The Relationship Between Computer Gambling and Academic Performance of High School Students

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Abstract: While some sources say that playing video games has potential benefits whether in medicine or science, other sources take a different view and say that it can have various negative impacts. Video games are becoming more attractive thanks to their social, intellectual and emotional possibilities compared to television, movies or radio. The issue of gaming is increasingly discussed today mainly due to the large number of available platforms on which to play. Games are becoming more and more realistic both in terms of graphics and artificial intelligence. It is relatively difficult to avoid the influence of games with ever-improving mobile games or games on social networks. Playing games is no longer a home affair but it has become ubiquitous. All of these aspects can have a negative impact on pupils' welfare across all age groups and may pose a risk of possible addiction. The aim of this paper is to describe the impact of computer gambling on school performance. The subject of this study was a group of 138 high school students studying to be computer science teachers. In addition, the authors also examined the latest gaming trends of the current generation of high school students and possible manifestations of addiction to playing video games in this group of individuals. The research was carried out using a questionnaire survey, projective methods (word association experiment and incomplete sentence test) and analysis of school documents. The aim of the questionnaire survey was to determine the player preferences of the examined individuals and their subjective perception of their own playing of games. Projective methods were used to determine the affective responses of individuals to stimuli related to playing games. School documentation was a source of records of a particular student. The study's findings suggest a potential relationship between playing video games and academic performance of the individuals and the obvious signs of addiction in some of the individuals involved.

Keywords: video games, academic performance, projective testing, high school, addiction

1. Introduction

The number of smartphone users is growing all the time, with more and more users being permanently connected to the internet and often addicted to playing sophisticated games or social media. While some sources mention possible benefits of video games (Sauce et al., 2022; Holmes et al., 2009; Sanchez, 2012) in medicine or science, other sources present a different take on the issue, listing negative effects of gaming (Freeman, 2008; Kim et al., 2008). Due to ongoing technological advancements, video games are constantly increasing in quality, with their gameplay characteristics and visual aspect becoming ever more realistic. In this study, the term "video game" refers to any game that runs on a computer, mobile device or video game console.

A 2021 survey with 389 teenage respondents revealed that for the vast majority of them (76.9 %), the smartphone was the platform on which they played video games (Wan, Zakaria, & Zahurin, 2021). Compared to other media, such as television, movies or radio, video games are much more attractive thanks to their social, intellectual and emotional possibilities (Javanmard, Khaksari, & Yarahmadi, 2014). Games can be a way out of a situation with which an individual is not comfortable for some reason. The study argues that video games are an affordable way to create one's own world, i.e. to create a problem-free reality. This allows an individual to escape from reality to their very own, idealized world (Viktorovna Grishina & Nikolaevna Volkova, 2018).

Gambling addiction or pathological gaming is "repetitive gaming behavior despite harm or negative consequences, such as risking or losing significant relationships, or job, educational or career opportunities" (Hartl, 2012). Video game addiction is also characterized by losing interest in or reducing participation in other recreational activities, i.e. giving up one's favorite activities due to gaming. In the worst cases, an individual may even lose their friends or spouse due to gaming. According to Griffiths (2009), there are similarities between substance abuse and video game addiction, both of which can be described using the six core components of addiction. For the above reasons, the authors are interested in this issue, especially in how video game addiction can influence students' academic performance.

The main research question was formulated as follows:

- RQ 1: Can there be a relationship between the time students spend playing video games and their academic performance?

The authors also formulated two additional research questions, which may prove beneficial in determining the relationship between gamer characteristics and academic performance.

- RQ 2: Why do students play video games? What is their main reason?

The third research question is related to the time students spend playing video games. It was formulated as follows:

- RQ 3: How many students show symptoms of video game addiction?

To collect data needed, among other things, to answer the research questions, the authors used mixed methods research, which combines elements of qualitative and quantitative research, including projective techniques, questionnaire survey and written document analysis.

2. Methods

Data collection was divided into three phases which followed one another in fixed order, as can be seen in Figure 1. Incomplete sentence test was used first:

Figure 1: Sequence of research phases

The verbal projective technique of sentence completion was used in a 24-question e-questionnaire. The goal was for the participants to complete the sentences using the first idea that came to mind. Time for completion was set so that the participants did not have much time to think about their answers and spend too long on the individual items. Such a test requires a researcher to be present during the testing.

The word association experiment, which was also carried out electronically, consisted of eight items, with only one item being displayed at a time. This prevented the participants from taking previous and/or following items into account, thus allowing them to focus on the current question. The participants had 60 seconds to complete each item. Then they had to proceed to the next one. The researcher instructed the participants to try and come up with as many words or ideas related to the listed word as possible.

A questionnaire survey was used that included 27 questions, some of which required a guess on the part of the participants. Since those were questions with a low significance level, they were modified from open-ended questions to multiple choice questions (the student had to choose one of a variety of categories).

To be able to answer the research questions, the authors needed to put the data collected through the questionnaire survey and the existing records of students' academic performance into context, focusing on their grades in the first semester of the 2021/2022 academic year. Each participant was assigned a value that was calculated as the arithmetic average of all their grades (all subjects) over the monitored period.

The main part of the research project took place at High School of Computer Science in Ostrava in December 2021. The school offers two study programs, with each divided into two classrooms. As a result, as many as 480 students can attend the school; there are 16 classrooms over 4 grades. The first study program is Information Technology and the second is Information and Communications Technology. Both study programs share the same basic concepts and theoretical and practical background, with the specifics being different.

127 students participated in the main part of the research project at High School of Computer Science in Ostrava.

3. Data analysis

3.1 Relationship between academic performance and time spent playing video games

The questionnaire included an item designed to determine time spent playing video games; the respondents were asked to choose one of seven options (from less than 1 hour to more than 6 hours). The respondents' answers are presented in Figure 2. It is obvious that the majority of students spend 2 to 4 hours a day on average playing video games. One-fourth of students spend even more time a day playing video games. The authors analyzed school documents in order to obtain records of students' academic performance across all subjects; these are presented in the table below.

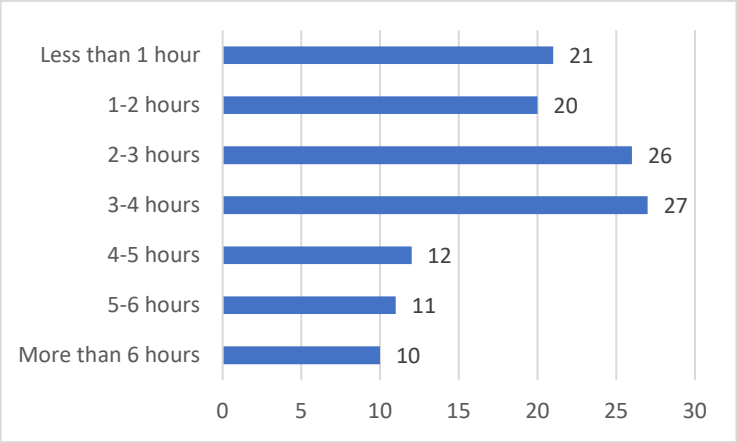

Figure 2: Time spent playing video games a day

Table 1: Data characteristics

	N	Min.	Max.	Avg.	SD	Median
Time spent playing video games	127	1*	7*	3.488	1.799	3
Academic performance	127	1.12	3.15	2.002	0.472	1.19

*) These are not real values but rather the order of choice, as seen in Figure 2

Pearson's correlation coefficient was applied to determine the relationship between the average time spent playing video games a day and students' academic performance. Based on the processed data, the coefficient reached the value of 0.22285. The calculated p-value = 0.011792 was below the significance level ($\alpha = 0.05$).

3.2 Reason for playing video games

Considering the research focus, it was appropriate to ask students why they play video games in the first place. What is their main reason for playing them? Data for answering this question were collected through questionnaire item No. 20, and are presented in a table which is attached as Attachment 6. The data layout is presented in Figure 3. Results show that the main reason why students play video games is to escape reality. The second most frequent reason was boredom, which is an opportunity for organizations providing sports and leisure activities for children and youth. This was followed by the desire to make new friends, which proves that online multiplayer games hold a significant position in the market, as it is only during these kinds of games that new friendships and relationships can be made. The chart also shows that overcoming challenges or games' gameplay characteristics are not significant factors determining the respondents' interest in a particular game.

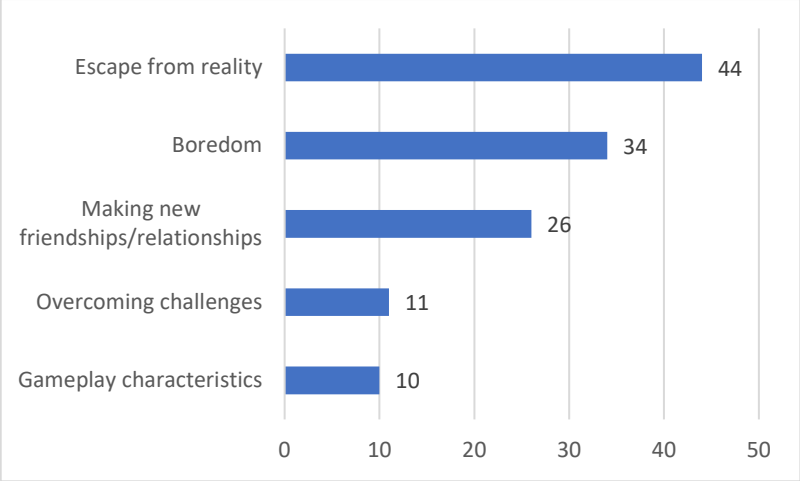

Figure 3: Reasons for playing video games

3.3 Addiction signs and symptoms

Selected questionnaire items were focused on addiction signs. They were designed as either multiple choice questions or Likert Scale questions. Situations or signs that the majority of addictions have in common were used in the questions. The questions were as follows:

- How many times over the past 6 months have you spent an entire day playing video games?
- When I am unable to play video games for a long time, I feel bad.
- When I am unable to play video games for a long time, I become angry.
- I become annoyed when I plan to play video games but cannot due to lack of time.
- Sometimes I argue with my parents about the amount of time I spend playing video games.
- Sometimes I do not have time for my family or friends due to gaming.
- Sometimes I do not have time for my school assignments or other chores due to gaming.
- I have been spending a lot more time playing video games than I used to.
- Sometimes I end up playing video games for much longer than I originally intended to.
- Over the past 6 months, I have not been able to reduce the amount of time I spend playing video games.
- Over the past 6 months, someone has unsuccessfully tried to persuade me to reduce the amount of time I spend playing video games.

A quantitative method was used for data processing, during which the answers were encoded and the final score was compiled. The maximum achievable score was 34 points. There were 16 respondents who gained 18 or more points. Selected individuals answered more than half of the addiction-related questions affirmatively, which should be considered as a warning signal. The following figure (Figure 4) shows the individuals who answered more than half of the addiction-related questions affirmatively. These respondents were also asked about their preferred video game genre. It was determined than 10 of them preferred action games, 5 of them preferred RPG games and 1 was a fan of simulation games.

In the final part of the questionnaire, the respondents were asked about their attitudes toward video games (Figure 5). The respondents were informed that the statements included in the items did not have to apply to them only, but they were common facts that could also be applicable to other persons. Judging by the prevailing answers, it is safe to say that the majority of respondents (67.4 %) did not agree with the statement that video games lead to drug experimentation. Furthermore, the majority of respondents (49.3 %) did not agree with the statement that in video games violence is a common problem-solving strategy. The majority of respondents also rather agreed with the statement that video games helped expand general knowledge (54.3 %) and improve concentration (54.3 %). The respondents also agreed that video games could help expand one's vocabulary (55.1 %), expand one's circle of friends (48.6 %) and improve one's social skills (46.4 %).

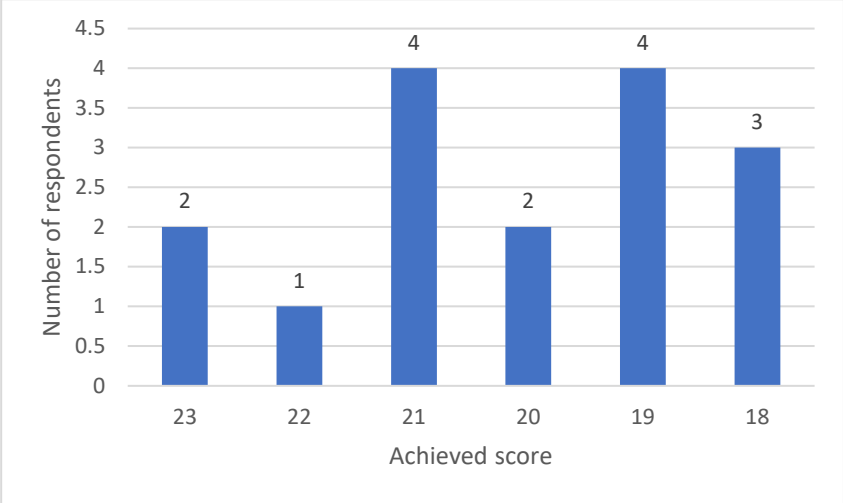

Figure 4: Respondents who showed symptoms of addiction

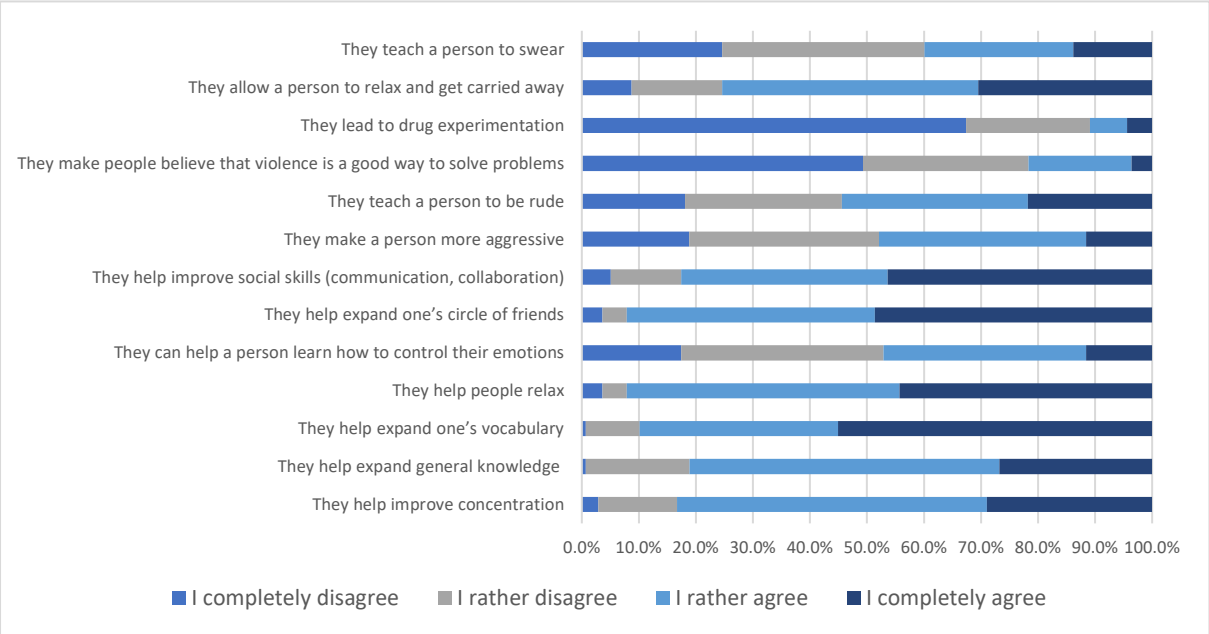

Figure 5: Respondents' attitudes toward video games

The following can be deduced from the results of a projective test composed of an incomplete sentence test and a word association experiment:

- In the examined sample of students, individuals most often play video games because they are bored.
- Students often play video games at home.
- The students also stated that they used their phone or computer/laptop mostly for games and entertainment. Searching for information and school preparation were the least frequent answers.

4. Discussion

Analysis of the collected data provided answers to the research questions.

RQ 1: The amount of time spent playing video games has a minimal effect on students' academic performance (the results showed a statistically insignificant relationship). Compared to other published studies (Wright (2011) or Anand (2007), however, the authors' results are not as clear. Since the survey was focused on high school students, who are used to playing video games, one can assume that they can divide their time between school preparation and playing video games (Drummond and Sauer, 2014).

However, there are studies where playing video games had a positive effect on students' academic **performance (Kovess-Masfety et al., 2016; Sauce et al., 2022).**

RQ 2: Among the reasons for playing video games listed by the participating students were: to escape reality, to escape boredom or because they consider playing video games to be a social event. These findings correspond to those found in published studies. In the majority of cases, the time spent playing video games can be viewed as procrastination. However, according to Nodby et al. (2019) , no such relationship has been confirmed. Therefore, students can have different reasons for playing video games.

RQ 3: Video game addiction is a wide topic. This study used a questionnaire survey and the aforementioned questions to ask students whether or not they thought they had their gaming under control. Using the aforementioned methodology, the authors were able to identify 16 students whose answers showed signs of video game addiction. The collected data confirm the results of the Novrialdy et al. study (2019), which argues that the majority of high school students are well aware of the risks posed by video games and therefore try to avoid them. Block (2008) uses a different methodology for measuring video game addiction, focusing on the amount of time spent playing video games. Having analyzed his data, Block (2008) concluded that students who spend 23 hours a week playing video games are likely to develop an addiction. Time spent gaming can therefore be a sign of addiction. At the same time, students with low socioeconomic status are more likely to become addicted to video games than others (Muezzin, 2015).

The presented results are not applicable to all high school students. This study is limited by its narrow focus – all the participants were computer science students who may have a better understanding of the issue and thus approach it differently than humanities students. However, the authors were able to prove that computer science students can be resistant to video game addiction.

5. Conclusion

The goal of this study was to determine whether playing video games had an effect on students' academic performance. The study was aimed at high school students, specifically computer science ones. The authors' findings prove that the amount of time spent playing video games has an effect, albeit a small one, on students' academic performance. Furthermore, playing video games is no longer a predominantly at-home activity; a large number of students stated that apart from their computer, they also used their smartphone to play video games. For students playing video games is a way to relax or a leisure activity. The question is whether or not students would play video games even if they had less free time. The authors intend to continue their research, focusing on the effect of video games on other target groups, the relationship between video games and the amount of knowledge and skills, as well as the effect of educational video games.

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