Hayati N & Roesdiana NI., JPKI, 2025;14(1):1-8
doi: 10.22146/jpki.87453

ORIGINAL RESEARCH

JPKI

Medical Students' Frequency of Playing Online Games with Their Academic Performance: A Cross-Sectional Study

Nur Hayati*, Novada Indra Roesdiana
School of Medicine, Universitas Muhammadiyah Yogyakarta, Bantul – INDONESIA

Submitted: 28 July 2023, Final Revision: 17 March 2025, Accepted: 20 March 2025

ABSTRACT

Background: Recently, internet users in Indonesia are getting higher. About 10% of these users are online gamers. Playing games on video or computer is believed to be educationally beneficial, but this is still limited to educational type games for learning activities. This study aims to determine the relationship between the frequency of playing commercial online games on smartphones with academic achievement of the Medical Faculty of Universitas Muhammadiyah Yogyakarta students.

Methods: This was a quantitative study with cross-sectional research design. Data on the frequency of playing online games on smartphones, and academic achievements were taken using a questionnaire. Data analysis used Spearman's correlation test to find out the correlation between the frequency of playing online games on smartphones with academic achievement.

Results: The frequency of playing online games on smartphones gets results with category: non-gamers 46.6%, infrequent gamers 24.3%, regular gamers 17.4%, and frequent gamers 11.7%. There is a negative relationship between the frequency of playing online games with academic achievement with a p value of 0.002.

Conclusion: The frequency of playing online games on smartphones is negatively correlated with the academic achievements of students of the Medical Faculty of Universitas Muhammadiyah Yogyakarta.

Keywords: frequency of playing online games, academic achievement, medical student

PRACTICE POINTS

- This study can be used as a basis to do further research about the use of academic game and its effect.
- Lecturer need to diagnosis students' frequency in playing game before learning so there is an intervention.

*corresponding author, contact: nurhayati.fk.umy@gmail.com

INTRODUCTION

Teenagers are familiar with the internet. They use digital media, such as video games, streaming, social media, augmented reality, and virtual reality, for communication, learning, and amusement.[1] In the industrialized world as a whole, issues associated with excessive gaming are becoming more widely acknowledged as possible public health burdens.[2] Computer gaming is typically a fun and interesting activity for most people.[3] Online games are a type of information technology that is entertainment-oriented and internet-based.[4] However, it still takes both pros and cons because of the risk of becoming addicted.

Students who play video games or online games can get either positive or negative effects based on the amount of time. Excessive use of them can also have negative effects. Digital gaming tends to draw more time, money, and effort from gamers, which could have bad effects on their lives, including game addiction. Excessive video gamers risk demonstrating lower educational and occupational performance, issues with peers, and lower social skills because they spend most of their waking hours playing video games.[5] Playing games can cause neglect of 'normal' relationships, school or work-related tasks, and even basic physical needs and thus have a tendency to be addictive.[6]

Game addiction starts to get troubling nowadays. Game addiction is a drawback of digital games, which is commonly defined as the excessive or compulsive play of video games that has unfavourable effects and undesirable everyday activity. Given that very few people are addicted to Internet games, some academics have proposed the term "deficient self-regulation" as an alternative to "addiction" to describe habitual Internet game use because the use of the word "addiction" should be used with caution as it can be used to create fear among the public about psychiatric problems.[7]

On the one hand, playing video games is very common and may have both benefits and drawbacks.[8] It is well established that playing video games can help with focus, multitasking, and working memory[7]. Video games is aimed to make a learning more fun so that it can increase students' enthusiasm in learning.[9] A study found that adolescents with a tendency to become addicted to internet use and/or electronic games were less likely to achieve higher scores in reading and arithmetic than those without problem behaviors.[10] It is reported that playing video games is negatively related to adolescents' academic performance.[11] In addition, collaborative team competition games and single-player games without competition had greater effects on learning outcomes than single-player games with competition.[12] Thus, the effect of playing games needs to be measured.

A preliminary study conducted by the author found that 7 out of 10 students of the School of Medicine Universitas Muhammadiyah Yogyakarta played online games on smartphones for approximately one hour a day. This phenomenon is important to study or find out how big the impact of playing online games on smartphones is on the academic achievement of medical students at the Muhammadiyah University of Yogyakarta.

METHODS

This study used quantitative methods. The research design was an observational analytic study with a cross-sectional approach. The aim is to determine the relationship between the frequency of playing online games on smartphones and academic achievement. The dependent variable in this study is academic achievement and the independent variable is the frequency of playing online games on smartphones.

The research was conducted at the School of Medicine Universitas Muhammadiyah Yogyakarta, with the population being undergraduate students of the School of Medicine, Universitas Muhammadiyah Yogyakarta. The sample of the research was taken by using a random sampling technique. The sample selection was based on the inclusion and exclusion criteria taken. Based on the calculation of the number of samples, the size of the research sample was 103 students from 3 academic levels.

This study used a questionnaire adapted from the research "Gaming frequency and academic performance" by Ip et al.[15] and has been translated into Indonesian and has been tested for its validity

and reliability. Data on academic achievement was obtained from the academic information system. After the data was collected, a normality test was carried out, which aimed to test whether the sample data was normally distributed or not using the Kolmogorov-Smirnov method because the number of samples used was more than 50. Furthermore, data analysis was carried out using the Spearman correlation test to determine whether there is a relationship between two variables. This research has obtained ethical clearance from the ethics committee of the School of Medicine Universitas Muhammadiyah Yogyakarta. Research subjects have obtained an explanation and filled out informed consent to participate in the study.

RESULTS AND DISCUSSION

The frequency of playing online games can be divided into four categories: gamers (consisting of infrequent gamers, regular gamers, frequent gamers) and non-gamers. Table 1 shows that the gamer (infrequent gamers, regular gamers, frequent gamers) category is larger than the non-gamer. It showed that most students of School of Medicine UMY were gamers.

Table 2 shows that category 4 – frequent gamers have the lowest average semester GPA for each class and overall compared to other categories.

Table 1. Gamer Category Based on Playing Time

Groups		N
Category 1	Non-gamers	48 (46,6%)
Category 2	Infrequent gamers	25 (24,3%)
Category 3	Regular gamers	18 (17,4%)
Category 4	Frequent gamers	12 (11,7%)

After statistical analysis, this study indicated a significant association between gamers and academic success among all respondents (p-value = 0.002). This shows that this association is unlikely to happen by coincidence, confirming the findings. The research also found a -0.295 link between smartphone online gaming activity and student performance. Although this association is minor, it shows that children who spend more time playing online games perform worse academically. This negative association between gaming frequency and academic achievement indicates an unfavourable link. The more pupils play online, the worse their GPA. This association does not prove a cause-and-effect link, but it does show a continuous tendency among individuals, supporting the idea that excessive gaming may hurt academic performance. Online gaming players spend less time studying, completing homework, and preparing for tests, which may explain this unfavourable

Table 2. Average Academic Achievement by Gamer Category

Groups	Academic Year	N (%)	GPA		Mean group GPA
			Mean	SD	
Category 1 – non gamers	2018	19 (18,4%)	3.28	0.57	3,29
	2017	17 (16,5%)	3.19	0.49	
	2016	12 (11,7%)	3.40	0.34	
Category 2 – infrequent gamers	2018	3 (2,9%)	3.38	0.06	3.23
	2017	12 (11,7%)	2.99	0.63	
	2016	10 (9,7%)	3.32	0.34	
Category 3 – regular gamers	2018	4 (3,9%)	3.02	0.93	3.19
	2017	5 (4,9%)	3.47	0.16	
	2016	9 (8,7%)	3.07	0.60	
Category 4 – frequent gamers	2018	4 (3,9%)	2.54	1.14	2.80
	2017	2 (1,9%)	2.99	0.42	
	2016	6 (5,8%)	2.85	0.41	

association. Long gaming sessions may diminish study time, lowering academic achievement. Online gaming, especially at night, can interrupt sleep cycles, causing weariness, poor focus, and impaired cognitive function, which can impact scholastic performance. Over gaming can also reduce attention spans, making it tougher for pupils to focus in class and remember material. Frequent gamers may struggle to transition to a classroom's slower pace and more structure since many online games are very exciting, demanding rapid reactions and ongoing involvement. This reduces involvement, understanding, and academic performance. Frequent gamers may also be addicted, prioritizing gaming above schoolwork. Gaming addiction can impair time management, academic motivation, and procrastination, lowering performance. This study demonstrated a weak but statistically significant negative link, stressing the need for students, educators, and parents to be aware of the academic repercussions of excessive gaming. Teaching self-regulation, time management, and responsible gaming can reduce the negative consequences of online gaming while letting them play in moderation.

This study found that regular gamers had the lowest average semester GPA across all academic levels. This implies that pupils' academic performance declines as they play internet games more. Frequent gamers consistently exhibited worse academic performance than non-gamers, infrequent gamers, and regular gamers, supporting the hypothesis that gaming behaviours affect students' education. This confirms prior findings that gaming frequency predicts academic success. Studies show that students who play video games more often fare lower academically. Reasons for this trend include temporal displacement, cognitive stress, and impaired study efficiency. More time spent on gaming means less time for academic pursuits like studying, completing homework, and preparing for tests. Academic success depends on consistent study habits and proper preparation, thus students who spend too much time gaming may struggle to stay up with courses and have lower GPAs. Gaming may affect cognitive function and attentiveness, explaining this tendency. Online games with fast-paced action and great involvement require strong attention and quick decision-making. These talents can help in some situations, but they can also impair academic performance. Online gamers may struggle to focus, assimilate new knowledge, and recall critical concepts, which can lower academic performance over time.[13] However, this study is in contrast to another study that reported that video-gaming behaviour had minimal impact on psychometrically accurate evaluations of academic performance in science, mathematics, or reading across more than 192,000 students in 22 nations.[14] The findings imply that the effect of video gaming on academic achievement is insufficient to warrant concern. However, the findings need to be followed up because they are more than 10 years old, which means that video games are different from modern video games. The results of this study are also in line with previous research on the effect of internet use and electronic games on adolescents, with the results that internet use and playing electronic games have a negative correlation to academic performance (e.g., reading, writing, and arithmetic) using a national academic performance standard test (i.e., NAPLAN) representative dataset in Australia.[15] Since these games tend to take up a lot of students' time and distract them from their studies, excessive use of them has a negative effect on their academic performance.[16]

In addition to social and academic issues, excessive gaming is associated with cognitive and neurological consequences. Research demonstrates that extended engagement with fast-paced, action-oriented games can modify brain function, especially in regions associated with decision-making, impulse control, and attention regulation. The human brain exhibits significant adaptability, and excessive gaming can alter neural pathways, resulting in increased impulsivity and reduced attention spans among students. Frequent engagement with violent or inappropriate online games may lead to desensitization to violence, thereby influencing individuals' perceptions of real-world consequences. Research indicates that excessive screen time and overstimulation from video games may lead to mental fatigue, thereby diminishing students' capacity to focus on complex cognitive tasks beyond gaming.

Moreover, excessive use of technology, particularly extended gaming sessions, has been associated with digital addiction. Digital addiction is defined as compulsive engagement with technology that disrupts daily activities, interpersonal relationships, and obligations. Students may exhibit withdrawal symptoms when deprived of gaming, including irritability, restlessness, and anxiety. This behavior, resembling addiction, is particularly troubling when gaming disrupts fundamental activities, including eating, sleeping, and physical exercise. Persistent gaming behaviors may result in psychological distress, heightening the likelihood of depression, anxiety disorders, and diminished emotional resilience.

In light of these concerns, collaboration among students, parents, and educators is essential to foster responsible gaming practices. Establishing screen time restrictions, fostering outdoor engagement, and enhancing in-person social interactions may alleviate the adverse impacts of excessive gaming. Educational institutions ought to implement programs that highlight the significance of digital balance and self-regulation. Promoting healthy gaming practices and encouraging students to prioritize their education and well-being can mitigate the negative impacts of excessive online gaming, while still permitting moderate enjoyment of video games.[17,18]

This study contradicts the findings of Islam et al,[10] who found that the average time spent on the internet on weekends and playing electronic games on both weekdays and weekends was positively associated with academic achievement in Australian adolescents, as measured by the National Assessment Program - Literacy and Numeracy (NAPLAN). Their findings challenge the widely held belief that gaming necessarily leads to low educational results. For some people, notably teens, children, and students, internet gaming is an important leisure activity that provides both amusement and relaxation. According to Kuss and Griffiths, teens frequently find respite from stress through online gaming, which provides a momentary escape from scholastic obligations and everyday duties. Many students experience severe academic stress as a result of heavy workloads, examinations, and other academic obligations, making recreational gaming an appealing stress reliever. Video games' immersive and interactive nature can promote emotional well-being by giving players a sense of accomplishment, enjoyment, and social engagement, particularly in multiplayer settings[3]. Furthermore, some forms of online games, particularly those involving problem solving, strategy, and riddles, might improve cognitive abilities. According to research, these games can help people improve their critical thinking, decision-making abilities, and mental agility. Puzzle games, for example, promote logical reasoning and problem solving, but adventure and strategy games demand players to stay attentive, strategize their actions, and make rapid judgments under duress. These cognitive benefits might explain why some studies have found no substantial detrimental association between gaming and academic performance, especially when used in moderation.[10] Self-regulation abilities can manage their gaming activities with their academic obligations. According to one research, those with great levels of self-control tend to perform well in school even when they play video games. This shows that gaming's detrimental impacts on academic accomplishment are not uniform, but rather vary according to individual variances in self-regulation and time management. Students who can restrict their gaming periods and prioritize their academics are less likely to face academic deterioration, emphasizing the necessity of developing self-discipline among online gamers.[19]

In conclusion, while excessive gaming might have a detrimental influence on academic performance, moderate gaming, especially when it involves intellectually engaging games, may provide advantages such as stress release, better decision-making, and increased cognitive abilities. Furthermore, self-control influences whether gaming has a favorable or bad impact on academic accomplishment. Future studies should look into how students might be encouraged to use self-regulation skills to properly manage gaming and academic commitments.

This study possesses multiple strengths that enhance its significance. This study examines a pertinent issue regarding the prevalent use of

online games among students and their possible effects on academic performance. The research presents empirical evidence bolstered by statistical analysis through Spearman's correlation test, confirming that the results are grounded in data. The incorporation of objective academic data from the university's academic information system improves the reliability of the results, in contrast to studies that depend exclusively on self-reported academic performance. A notable strength is the categorization of gaming frequency, facilitating a more nuanced understanding of the relationship between varying levels of gaming behavior and academic achievement. Ethical considerations were adhered to, with informed consent acquired from participants, and the questionnaire utilized was adapted from a validated study, thereby enhancing the credibility of data collection. Nonetheless, the study exhibits several significant limitations. A significant limitation is the sample size and population, as the study involved only 103 medical students from a single university. This limitation affects the generalizability of the findings, leaving it uncertain whether analogous results would occur in students from different disciplines or institutions. The cross-sectional research design establishes only a correlation and does not determine causation. The relationship between frequent gaming and academic performance is not well-defined, as it is uncertain whether gaming directly impacts academic outcomes or if other underlying factors influence both behaviors. A further limitation is the dependence on self-reported data regarding gaming frequency, which may lead to recall bias or social desirability bias, as students may inaccurately report their gaming habits. The study fails to consider additional factors that may affect academic performance, including study habits, socioeconomic background, motivation, and mental health. The true effect of gaming remains uncertain without controlling for these variables. Another significant limitation is the absence of differentiation among game types, as various genres, including strategy games, role-playing games, and competitive multiplayer games, may exert differing cognitive effects on students. Finally, the brief duration of data collection limits the study to a singular temporal snapshot, thereby precluding the evaluation of long-term trends in gaming behavior and academic performance. A longitudinal approach offers valuable insights into the evolution of gaming habits and their impact on students' academic success over time. This study provides important insights into the relationship between online gaming frequency and academic achievement; however, its limitations underscore the necessity for additional research. Future research should utilize a larger and more diverse sample with a longitudinal designs, account for additional academic influences, and distinguish between various types of online games to achieve a more thorough understanding of the impact of gaming on student learning.

CONCLUSION

Based on the results of the discussion described above, it can be concluded that there is a significant relationship between the frequency of playing online games on smartphones with academic achievement of students of the School of Medicine, Universitas Muhammadiyah Yogyakarta. The relationship that is owned is negative with low relationship closeness. This study is limited to the factors which affect the result. Thus, further research needs to find out the factors which may contribute to it.

RECOMMENDATIONS

Many practice, policy, and research suggestions come from this study. Universities and instructors should use academic or educational games to boost student engagement and performance. To manage their academic obligations, students should self-monitor their gaming habits and set time limitations. Medical schools should offer counselling and awareness seminars on how excessive gaming affects academic achievement and well-being. Universities should adopt mentorship programs where experienced students or academic advisers help younger students learn time management and gaming-academic balance.

University digital well-being standards should advise on screen time and good gaming behavior. Institutions should monitor students' academic achievement in extracurricular activities like internet

gaming. University orientation programs must also include responsible technology use policies, including gaming. Game-based learning can boost student engagement and cognition without hurting academic achievement if handled properly.

Longitudinal studies should examine how internet gaming affects academic achievement and mental health over time. Future studies should focus on treatments to help children balance gaming and academic activities. Understanding how strategy-based, problem-solving, and instructional games affect academic achievement requires studying their cognitive advantages. Qualitative research is needed to explore students' gaming motives and its influence on academic achievement. Medical students and students from other faculties might be compared to see how gaming affects their academic fields.

COMPETING INTEREST

The authors declare that there are no competing interests related to the study.

AUTHORS' CONTRIBUTION

Nur Hayati – developing research proposal, data analysis, manuscript writing.

Novada Indra Roesdiana – developing research proposal, data collection, data analysis.

REFERENCES

1. Chassiakos Y, Linda R, Stager M. Current trends in digital media: How and why teens use technology. In: Technology and Adolescent Health [Internet]. Elsevier; 2020 [cited 2023 Jul 20]. p. 25–56. Available from: https: //linkinghub.elsevier.com/retrieve/pii/B9780128173190000025
2. King DL, Delfabbro PH, Doh YY, Wu AMS, Kuss DJ, Pallesen S, et al. Policy and Prevention Approaches for Disordered and Hazardous Gaming and Internet Use: an International Perspective. Prev Sci. 2018 Feb; 19(2): 233–49.
3. De Freitas S, Griffiths M. Online gaming as an educational tool in learning and training. Br J Educ Technol. 2007 May; 38(3): 535–7.
4. Rafdinal W, Qisthi A. In-Game Factors and Technology Acceptance Factors in Increasing Intention to Play Online Game. In: Proceedings of Tourism Development Centre International Conference [Internet]. Sciendo; 2020 [cited 2023 Jul 22]. p. 281–96. Available from: https: //www.sciendo.com/chapter/9788395720406/10.2478/9788395720406-029
5. Mihara S, Higuchi S. Cross-sectional and longitudinal epidemiological studies of Internet gaming disorder: A systematic review of the literature: Review of epidemiological studies of IGD. Psychiatry Clin Neurosci. 2017 Jul; 71(7): 425–44.
6. Paulus FW, Ohmann S, Von Gontard A, Popow C. Internet gaming disorder in children and adolescents: a systematic review. Dev Med Child Neurol. 2018 Jul; 60(7): 645–59.
7. Jeong EJ, Kim DJ, Lee DM. Why Do Some People Become Addicted to Digital Games More Easily? A Study of Digital Game Addiction from a Psychosocial Health Perspective. International Journal of Human–Computer Interaction. 2017 Mar 4; 33(3): 199–214.
8. Von Der Heiden JM, Braun B, Müller KW, Egloff B. The Association Between Video Gaming and Psychological Functioning. Front Psychol. 2019 Jul 26; 10: 1731.
9. Amin F, Wahyudin AY. Journal of English Language Teaching and Learning. Journal of English Language Teaching and Learning. 2022; 3(1): 74–80.
10. Islam MI, Biswas RK, Khanam R. Effect of internet use and electronic game-play on academic performance of Australian children. Sci Rep. 2020 Dec 10; 10(1): 21727.
11. Adelantado-Renau M, Moliner-Urdiales D, Cavero-Redondo I, Beltran-Valls MR, Martínez-Vizcaíno V, Álvarez-Bueno C. Association Between Screen Media Use and Academic Performance Among Children and Adolescents: A Systematic Review and Meta-analysis. JAMA Pediatr. 2019 Nov 1; 173(11): 1058.

12. Huizenga JC, Ten Dam GTM, Voogt JM, Admiraal WF. Teacher perceptions of the value of game-based learning in secondary education. Computers & Education. 2017 Jul; 110: 105–15.
13. Malek A, Ninčević M, Jurić Vukelić D. The Role of Playing Video Games on School Achievement. CMR. 2019 Jan 1; 03(02): 54–71.
14. Drummond A, Sauer JD. Video-Games Do Not Negatively Impact Adolescent Academic Performance in Science, Mathematics or Reading. Chambers C, editor. PLoS ONE. 2014 Apr 3; 9(4): e87943.
15. Ip B, Jacobs G, Watkins A. Gaming frequency and academic performance. AJET [Internet]. 2008 Aug 17 [cited 2023 Jul 26]; 24(4). Available from: http://ajet.org.au/index.php/AJET/article/view/1197
16. Rehim MH, Al-tkhayneh K, Zaitoun EA, Khaled A. The Effects of Electronic Games on Students' Academic Achievement in the United Arab Emirates from a Parental Perspective. Journal of Social Studies Education Research. 2023; 14(2).
17. Dumrique DO, Castillo JG. Online Gaming: Impact on the Academic Performance and Social Behavior of the Students in Polytechnic University of the Philippines Laboratory High School. KSS. 2018 Jun 4; 3(6): 1205.
18. Young K. Understanding Online Gaming Addiction and Treatment Issues for Adolescents. The American Journal of Family Therapy. 2009 Sep 28; 37(5): 355–72.
19. Karim MuhA, Mastuti E. Self-control on the effect of online games for students' academic achievement. Palarch's Journal Of Archaeology Of Egypt/Egyptology. 2020; 17(4).