POSITIVE AND NEGATIVE EFFECTS OF ONLINE GAMING IN RADIOLOGIC TECHNOLOGY STUDENTS' ACADEMIC PERFORMANCE: AN ASSESSMENT

Dr. Cecilia J. Cardoso, Dr. Noel J. Acosta, De Guzman, Michael M., Diaz, Cedrix B., Legarda, Ashley Marie M., Magpusao, Danica U. and Dr. Edgardo C. Cayanan
Department of Radiologic Technology, Perpetual Help College of Manila, Metro Manila,1008

ABSTRACT
This study aims to examine and discuss the dual influence of online gaming on the academic performance of Radiologic Technology students, while also proposing strategic interventions. The researchers conducted surveys to gather fundamental data, including the respondents' gender and academic year, as a foundational step for data collection. Additionally, the study evaluates the impact of online gaming on academic performance across cognitive, affective, and psychomotor domains, and presents proposed interventions to enhance students' academic outcomes.

Keywords: Cognitive, Affective, Psychomotor, Radiologic Technology, and Online Gaming.

1. INTRODUCTION

In the current digital age, online games are a popular kind of satisfaction for students. On one hand, the advent of games accessible via smartphones and tablets has revolutionized how the younger generation interacts with technology. On the other, the more students integrate this form of amusement into their daily lives, the more it raises concerns about their ability to focus on education and, eventually, academic progress. For this reason, the given research will focus on the correlation between online games and concentrate on the study.

Online gaming presents a compelling experience that captures students' engagement and requires considerable time commitment. They create opportunities for brief moments of entertainment and mental challenge, but they also create the risk of distractions preventing a student from focusing on learning. Thus, the question remains about the interplay of factors such as online gaming and the ability of students to concentrate, which will be the reason for the investigation issue.

In recent years, playing games online has been growing in influence among students, with many of them spending hours playing games on their cell phones, tablets, and even laptops. According to (Dumrique & Castillo, 2018), certain individuals claim that games that are played can be used for a variety of goals, including learning, stress relief, competition, relaxation, enjoyment, and even mental escape from the actual world. Communication tools provide entertaining features for users (Anggraeni & Wihardja, 2020). Additionally, there are studies about the impact of playing on the internet on educational performance, which show that online gaming players will not be negatively influenced if they play within the recommended period (Harahap & Ramadan, 2021).

It has been established that children are more susceptible to developing a dependency on online games compared to adults. One form of this addiction involves prolonged periods of gameplay, which can have adverse effects on gamers. Various studies have demonstrated that online gaming has detrimental consequences for players, ranging from reduced sleep duration and behavioral issues (e.g., diminished self-esteem, heightened anxiety, and depression) to a decline in academic performance among students. Furthermore as stated by (King, 2018, Rikkers et al., 2016), overuse of the internet and increased participation in online gaming contribute to addictive behavior, causing severe disturbances in the functioning of younger people and teens if left untreated.

This study investigated the favorable and adverse impacts of playing games online on the educational achievement of Radiologic Technology learners at the Perpetual Help College of Manila (PHCM) campus. Lastly, researchers recommend strategies to promote students' academic performance despite their use of games online.

2. METHODOLOGY

This study combined the strengths of quantitative and qualitative research methods with descriptive research to make quantitative data easier to understand or comprehend the larger relevance of qualitative findings from the respondents. The significance of qualitative research is to further understand and explore the different underlying meanings that people assign to different social situations, Tenny et al., (2022). On the other hand, quantitative research indicates the use of a set of strategies and assumptions that are applied to psychological, and socio-economic aspects through an in-depth exploration of numerical data, Ahmad et al. (2019).

This study utilizes a mixed method, combining multiple elements from qualitative and quantitative research, integrating techniques such as the transformative and sequential nature of both frameworks. Through this, the respondents will have to answer diverse questions regarding the chosen topic to solidify the validity of the thesis, and in the process, completely broaden the scope. For academics and practitioners seeking a deeper, more nuanced understanding of their research topic, mixed methods research can offer a multitude of benefits.

Triangulation or the corroboration of data is used to provide credibility in order to strengthen the validity of your research, Noble Heale (2019). This can help showcase the complexity of the study being conducted. Therefore, the researchers will be able to identify the issues and difficulties that students have as a result of playing online games and provide a platform to help them perform better academically in class with the aid of mixed-method research.

Table 1. Distribution of Respondents According to Demographic Profile.

GENDER	n=86 No. Items	f	Percentage
	Male	39	45.35%
	Female	47	54.65%
	Total	**86**	**100%**
	No. Items		Percentage
Year Level	1st Year	36	**41.86%**
	2nd Year	29	**33.72%**
	3rd Year	22	**25.58%**
	Total	**86**	**100%**

Table 1, Distribution of Respondents According to Demographic Profile based on the data being gathered, 39 out of 86 respondents are male respondents with 45 percent while female respondents are 47 having 54 percent. At this point, females continue to dominate the course may also be due to its work nature. As for the year level, the first-year students of Perpetual Help College of Manila were 36 or 41.86 percent while the 2nd year was 29 or 33.72 percent lastly the 3rd year were 22 or 25.58 percent. Therefore, 100 percent of the participants answered the questionnaire.

3. RESULTS AND DISCUSSION

Table 2. *Positive effects of Online Gaming in Student's Academic performance based on Cognitive*

No.	Items	SD	MEAN	R	VI
1	It has heightened my creativity and innovative thinking, which influence my academic accomplishments	55.33	3.75	5th	Strongly Disagree
2	It has enhanced my problem-solving skills, and analyzed information, contributing to improved academic success.	59.88	3.85	4th	Disagree
3	It has enhanced my mental flexibility, leading to better academic performance.	66.12	3.95	3rd	Neutral

No.	Items	SD	MEAN	R	VI
4	It has improved my critical thinking abilities in my studies.	75.51	4.21	1st	Strongly Agree
5	Memory retention and recall abilities have improved due to playing online games.	65.66	4	2nd	Agree
6	It has helped me develop better concentration and focus during academic activities	45.46	3.5	5th	Strongly Disagree
7	It has improved my cognitive abilities and enriched my learning experiences	52.09	3.64	5th	Strongly Disagree
Average Mean			3.84		Strongly Agree
Standard Deviation (SD)			60.01		

Table 2 Positive effects of Online Gaming in Student's Academic performance based on Cognitive, shows that *"It has improved my critical thinking abilities in my studies"* reaches the highest weighted mean value of 4.21 with the descriptive interpretation of *"Strongly Agree",* this indicates that some online games have a positive effect on students, particularly on their mental processes, where their gaming experiences make it easier for them to learn and comprehend the subjects they are studying. Next, *"It has helped me develop better concentration and focus during academic activities"* got the lowest weighted mean of 3.5 and was interpreted as "Strongly Disagree", which shows that there are students who disagree that online games help them to develop and focus while conducting their academic activities. Moreover, the positive effects of online gaming on students' academic performance based on cognitive ability obtained a weighted mean of 3.84 and a standard deviation (SD) of 60.01 with a verbal indicator of *"Strongly Agree"*. Hence, this proves that online games carry positive effects, particularly in the enhancement of their critical thinking skills, memory retention, and mental flexibility. In support, online games improve the academic knowledge base of the students mainly in Math, English, Science, and other academic subjects (Sahi and Bhagat, 2019). Additionally, online games are capable of improving the brain connectivity of the students. This can enhance the vision, concentration, and teamwork skills of the students. (Smith, 2021)

Table 3. Positive effects of Online Gaming on Student's Academic performance based on Affective

No.	Items	SD	MEAN	R	VI
1	Increased my interest in academic pursuits, leading to improved academic engagement.	51.30	3.65	1st	Strongly Agree
2	Positively influenced my emotional well-being, contributing to better academic engagement and enthusiasm.	38.89	3.38	3rd	Neutral
3	Positively affected my emotional stability, fostering a conducive environment for academic success.	36.48	3.31	5th	Strongly Disagree
4	Improved my mood and attitude towards academic challenges.	43.65	3.40	2nd	Agree
5	Heightened my overall motivation and interest in my academic subjects.	37.90	3.36	4th	Disagree

Average Mean	3.42	Strongly Agree
Standard Deviation (SD)	41.65	

Table 3 Positive effects of Online Gaming in Student's Academic performance based on Affective, the data gathered shows that "Increased my interest in academic pursuits, leading to improved academic engagement" got the highest weighted mean value of 3.65 with the descriptive interpretation of "Strongly Agree", indicating that students would become more interested in and engaged in their academic performance with the aid of online games. Next, "It has helped me develop better concentration and focus during academic activities" got the lowest weighted mean of 3.5 and was interpreted as "Strongly Disagree" This shows that there are students who disagree that online games help them to develop and focus while conducting their academic activities. Moreover, the weighted mean value of 3.42 and standard deviation of 41.65 which indicates "*Strongly Agree*" as its descriptive interpretation implies that online gaming is positively influencing the academic performance of the students based on affirmative by making them motivated to their academic tasks. As well as it positively redounds to their emotional state by contributing happy hormones that set them in a good mood. In terms of digital games, there is a sense of fulfillment in terms of one's psychological needs, which leads to the appreciation of the experience itself, leading to positive implications towards interpersonal relationships, fostering a positive emotional state, Reer and Quandt (2020). Additionally, in terms of motivation, players have become adept in bonding in a virtual space through victories, and mutual hardships that come with the gaming experience, both having the potential to build strong bonds through shared experiences.

Table 4. Positive Effects of Online Gaming on Students' Academic Performance Based on Psychomotor

No.	Items	SD	MEAN	R	VI
1	It has improved my hand-eye coordination, which contributes to my academic performance.	65.23	3.88	1st	Strongly Agree
2	It has enhanced my reflexes, contributing to better performance in tasks that require quick reactions.	56.33	3.77	2nd	Agree
3	It has influenced my coordination, leading to better performance in academic tasks requiring physical movement.	51.84	3.60	4th	Disagree
4	It has helped me develop precise motor skills, contributing to my success in specific academic activities.	61.24	3.73	3rd	Neutral
5	It has contributed to my improved motor control, leading to more accurate and controlled movements while handling radiographic equipment.	42.66	3.43	5th	Strongly Disagree
	Average Mean		3.68		Strongly Agree
	Standard Deviation (SD)		55.46		

Table 4, Positive Effects of Online Gaming on Student's Academic Performance based on Psychomotor, based on the collected data "It has improved my hand-eye coordination, which

contributes to my academic performance" got the highest weighted mean value of 3.88 with the descriptive interpretation of "Strongly Agree", indicating that playing online games has a positive impact on their hand-eye coordination that is highly useful to their academic performance. Next, to support the highest data, "It has contributed to my improved motor control, leading to more accurate and controlled movements while handling radiographic equipment" Obtains the lowest weighted mean value of 3.43 with the descriptive interpretation of "Strongly Disagree" which indicates that there are students who never find online games as a helpful practice to master their hands in using radiographic equipment. Moreover, the weighted mean value of 3.36 and standard deviation of 55.46 which indicates *"Strongly Agree"* as its descriptive interpretation implies that digital games has a positive impact on their motor skills mainly in terms of hand-eye coordination, enhancement of reflexes, and by acquiring necessary motor skills that will be beneficial to their academic performance. In support, computer educational games, particularly those that have multimed features, are capable of supporting the psychomotor skills of the students, even the disabled children (Karal et al., 2011).

Table 5. Negative effects of Online Gaming on Student's Academic performance based on Cognitive

No.	Items	SD	MEAN	R	VI
1	Difficulty in concentrating on academic/work-related tasks after prolonged online gaming sessions?	46.91	3.53	1st	Always
2	Low grades and poor academic performance	22.73	2.87	2nd	Sometimes
3	Inability to concentrate during study hours	18.04	2.81	3rd	Rarely
4	Poor problem-solving skills, reasoning, and creativity	23.42	2.43	5th	Never
5	Poor memory retention and recall abilities.	21.74	2.74	4th	Often
	Average Mean	2.88		Always	
	Standard Deviation (SD)	26.57			

Table 5 Negative effects of Online Gaming on Student's Academic performance based on Cognitive, based on the gathered data "Difficulty in concentrating on academic/work-related tasks after prolonged online gaming sessions?", got the highest weighted mean value of 3.53 with the descriptive interpretation of "Always", indicating that most students who are consuming long hours in playing online games face difficulties in concentrating whenever doing academic activities. Next, to support the highest data, "Poor problem-solving skills, reasoning, and creativity" Obtains the lowest weighted mean value of 2.43 with the descriptive interpretation of "Never" which indicates that online gaming never negatively redounds to the problem-solving skills, reasoning, and creativity of the students. Moreover, the weighted mean value of 2.88 and standard deviation of 26.57 which indicates *"Always"* as its descriptive interpretation implies that online games negatively affect the academic performance of the students in terms of cognitive. The students who over-spent their time playing computers mostly suffer from difficulties in terms of learning ability and concentration problems that will lead to poor academic performance and failed grades. Additionally, it was found that digital communication, in this case, online games, were shown to lower the quality of interpersonal relationships, as it decreases the amount of meaningful social interactions with other people due to an extended period that is invested in the activity, Nguyen et al (2022).

Table 6. *Negative effects of Online Gaming on Student''s Academic performance based on Affective*

No.	Items	SD	MEAN	R	VI
1	Increased frustration or irritability when transitioning to academic tasks.	44.98	3.55	2nd	Always
2	Managing my emotions effectively becomes challenging after prolonged online gaming sessions.	40.24	3.57	1st	Often
3	Difficulty of managing emotions effectively unable to manage overall mood and mental well-being	47.50	3.43	3rd	Sometimes
4	Emotional stability is compromised due to excessive online gaming.	29.22	3.02	5th	Never
5	Difficulties in regulating my emotional responses during academic activities.	33.46	3.21	4th	Rarely
	Average Mean		3.36	Often	
	Standard Deviation (SD)		39.08		

Table 6 Negative effects of Online Gaming on Student''s Academic performance based on Affective, most of the respondent's answers "Managing my emotions effectively becomes challenging after prolonged online gaming sessions", got the highest weighted mean value of 3.57 with the descriptive interpretation of "Often", indicating that there are students who experience having a hard time bouncing back in their study after long exposure in playing online games. Next, to support the highest data, "Emotional stability is compromised due to excessive online gaming" "obtains the lowest weighted mean value of 3.02 with the descriptive interpretation of "Never", this indicates that it is important to recognize that while online gaming can have drawbacks, some students demonstrate remarkable resilience and successfully manage their mental health alongside their gaming habits. Moreover, the weighted mean value of 3.36 and standard deviation of 39.08 which indicates *"Often"* as its descriptive interpretation implies that online gaming redounds negatively to the academic performance of the students in terms of affective. Particularly, in managing their emotion and difficulty controlling their frustration. In addition, overconsumption of online games directly affects the mental health of the students. It causes violent behavior, anxiety, and depression. The adverse impact of online games on the psychological and emotional state of the people depends on factors such as the severity of the violence in the game and in the situation when players are already facing difficulties to differentiate the virtual world and the real world. Hence, these factors make students feel frustrated and irritated often, (Zamani et al., 2019).

Table 7. Negative effects of Online Gaming on Student's Academic performance based on Psychomotor

No.	Items	SD	MEAN	R	VI
1	It harmed my reflexes and motor coordination.	20.19	2.51	3rd	Sometimes
2	Physical dexterity and reaction times suffer.	28.86	2.5	5th	Rarely
3	Physical discomfort or strain affecting my academic readiness.	21.35	2.71	2nd	Often
4	Decline in my overall motor skills and physical coordination	10.31	2.12	4th	Never

5	Decrease in physical energy or readiness for academic activities after participating in lengthy online gaming sessions.	44.75	3.48	1st	Always
Average Mean			2.66		Always
Standard Deviation (SD)			25.09		

Table 7 Negative effects of Online Gaming on Student's Academic performance based on Psychomotor, *b*ased on the data gathered shows that a "Decrease in physical energy or readiness for academic activities after participating in lengthy online gaming sessions, got the highest weighted mean value of 3.48 with the descriptive interpretation of "Always", and being placed in 1st rank which indicates that most students numerous of the respondents believe that students who spend excessive hours in playing online games are most likely to experience fatigue and take their energy supposedly for academic tasks. Next, to support the highest data, "Physical dexterity and reaction times suffer" " obtains the lowest weighted mean value of 2.5 with the descriptive interpretation of "Rarely", this indicates that excessive online gaming can negatively impact physical dexterity and reaction times, hindering a student's ability to perform well in academic tasks requiring physical movement. Moreover, the weighted mean value of 2.66 and standard deviation of 25.09 which indicates "Always" as its descriptive interpretation implies that online gaming redounds negatively to the academic performance of the students in terms of psychomotor. Particularly, physical discomfort, reflexes, and physical energy. To expound addition, excessive online gaming can cause gaming injuries or overuse injuries — that means muscles and tendons start to develop inflammation that will result in numbness and weakness of the arms and hands (Grinspoon, 2022). In addition, excessive usage of online gaming will potentially trigger seizures with the scientific name of photosynthesis seizures. This happens due to the flashlights, lights, fast patterns, and bright moving illustrations. Digital games also cause different musculoskeletal pain because inappropriate posture while playing online games will damage the back, neck, joints, arms, wrists, and elbow will cause severe pain (Barden, 2022).

Table 8. The Effects of Online Gaming on Radtech Students' Performance in Concentration

No.	Items	SD	MEAN	R	VI
1	It hampers my ability to concentrate on academic tasks.	45.17	3.47	5th	Very Ineffective
2	I find it hard to focus on my studies after playing online games.	59.29	3.65	4th	Ineffective
3	Gaming activities distract me during crucial study periods.	68.94	3.91	1st	Very Effective
4	Poor concentration on academic work.	64.95	3.91	2nd	Effective
5	Lack of academic concentration.	56.96	3.71	3rd	Neutral
Average Mean		3.73			Very Effective
Standard Deviation (SD)		59.06			

Table 8 *The* Effects of online gaming on Students Performance in Concentration, shows that item number 3, "Gaming activities distract me during crucial study periods", got the highest weighted mean value of 3.91 with the descriptive interpretation of "Very Effective", indicating that most students most of the students who are addicted to online games are easily getting distracted whenever they are studying for the crucial part of the academic period. Next, to support

the highest data, "It hampers my ability to concentrate on academic tasks" "obtains the lowest weighted mean value of 3.47 with the descriptive interpretation of "Very Ineffective", this indicates that there are students who never get affected in online games whenever they need to focus on academic tasks. Moreover, the weighted mean value of 3.73 and standard deviation of 59.06 which indicates "*Very Effective*" as its descriptive interpretation implies that digital gaming adversely affects the concentration of the students in performance tasks. Additionally, it was found that digital communication, in this case, online games, were shown to lower the quality of interpersonal relationships, as it decreases the amount of meaningful social interactions with other people due to an extended period that is invested in the activity, Nguyen et al (2022). In addition, playing online games disrupts the teaching and learning process for the reasons that students are too focused on playing online games and become less attentive to the class. Hence, these situations lessen the enthusiasm of the students, and learning outcomes are not good (Rumapea et al., 2022).

Table 9. *The Effects of Online Gaming in Radtech Students' Performance in Motivation*

No.	Items	SD	MEAN	R	VI
1	Online gaming drives me to complete my academic tasks efficiently.	44.46	3.47	2nd	Ineffective
2	I feel more assertive to excel academically.	42.91	3.5	4th	Effective
3	It inspired me to pursue academic endeavors.	47.69	3.53	1st	Very Effective
4	I feel inspired to tackle my academic responsibilities after gaming.	23.67	2.92	5th	Very Ineffective
5	It enhances my motivation to perform well in my studies.	41.28	3.35	3rd	Neutral
	Average Mean	3.35			Very Effective
	Standard Deviation (SD)	40.00			

Table 9 the Effects of Online Gaming in Radtech Students' Performance in Motivation, the data gathered shows that "It inspired me to pursue academic endeavors" got the highest weighted mean value of 3.53 with the descriptive interpretation of "Very Effective", indicating that online gaming can be a powerful tool for students. By harnessing the motivational aspects of online gaming, students can find unexpected inspiration to explore new knowledge and achieve their full academic potential. Next, to support the highest data, "I feel inspired to tackle my academic responsibilities after gaming", Obtains the lowest weighted mean value of 2.92 with the descriptive interpretation of "Very Ineffective", this indicates that for many students, the immersive nature of online gaming can unintentionally hinder their motivation to tackle academic tasks. Moreover, the weighted mean value of 3.35 and standard deviation of 40.00 indicates "*Very Effective*" as its descriptive interpretation implies that there are students Additionally, a reward system is one of, if not, the most important element of video games, which is bestowed to players upon completion of tasks, an experience that tends to be satisfying, Puntillo (2023). This makes completing tasks a less tedious activity, since players are motivated by the reward, which can easily be applied to academic tasks in the form of positive reinforcement, such as honorary titles and trophies that highlight their accomplishments.

Table 10. *The Effects of Online Gaming on Students' Performance in Behavior*

No.	Items	SD	MEAN	R	VI
1	I exhibit irritability when unable to play online games.	51.97	3.66	1st	Very Effective
2	I feel distracted with my academic tasks.	57.82	3.31	4th	Effective
3	I am impatient in accomplishing my school activities.	51.54	3.51	2nd	Ineffective
4	I am addicted to playing online games.	63.42	1.98	5th	Neutral
5	I have aggressive behavior while playing online games.	50.96	3.49	3rd	Very Ineffective
Average Mean		3.19			Very Effective
Standard Deviation (SD)		55.14			

Table 10. The Effects of Online Gaming on Students' Performance in Behavior, based on the collected data" I exhibit irritability when unable to play online games", got the highest weighted mean value of 3.66 with the descriptive interpretation of "Very Effective", indicating that online gaming can be a source of fun and connection, dependence on it can lead to student irritability when unable to play. This emotional state can negatively impact academic performance. Next, to support the highest data, "I am addicted to playing online games", got a computed mean value of 1.98 which has a descriptive interpretation of "Neutral", this indicates that the loss of control, social isolation, and distorted perception of reality fostered by addiction can negatively impact a student's overall well-being. The frustration, loss of focus, and potential for social isolation associated with online rage can negatively impact student performance. Moreover, the weighted mean value of 3.19 and standard deviation of 55.14 which indicates "*Very Effective*" as its descriptive interpretation implies that online games negatively affect the behavior of the students. Excessive usage of online games negatively changes the behavior of the students. This will eventually make the students lazy and most of the time feel frustrated, especially in a defeated game and this will lead to a worst-case scenario wherein students get addicted to online games. Then, starting to waste money to purchase expensive tools and equipment for online games. Additionally, it will also influence the students to talk dirty or to curse because gamers often say rude words while playing to express their emotions (Hanafie et al., 2022).

4. CONCLUSIONS

The findings underscore the significance of developing healthy gaming habits and implementing strategies to mitigate the possible detrimental effects of excessive amounts of gaming regarding a student's academic performance, and overall well-being. It must be imperative to moderate and balance the benefits, together with the challenges that are associated with online gaming to ensure optimal academic outcomes for students.

5.RECOMMENDATIONS

The following recommendations are implemented based on the results and conclusion of the study being presented.

1. Students should consider employing techniques like the Pomodoro Technique for better time management and to balance leisure and academic activities.

2. Professors or teachers can establish clear guidelines and promoting a balanced approach can mitigate negative effects while harnessing the benefits of gaming for student development

3. Schools can provide orientation webinars for educators and learners to promote the understanding of balancing gaming with academic commitments for better performance and well-being.

4. Parents should monitor children's time usage, encourage wise time allocation, and limit exposure to technology while educating them about the pitfalls of excessive gaming

5. This study serves as a resource for future researchers on the effects of online gaming addiction on students and suggests strategies for academic focus and personal development.

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ABOUT THE AUTHORS

Dr. Cecilia Cardoso, adviser and Dr. Edgardo C. Cayanan, faculty of Perpetual Help College, Dr. Noel J. Acosta, the dean of the College of Radiologic Technology Michael M. De Guzman, Cedrix B. Diaz, Ashley Marie M. Legarda, Danica U. Magpusao are 3rd-year students of Bachelor of Science in Radiologic Technology at Perpetual Health College of Manila.