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Relationship between Video Gaming Habit and Achievement in
Mathematics of Secondary School Students

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Abstract

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The popularity of video games has grown tremendously over the past 20 years. Being a large industry video games has brought some effects on our society especially on our youth and children both positive and negative effects. When someone plays a game, learning of something occurs. The challenge for the educator is to make that learning be with academic objectives. The study explores the relationship between Video Gaming Habit and Achievement in Mathematics of Secondary School Students. The sample consisted of 700 ninth standard students of Thrissur district of Kerala. The result shows a positive relationship between Video Gaming Habit and Achievement in Mathematics and no significant difference in the video gaming habit of rural and urban students

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World today revolves around technology. This technology (such as computers and cell phones) affects even our basic cognitive abilities like writing and mathematics (Sternberg & Preiss, 2005). The most technologically demanding and psychologically absorbing experience of technological mediation on mental functioning is video game play. Video games today enjoy unprecedented popularity, and the influence of video games is enormous: websites, blogs, apparel, toys, and stores are dedicated to them (Kietzmann, 2007). Video games are a popular form of media that are enjoyed by individuals with a wide range of age. Throughout this study, the term "video games" will be used to mean any game that is played using either a personal computer, on video game consoles, on hand held game devices, video arcades or dedicated gaming system. The adverse of addiction to internet and gaming is clear from the following words by Philip Tam, a psychiatrist and the President and co-founder of the Network for Internet Investigation and Research in Australia:

"It is a cliché to state that computing, the Internet and gaming are now ubiquitous elements of daily life for most if not all people, particularly the young. The power and reach of the WWW most probably far exceeds any technology in humanity's short but eventful history... In many ways, Internet Overuse/ Addiction is the ultimate post-modern affliction for the 21st Century" (Mez Breeze, 2001).

Video games can clearly consume the attention of children and adolescents. However, it is important to assess the extent that video game technology had an impact on childhood education. Since video games have the capacity to engage children in learning experiences, this has led to the rise of "edu-tainment" media. Just by watching children it becomes very clear that they prefer this type of approach to learning. The increase in learning happens when the student is enjoying the process (Miller, 2001). Games are transformed in a particular form when they are used for educational purposes. Bavelier and Davidson (2013) studied young people playing action video games for a longer duration and found that video gamers show improved skills in vision, attention and certain aspects of cognition. Actually these skills are not just gaming skills, but real-world skills and they perform better than non-gamers on certain tests of attention, speed, accuracy, vision and multitasking.

Certain types of video games can help to train the brain to become more agile and improve strategic thinking, according to scientists from Queen Mary University of London and

University College London (UCL) (Lindsey, 2013). It also reports that video game 'Exercise' for an hour a day may enhance certain cognitive skills. The studies found that playing shooter video games improved a player's capacity to think about objects in three dimensions, just as well as academic courses to enhance these same skills. Playing video games may also help children develop problem-solving skills. Video games have been used in comprehensive programmers to help develop social skills in children. Video games provided the visual patterns, speed and storyline that help children's basic skills development.

Recent research evidences suggest video games as an effective pedagogical tool. Video game players receive cognitive benefits in the areas of divided attention tasks, memory, hand-eye co-ordination, visual acuity, spatial skills and even intelligence (Gibb, Bailey, Lambirth, & Wilson, 1983; Green & Bavelier, 2003; Reisenhuber, 2004; Satyen, 2005). Games have also been used as a clinical tool to successfully aid therapy (Griffiths, 1997). Granic, Lobel, and Engels (2014) summarize the research on the benefits of playing video games, focusing on four main domains: cognitive (e.g., attention), motivational (e.g., resilience in the face of failure), emotional (e.g., mood management), and social (e.g., prosocial behavior) benefits. Physicians have begun to use video games to motivate patients to improve their health. Likewise, educators are currently redesigning classroom experiences, integrating video games that can shift the way the next generation of teachers and students approach learning.

Learning occurs with the utilization of various resources and utilization of resources is the ability of a person. The increase in learning happens when the student is enjoying the process (Miller, 2001). The guarantee for real learning is the creation of joy, excitement, and love for learning and these are created through games and it is a way of learning (Haramati, 2000). Through games-based teaching education can be imparted affectively in all fields particularly in mathematics, as "games have educational values and are played for enjoyment and pupils enjoy games in mathematics" (Ediger & Rao, 2000, p.152). Games are transformed in a particular form when they are used for educational purposes. They are still games but they are used for specific aim to learn particular things, and to develop certain strategies or abilities (Barbara, Mattson & Chu, 2008). Designing educational games for facilitating games-based learning is found to be highly emphasized in the literature by O'Neil and Fisher (2004). Games can be used as a tool in the classroom to engage students.

The very nature of learning mathematics is quite different from other subjects, because it needs logical thinking and mental efforts. To teach Mathematics is not to get scores of marks and degrees but to develop an intellectual personality with sharp observation, deep concentration, and precise decision-making and scientific approach. We need to cultivate abilities such as power of abstractness, precision in the use of words, logical thinking and skills in calculation. Therefore the involvement of video games in their academic matters really plays a crucial role in achieving the target of educational standards.

Unsurprisingly, these developments have led to concerns from many parents, educators, and policymakers that the excessive amount of time spent by children on video games may result in the development of addictive tendencies among children video gamers. In Kerala, technology has reached almost all corners and hence itself children of the rural area have equal opportunity to interact with various technological devices as the children of urban area. It will be interesting to find whether they differ in the video game habits. The study will be helpful to the teachers and academicians for developing for their reflections in the field.

Objectives

1. To find out the difference in video gaming habit among secondary school students for the sub samples based on Locale.
2. To find out the relationship between the video gaming habit and achievement in mathematics among secondary school students.

Hypotheses

1. Rural and urban secondary school students do not differ significantly in their video gaming habit.
2. There is significant relationship between the video gaming habit and achievement in mathematics of secondary school students.

Method

Participants

The population of the study is secondary school students of Kerala and the study was conducted on a representative sample of 700 students in 9th standard drawn from 18 schools of Thrissur district. The sample was selected using stratified sampling technique by giving due representation to the factors like locale and gender.

Instruments

1. Video gaming habit inventory: The variable video gaming habit was measured using 'video gaming habit inventory' developed by Saritha and Happy (2014). It consists of 40 items with two possible responses 'Yes' and 'No'. All items are positive statements. The respondents were asked to mark their response by putting a tick mark on Yes or No as the case may be, given right to each item. A score of 2 or 1 was given to the responses Yes or No respectively. The reliability obtained using *Cronbach's Alpha Coefficient* was 0.813. This was distributed to subject experts and teachers for their comments, opinion and suggestions. Thus the video gaming habit inventory has got the face validity.
2. School records: The data regarding the dependent variable 'achievement in Mathematics' was taken as the mark obtained by the students in mathematics for 8th standard final examination. It was collected by the investigator from the school records.
3. General data sheet: The relevant information like gender, locale of the school was collected through a personal data sheet.

Results and Discussion

Assessment of the video gaming habit scores among secondary school students.

The investigator calculated the mean, median, mode, standard deviation, skewness and kurtosis of video gaming habit scores of secondary school students. The details of the calculated values are presented in Table 1.

Table 1

Statistics for video gaming habit of secondary school students

| Statistics | Value |
|--------------------|-------|
| Mean | 59.79 |
| Median | 60.00 |
| Mode | 62.00 |
| Standard deviation | 6.704 |
| Skewness | 0.106 |

As per the table 1, it is observed that the mean value of video gaming habit scores is 59.79. The median value is 60 which means fifty percent of the students scored above 60 and fifty percent of students scored below 60. The mode of scores was found to be 62 which gives

the most frequently occurring score in the distribution. The standard deviation is found to be 6.704. The skewness obtained for the video gaming habit scores of secondary school students is 0.106. The value indicates that the distribution is positively skewed. Positive value shows that the number of students who scored higher marks is lower than that of those who scored lower marks. Kurtosis is -0.488 indicating a leptokurtic nature of the curve. But the values of skewness and kurtosis are negligibly small and the sample size is large enough to assume normality of the distribution of the scores.

Comparison of video gaming habit of secondary school students based on locale

Comparison of video gaming habit of students based on locale was done and the result is given as table 2.

Table 2

Results of the test of significance of mean difference in video gaming habit based on locale

| Variable | Locale | n | M | SD | 't' Value |
|--------------------|--------|-----|-------|------|-----------|
| Video gaming habit | Rural | 388 | 59.78 | 7.01 | 0.083 |
| | Urban | 312 | 59.82 | 6.32 | |

The mean score of video gaming habit of rural secondary school is found to be 59.78 and that of urban secondary school is 59.82. The standard deviation of rural secondary school is 7.01 and that of urban is found to be 6.32. The obtained t value is 0.083 which is less than the table value 1.96 at .05 level of significance. The result shows that there is no significant difference in video gaming habit of Urban and Rural secondary school students. The analysis resulted in the finding that there is no significant difference in video gaming habit among secondary school students based on locale.

Assessment of the achievement in mathematics among secondary school students.

The mean, median, mode, standard deviation, skewness and kurtosis of achievement in mathematics among secondary school students. The details of the calculated statistics are presented in table 3.

Table 3

Statistics calculated and their values obtained for achievement in mathematics of secondary school students

| Statistics | Value |
|--------------------|--------|
| Mean | 60.82 |
| Median | 60.00 |
| Mode | 60.00 |
| Standard deviation | 17.653 |
| Skewness | 0.163 |

As per the table 3, it is observed that the mean value of achievement in mathematics is 60.82. The median value is 60 which means fifty percent of the students scored above 60 and fifty percent of students scored below 60. The mode of scores was found to be 60 which gives the most frequently occurring score in the distribution. The standard deviation is found to be 17.653. The skewness obtained for the achievement in mathematics of secondary school students is 0.163. The value indicates that the distribution is positively skewed. Positive value shows that the number of students who scored higher marks is lower than that of those who scored lower marks. Kurtosis is -0.998 showing the curve is leptokurtic.

Relationship between video gaming habit and achievement in mathematics among secondary school students. In order to find out the relationship between video gaming habit and achievement in mathematics among secondary school students Karl Pearson's product moment correlation coefficient 'r' was calculated and statistical significance was also tested. Details are given in table 4.

Table 4

Results of test of significance of relationship between video gaming habit and achievement in mathematics

| Variables | <i>n</i> | Achivement in Mathematics |
|--------------------|----------|---------------------------|
| Video gaming habit | 700 | .204 |

** $p \leq .01$

From the table 4, it is observed that the obtained 'r' value is .204 (r from $\pm .20$ to $\pm .40$ denotes low correlation; present but slight). This shows that there is a low positive correlation between video gaming habit and achievement in mathematics. From table, the value for significance at .01 level is .115. The obtained r value is greater than that of table value .115. Finding is that there is low positive significant correlation between video gaming habit and achievement in mathematics ($p \leq .01$).

Conclusion

The study revealed that Video gaming habit of rural and urban students are not significantly different. This may be because of the special nature of cities and panchayats of Kerala. Though schools are classified as rural and urban on the basis of the governance, the facilities are almost the same in both areas. The study also found that Video gaming habit and achievement in mathematics are positively correlated, but the extent of relationship is low. That is, as video gaming habit increases academic achievement in mathematics increases to a small extent. The findings of the study and conclusions drawn helped the investigator to suggest some measures to improve student performance.

Teacher training, focusing on the integration of games (e.g., what to do before and after game play, how to access and interpret students scores, how game missions relate to course topics) is essential for enhancing student learning. Access to the games from home, at community centers and libraries, as well as in class and in computer labs before and after school may optimize use. It appears that students are motivated to play the games outside of class on their own. Smart class rooms, IT labs set for proper use of free time with education content video games. School and district administrators should be educated and observe the use of math video games in teaching math. Math games should be designed so students cannot progress in the games without solving mathematics problems, putting additional focus on learning mathematics compared to playing the games. Maximize the potential of the video game to be an effective instructional tool. Educational video games enhanced teaching methods but did not replace them. When designing games for the class room is finding the right balance on the learning content. To minimize potential harm, Parents might focus on video game literacy and limit unsupervised play. Like other media, video games can promote harmful stereotypes. Routinely keeping game systems in common areas of the home allows parents to set sensible limits on play tile and to monitor for negative effects such as increased anger, irritability or aggression. Parents and students play together video games it is very useful. Asking the child to teach how to play a video game, reversing the usual parent-child role may be good for parent-child relationships. It also implies respect for the Childs interests and skill in a culture that often dismisses video games a waste of time. Parents can play a part in guiding their children's use of video games in selecting video games, review video game before

purchasing, talk your child about video games, etc. Game companies should survey both teachers and students while creating games to gather more content design understanding.

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