

The Effects of Mobile Games on Male Adolescents using Data mining techniques- A Review

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Abstract: In following study “The effects of mobile games on male adolescents using Data mining techniques”, various papers are reviewed. There are about 67% mobile users world-wide. Almost every mobile user has a mobile game installed on their mobile. Most of mobile users play mobile games, while adolescents are very specific and keen users of mobile games. This paper introduces mobile game usage gaming addiction among adolescents, it reviews difference between computer games, video games, console games and mobile games and it then reviews positive and negative effects of mobile games on male adolescents using data mining techniques.

Keywords: Adolescents, mobile game, PC game, console game, video game, sampling, Data mining

A. Introduction

Mobile gaming has become an integral part of adolescents over the past few years as smartphone graphics and processors have improved. Adolescents form the major users of mobile game. Assessing mobile gaming addiction in children and adolescents is important as there is maximum development in physical and psychological attributes, it appears that addictions tend to have precursors during adolescence [1] [Hawkins and Fitzgibbon, 1993] during this period of time.

In following study, reviews regarding effects of mobile games on adolescents are reviewed .various studies using various methods of sampling, data processing and results produced are presented. This study depicts difference between various video games played, different types of effects adolescents face due to mobile game play and different techniques used in various scopes.

Video Game, Personal/Computer Games, Console Games and Mobile Games

Video games are all type of electronic games played on a video screen may be a television, a built-in screen, a

computer or on mobile. It is essentially the same form of entertainment, but refers not only to games played on a personal computer, but also gamesplayed on a computer, console or mobile.Video games for home,personal use are also proved popular from the start. Adolescents are particularly attracted to them for a variety of reasons. Fantasy simulations attract the young imaginations and provide and relax from everyday routine and the stresses presented by parents, friends, and school. In addition, the games give adolescents a level of control that they do not experience in real life, as the characters on the screen respond to the children's commands. Adolescents also receive immediate rewards may be in any form for getting the success.

Computer game or personal computer (PC) game is a type of video game played on a personal computer. It is a game that you play on a computer normally with input devices like keyboard; mouse and joysticks etc .They can be played with or without an Internet connection.They have been introduced since the invention of personal computers. There is huge number of games available for the PC platform. Computer games have become most popular because they can be used for fun and for learning. There is need of specific computer software and hardware in order to play the games, in most cases, the computer's graphics card, sound card, processor, power supply and even the operating system may

need to be upgraded to play the latest specifications game. New users needs help to understand computer games. With the help of the Internet, PC-based online games have also become available online withwhich multiple players can play together or against each other.

Console game is a type of video game which uses interactive multimedia software to provide an interactive multimedia experience via a television or other display device. The game console generally consists of a handheld control device or cameras to monitor user movements and a display device that runs the game's software. A console game is also known as video game. Console game media is stored in a disk, which is inserted into the game console device. Before 90s most game consoles used cartridges, which stored the game's programming on integrated circuits. The game is usually controlled and managed using a handheld device connected to the console. The hand held device generally contains a number of buttons and directional controls such as analogue joysticks, each of which has been assigned a purpose for interacting with and controlling the images on the screen. The latest game consoles can download game content directly from the web to built-in storage devices.

Console games may also be played on specialized computers, which may be referred to as game consoles. Using audio-video output devices, video and sound are controlled by players' interactions with game characters through handheld controllers. Some of popular Consoles are Famicom, Xbox, PlayStation, Nintendo Switch, Wii etc.

Mobile games are defined as games conducted in handheld portable devices with network functionality. The two key elements of this definition are portability and networkability. In this definition, mobile games are generally referred to as the games played in handheld mobile devices such as cell phones and PDAs with wireless communication functionality. In terms of portability and networkability, the characteristics of mobile games differ from other device platforms such as PC and console games; they do not have both portability and wireless capability.

Differentiation between Mobile Games and Video, Computer, Console Games.

Mobile gaming revenues are eventually more than the money generated by console and PC games. Games from tablets and Smartphone's will generate a total of \$36.9 billion in revenues or 37 percent of the total market which is expected to reach \$99.6 billion this year, according to research firm *Newzoo*. [2] In comparison, PC games will bring in \$31.9 billion while console gaming will generate \$29 billion in revenues.

Geraldus Galehantomo P.S [3] differentiate PC games and mobile games in following way .PC game is a video game in which users use computer or laptop as a tool to play. PC

games can't be portable as it is using a computer, the price of electricity the game used is expensive. Mobile gaming is a video game in which users use smart-phones or PDA media. They are easy to carry because it has a battery that can be re-charged, easy to store anywhere and the quality of its graph is less supportive than PC game. A computer game is a computer-controlled game played mostly on personal computers. A video game is played on arcade machine which generally has no interface like keyboard mouse but huge joysticks like controllers.

B. Paper Inclusion Criteria

Various criteria for inclusion were fixed for this study. The papers included for this study were the paper published in journal from January 2009 onwards because mobile revolution started in from 2009 onwards only. The various games were developed before 2009 also but rigorous games were developed since last 10 years.

Journal paper dedicated to research and published with doi ISSN, Conference proceedings were considered for this review. Books/News/Web publishing were not considered as there is no research support for findings.

There was very limited research study on finding effects of mobile games on adolescent. therefore video game effects were considered also effects on both genders were considered as their was no specific study on male related research. Also there was neither study using data mining techniques to review for this paper.

C. Review of effects of Mobile Games on Male Adolescents.

Various journal papers were reviewed and are categorized into positive and negative effects on adolescents. Almost every research study has considered effects on adolescents of online/computer games. Very few study were limited to "effects of mobile games on adolescents" and none of them were particularly on male adolescents.

Table of Journal Papers and findings.

Journal Papers with Positive Effects Findings.

Sr. No	Researcher & Publication Year	Research Methodology Used	Findings
1	Christopher J. Ferguson , Adolfo Garza,	Participants in the current study included 333 youth	They concluded that results from both sets of analysis revealed that exposure to violent

	Jessica Jerabeck, Raul Ramos & Mariza Galindo. [8] Year-2012	between the ages of 10 and 17 (M = 12.76, SD = 1.88). Participants were equal in regards to gender distribution (51.7 % female). Main analyses consisted of hierarchical multiple regression	game had neither short-term nor long-term predictive influences on either positive or negative outcomes. Results did not differ across age categories of older children, preadolescents or adolescents. Results suggest that the influence of video game violence on children and teen's development across outcomes is both stable and negligible.
2	Sri Kurniawan. Marilyn Walker, Sonia M. Arteaga [9] Year-2012	A survey of 28 participants with an average 17 years old, Analysis through statistical tool.	Mobile games can be used to promote positive behavioral beliefs. In teenagers They can be used to promote positive behavioral beliefs.
3	Zahra Khak sari, Mehdijavanmard, Javadyarah madi. Year-2014. [12]	Morgan's table and random stratified sampling, statistical density of research sample of 184, 122 which constitutes of guidance and high schools respectively. Statistical indexes such as t-test, descriptive statistics and Pearson's correlation test was used.	Results showed that 85 percent of students play 2 to 3 hours a day. findings demonstrated that there is significant difference between guidance school students and high school students in psychological motives such as refreshment ,compete with others and win ,relaxation ,like the guns & other weapons, creativity ,forgetting problems, discharging aggression ,imitation of friends, educate others and make new friend.

	Year		
1	Olson, C. K., Kutner, L. A., Baer, L., Beresin, E. V., Warner, D. E. And Nicholi [4] Year-2009	Survey data were collected from 1254, 7 th and 8 th grade students in two state .t tests and chi square tests were used.	M-rated game dose predicted greater risk for bullying (p<.01) and physical fights(p<.001)
2	Eshrat Zamani , Maliheh Chashmi Nasim Hedayati [5] Year-2009	The sample size includes 564 students selected by multiple steps stratified sampling. Data were collected using Questionnaire (GHQ-28) scale. Pearson's correlation coefficient and structural model were used for data analysis.	The results of this study showed that there is a direct relationship between physical health, anxiety and depression with computer games addiction. However, the relationship of addiction to computer games and social dysfunction was significance and inverse.
3	Dongdong Li, Angeline Khoo, Hyekyung Choo, Albert K. Liao [6] Year-2012	Sample of total 2,998 adolescents from Primary schools. 2,179 were males and 819 were females. Average age of participants was 11.2 Years. ANOVA , T Test using SPSS.	Results indicate a positive relationship between longer gaming hours and poorer academic performance. Also positive relationship between longer gaming hours and more pathological symptoms were found.
4	Daniel L. King ,Michael Gradisar, Aaron Drummond	Seventeen males, aged 16 ± 1 years, were recruited via advertisements at an on-campus. Subjects	Prolonged video-gaming before normal bedtime caused a clinically

Journal Papers with **Negative** Effects Findings

Sr. No	Researcher & Publication	Research Methodology	Findings
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	,NicoleLovato, Jason Wessel, GoricaMicc, Paul Douglas AndPaulDeIffabro [7] Year -2012	were exposed to either 50 or 150 min of video-gaming Fifty minutes of video-gaming exposure was considered ‘normal’, given males aged 13–18 years play video-games between 34 and 76 min day1 (Marshall et al., 2006). Video-gaming for an uninterrupted 150 min period was considered ‘prolonged’ (i.e. >2 SDs above the mean)	significant reduction in adolescent sleep time. It may be extrapolated that long-term or repeated prolonged video gaming may produce cognitive deficits associated with chronic sleep reduction		ouhi-Moqhaddam, and Mahmoud Zivari [11] Year-2013		However, there was no statistically significant correlation between the amount of computer game usage and physical complaints, thinking problems, and attention problems.
				7	SelahattinÇavuş, Bünyamin Ayhan [13] Year - 2014.	384 students were surveyed. Questionnaires were asked and data was analyzed through SPSS 20 package program. The statistical significance level of the study was accepted 0.05.	It was found that the average of the boys were higher than those of girls when the whole addiction scale was considered. Moreover, the boys are observed to spend more money on games.
5	Halima SadiaQureshi and MussaratJabeen Khan UzmaMasroor [10] Year-2013	Sample consisted of 150 adolescents, divided into 76 male and 74 female, age ranged from 12 to 20 years. T-test, ANOVA, and Regression analyses	It was concluded that pathological video gaming can induce aggression and create feelings of loneliness among adolescents.	8	You, Sukkyung & Kim, Euikyung & No, Unkyung. [14] Year-2014	The study of 1242 participants studying in grades 7, 8, and 9 were selected. Structural equation modeling (SEM) was used to assess the hypothesized structural relations among the latent variables	The results indicated that violent video games have a significant direct effect on aggressive behaviors, and a significant indirect effect on pro social behaviors.
6	SolmazShokouhi-Moqhaddam, Noshiravan Khezri-Moghadam, ZeinabJavanmard, Hassan Sarmadi-Ansar, MehranAmirinaee, MajidShok	Required sample was determined according to the sample size and using Cochran’s formula (n = 384) through convenient random sampling method. Data analysis was done using the bivariate regression, and analysis of variance (ANOVA).	The Results of this study indicated that there was about 95% direct significant correlation between the amount of playing games among adolescents and anxiety/depression, withdrawn/depression, rule breaking behaviors, aggression, and social problems.	9	Luca Milani1, Elena Camisasca 2, Simona C. S. Caravita1, Chiara Ionio1, Sarah Miragoli1, and Paola Di Blasio [15] Year-2015	471 children attending primary and secondary schools in Northern Italy.	Participants who use violent video games show more externalizing problems, more aggression and more coping strategies compared with participants who do not use violent video games.

10	KarzanWakil,ShanoOmer,BayanOmer [16] Year-2017	Survey using Questionnaires for collecting Data and processing using Tool.	Students who are playing between 1-3 hours per day with electronic games their GPA(Grade Point Average) is not decreased or very few changes are seen which is -0.22% per hour.At the same time students that are playing more than 3 hours per day their GPA decreased more which is -2.41% per hour.
11	AdileAskim Kurt, EzgiDogan , YaseminKahyaogluErdogmus, BulentGurselEmiroglu [17] Year-2018.	open-ended questions with a personal information .The computer gaming addiction scale forchildren(CGAS-C)was utilized.	It was found that male students had higher levels of gaming addiction when Compared to females.
12	FundaErdogdu,BurcuBerikan, ŞahinGökçe arslan. [18] Year-2018.	. The PISA 2015 study covers 87schools and 5895 15-year-old students from 61 provinces of Turkey. 49% of these students consist of girls while the rest are boys. open-ended questions.	increased class repetition rate may indicate a positive correlation between playing computer games and student failure in this age group
13	Ping Su1, Chengfu Yu2, Wei Zhang1*, Sha Liu1,	Using random cluster sampling questionnaires 386 seventh graders participated (52.94%	peer victimization positively related to Internet Gaming Addiction.

	Yang Xu1 and Shuangju Zhen [19] Year-2018	females, Mean age = 14.83, SD = 0.49, range = 13.50–16.50).	
14	Geert P. Verheijen ,William J. Burk , Sabine E. M. J. Stoltz ,Yvonne H. M. van den Berg, Antonius H. N. Cillessen, [20] Year-2018	sample to 705 adolescents (33.5% female, Mage = 14.07, SD = 1.29). Participants completed a computerized survey.	This study showed that the social context influences the effect of violent video games on aggressive behavior. Adolescents' exposure to violence in video games positively predicted the aggressive behavior of their best friend one year later..
15	T. Gnamb, L. Stasielowicz, I. Wolter, and M. Appel [21] Year-2018.	responses from N = 3,554students (56% female) across several years beginning in the ninth grade. The mean age at the time of the first wave was M =14.47 (SD = 0.57) years applied a non-linear transformation	playing computer and video games can result in a noticeably, albeit small, loss of educational returns, but it does not affect basic competences.

D. Review of Data Mining Techniques for finding effects of Mobile Games on Male Adolescents.

Data mining process is of inferring knowledge from huge data. It is searching large stores of data to discover patterns and trends Data collected from various surveys when properly mined, valuable knowledge can be discovered from data mining techniques and then can be used for finding various effects of mobile games on adolescents. The medical data mining produces business intelligence which is useful for predicting, classification is the major data mining technique which is primarily used in healthcare sectors for medical diagnosis and predicting diseases. Various data mining

techniques can be applied for finding effects of mobile games on adolescents.

E. Conclusion

Mobile gaming forms an essential paradigm in life of adolescents. As depicted in above reviews mobile games definitely play a dignifying role in everyday life of adolescents. Many of reviews show negative effects and some show positive effects on physical, social, academic, behavioral approach on adolescents. There were more studies related to effects of video games on adolescents but very few are specific with mobile only. As there is a difference between mobile and video games in portability, availability, cost it's very essential to study effects of mobile games on adolescents. Also it was revived that no data mining techniques were used for above studies. Data mining techniques viz. classification, association, neural networks can be used to find association between adolescents and mobile game playing.

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