	1	.023	.137	.156	.070	.050
	Sig. (2-tailed)		.850	.266	.203	.568	.686
	N	129	68	68	68	68	68
Strategy Games	Pearson Correlation	.023	1	-.253(*)	.066	-.096	-.091
	Sig. (2-tailed)	.850		.038	.594	.435	.459
	N	68	68	68	68	68	68
Reflex Games	Pearson Correlation	.137	-.253(*)	1	-.004	-.096	-.289(*)
	Sig. (2-tailed)	.266	.038		.973	.435	.017
	N	68	68	68	68	68	68
Eye Focus Games	Pearson Correlation	.156	.066	-.004	1	.009	-.036
	Sig. (2-tailed)	.203	.594	.973		.944	.768
	N	68	68	68	68	68	68
Edutainment Games	Pearson Correlation	.070	-.096	-.096	.009	1	-.156
	Sig. (2-tailed)	.568	.435	.435	.944		.205
	N	68	68	68	68	68	68
Strategy/War Games	Pearson Correlation	.050	-.091	-.289(*)	-.036	-.156	1
	Sig. (2-tailed)	.686	.459	.017	.768	.205	
	N	68	68	68	68	68	68
*Correlation is significant at the 0.05 level (2-tailed).							

Table 3.2 Correlation between Students Preferred Mobile Games

### 3.1.5 Relationship between Edutainment Games and Other Types of Game

The relationship between edutainment games and eye focus games is positive. The relationship with the other games is negative. It is obvious that whoever that do not play edutainment games will unlikely want to play strategy and war games as well. These three games need players to think and have some knowledge to manipulate in order to win the game. However, students who like eye focus games also like to play edutainment games too with the correlation of 0.009 only (small number of students).

### 3.1.6 Relationship between War Games and Other Types of Game

The correlation between war games and reflex games is negative with significant being less than 0.05. As a result, the relationship is unacceptable. The other relationships are negative. Therefore, it can be concluded that students who do not play war games will not play strategy, eye focus, and edutainment games too.

### 3.1.7 Analysis of the Relationships

The relationships between these five types of mobile games have been analyzed using the Pearson Correlation. They are strategy, reflex, eye focus, edutainment, and war games. Two relationships are not acceptable which are; 1) strategy and reflex games, and 2) war and reflex games. Only two relationships have positive correlation. The first relationship is between strategy and eye focus games. Its correlation is only 0.066 which is far from 1. This means that not many students prefer both games at the same time. The second relationship is between eye focus and edutainment games. Both games do not need much physical reaction. Therefore students who prefer these types of games are into brain challenging games. There are two other relationships that have negative correlation for all relationships which are reflex and war games. Students who do not like reflex games will not like the other four games as well. Same conclusion goes to war games correlation. Students who do not like to play war games will not like to play any of other types of games as well.

### 3.1.8 Relationship towards Favorite Game.

From the Table 3.2, it noticed that for variables Play Mobile Game and Favorite game (Strategic Thinking,

Reflexes, Eye Focus, Edutainment, Strategy/War), the number of respondents, N, differs. This is because only 68 of the respondents play mobile game. For example, a Pearson correlation coefficient shows that there is a positive relation between students who prefer playing game and the favorite type of game which is Reflex Games. This correlation coefficient is .137. This tells us that students prefer to play Reflex games. The correlation between this type of game and students who do play games is statistically not significant ( $p > 0.05$ ) and not linearly related. Other correlations between students who prefer playing games and favorite type of games are positively associated. Also observed was that there is a statistically significant ( $p < 0.05$ ) negative correlation coefficient (-.253) for the association between Reflex and Strategic Thinking games, indicating that the linear relationship between these two variables is 5 in which the value of one variable decreases as the other increases.

### 3.1.9 Relationship towards Gender

This output gives us two correlations matrix in the above dialog box (Table 3.3). Note that there are four cells in the above matrix, but there is only one correlation coefficients of interest: the correlation between playing mobile games and gender, and the correlation between gender and playing mobile games. The reason why only two of the four correlations are of interest is because the diagonal consists of correlations of each variable with itself, always resulting in a value of 1.00 because each variable has a perfect positive linear relationship with itself, and the values on each side of the diagonal replicate the values on the opposite side of the diagonal. For example, the correlation coefficient shows, there is a positive correlation (.009) between playing mobile games and gender, indicates that students who prefer to play mobile games depend on the amount of students, either male or female. The significant level is relatively large (.922) which means that the correlation is not significant and the variables are not linearly related.

		Play Mobile Game (yes)	Gender
Play Mobile Game (yes)	Pearson Correlation	1	.009
	Sig. (2-tailed)		.922
	N	129	129

Gender	Pearson Correlation	.009	1
	Sig. (2-tailed)	.922	
	N	129	129

Table 3.3 Correlations between Playing Mobile Game and Gender

### 3.1.10 Relationship towards Downloading Game Using SMS

Table 3.4 shows the positive correlation coefficient between students who prefer to play game is .013. The correlation is not significant and not really linearly related to each other ( $p > 0.05$ ). There are 72 respondents out of 129 who choose to download games via SMS (Short Message Service). The correlation indicates that the more students play games, the higher the number of the game will be downloaded.

		Play Mobile Game (yes)	Download game using SMS
Play Mobile Game (yes)	Pearson Correlation	1	.013
	Sig. (2-tailed)		.914
	N	129	72
Download game using SMS	Pearson Correlation	.013	1
	Sig. (2-tailed)	.914	
	N	72	72

Table 3.4 Correlation between Playing Mobile Game and Download Game Using SMS

## 3.2. Student without Preferences to Play Mobile Game

### 3.2.1 Relationship towards Gender

Table 3.6 shows a correlation between students who do not prefer to play mobile games and gender. Non-mobile

gamers and gender do not have a significant linear relationship. A Pearson correlation in this table shows that it is negative. The Person Correlation Coefficient -.009 is indicated by the significant level of .992.

### 3.2.2. Relationship towards Age

Table 3.7 gives us a correlation between students who do not play mobile games and age. A Pearson correlation coefficient shows that it is a positive relation between students who do not play games and their age. This correlation coefficient is .130. However, the significance level is relatively large (.143) therefore the correlation is not significant and the two variables are not linearly related. This tells us that the older the students are, the lesser the passion or interest in playing games.

		Play Mobile Game (no)	Gender
Play Mobile Game (no)	Pearson Correlation	1	-.009
	Sig. (2-tailed)		.922
	N	129	129
Gender	Pearson Correlation	-.009	1
	Sig. (2-tailed)	.922	
	N	129	129

Table 3.6 Correlation between Student who is not Preferred Playing Mobile Game and Gender

		Play game (no)	Age
Play game (no)	Pearson Correlation	1	.130
	Sig. (2-tailed)		.143
	N	129	129
Age	Pearson Correlation	.130	1
	Sig. (2-tailed)	.143	
	N	129	129

Table 3.7 Correlation between Student who is not Preferred Playing Mobile Game and Age

### 3.2.3. Relationship towards Degree of Education.

Table 3.8 shows a correlation matrix for the three correlations requested in the above dialog box. A Pearson correlation coefficient shows a negative relationship between students who do not play games and their age. This correlation coefficient is  $-.093$ . However when the significance level is relatively large (.296) then the correlation is not significant and the two variables are not linearly related. This tells us those students who have a higher educational background are less interested in playing games. In other words, the higher the level of education, the lower their likelihood to play games.

## 4.0 Future Research Direction

Future study could be done on students' preferences and familiarity with mobile learning. For examples, finding out the type of learning and knowledge that should be converted into mobile platform, how learning can be done via a mobile platform, and also the effects of mobile learning for students. Mobile games to support learning could also be a new area of study where more research could be done to analyze the acceptance of students on mobile learning through games. From this paper we have identified the type of mobile games that students prefer and that could be used as a basis when further studies on mobile learning is done. We could then design the appropriate content and match it with the preferred gaming style or game type as defined by this paper. Further surveys should be done to support this direction of mobile application.

## 5.0 Conclusion

In this paper, a survey on mobile games usage among the IHL students was conducted. The rationale for conducting this survey was based on the rapid growth of mobile phone usage especially among IHL students. The survey investigated that 54 % out of 129 students are mobile gamers. The discussion is all about defining correlation between students who do play mobile games and students who do not play mobile games at all. There are a few relationships that have been investigated in this survey.

The relationship towards favorite games shows that the students who play mobile games would chose Reflex games. This study also concludes that students find games through mobile easier to be obtained hence easily

downloaded through SMS. In fact, mobile games seem likely to replace most of other game platforms such as console and arcade. The paradigm shifts from conventional game platforms to handheld would be depended on the portability of the platform and this would consume time. Students prefer to play mobile games on the bus, cars, trains or it could even be in lecture rooms while waiting for the lecture to begin. This survey shows that the likelihood of playing mobile games would decrease when these two scenarios occur: (1) the age of the player increases (2) the level of the player's education increases.

Further direction of this research can be focused on the implementation of mobile games for learning where the acceptance of students to learn through this method can be studied and analyzed. Results on that could pave a way for the development of mobile based learning games to further reap the benefit of both the mobility and the entertainment aspect of mobile games.

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