Impact of online games on the academic performance of biology education students in Nigerian universities

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Abstract
Online gaming has become increasingly popular among university students, raising concerns about its potential influence on academic performance. This study examined the relationship between online gaming and academic performance among Biology Education students in selected Nigerian universities. A correlational research design was employed, involving 100 final-year students selected through simple random sampling. Data were collected using the Online Gaming Behaviour Questionnaire (OGBQ) and students' cumulative grade point average (CGPA) records. The instrument was validated by experts and demonstrated good reliability ($\alpha = 0.87$). Data were analyzed using descriptive statistics, Pearson correlation, and SPSS version 26. The findings showed that both male and female students actively engaged in online gaming, although males spent more time on daily gaming, participated more frequently in multiplayer games, and reported greater study distractions. However, no significant gender differences were found in academic performance, with mean CGPAs of 3.236 for males and 3.232 for females. Pearson correlation analysis revealed a very weak negative relationship between online gaming and academic performance ($r = -0.017$), suggesting that increased gaming was associated with only a slight decline in academic achievement. Overall, the findings indicate that online gaming has a negligible effect on students' academic performance when gaming is appropriately regulated.

1. Introduction

Online gaming has become a widespread leisure activity among students of universities, including students of Biology Education who often involve themselves with the digital technologies. Although online games might be a way to relax and enhance some technological skills, overuse of online games can be detrimental to the academic performance of students. Academic performance is the performance of the students in terms of tests, assignments, practical projects, classroom work and grade point average. Biology Education, focuses on training students to understand living organisms, cellular processes, and ecological systems. It equips learners with scientific inquiry skills, pedagogical techniques, and technological tools to effectively teach biological concepts.

Inappropriate time management is one of the greatest adverse effects of online gaming. Numerous learners devote excessive time to playing online multiplayer games like PUBG, Call of Duty, Free Fire, and football, at the cost of studying. Games are modeled in such a way that they are very captivating to play that people are willing to spend long hours of their time playing them. When students spend too much time gaming, they have little time to attend lectures, complete assignments and attend robotics practical sessions. Discovered that students who spent over 10 hours/week on gaming had lower academic results and were more prone to be academically challenged (Gabrito et al, 2023). That excessive gaming is a contributor to procrastination and less commitment towards academic tasks (Kaya & Sarpkaya (2025).

The other major impact is a lack of concentration and involvement in the classroom. Biology Education programmed aims to foster scientific literacy, environmental awareness, and innovation for addressing real-world health and environmental challenges. Over gaming can cause mental fatigue, distraction and loss of attention. When students spend up late at night playing games, they tend to be tired during lectures and may have problems in grasping technical concepts. Online gaming was found to have negative effects on students in terms of lack of focus, reduced classroom participation, and low CGPA (Mahmor et al, 2024).

Moreover, online games can also be the cause of addiction and psychological stress. Others become addicted to compulsive gaming behaviour whereby they become emotionally bound to the virtual successes. This can be a source of anxiety, aggression, irritability and depression when they cannot play. In their systematic review, Alzahrani and Griffiths (2024) found out that problematic gaming has a negative impact on the academic performance of students in terms of absenteeism, poor study behaviors, and emotional instability. Gaming addicted students can fail to do coursework, project deadlines and even exam preparation. Online gaming has been able to impact physical health of students indirectly affecting academic performance. Spending many hours gaming can lead to sleep-deprivation, headaches, eye stress and physical exercise. The students whose major is

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Biology Education must be physically and mentally alert when conducting laboratory experiments, and handling machines. Gaming addiction can lead to poor health that can in turn lower their output and academic performance. Long-lasting gaming is a contributor to stress, sleep disorders, and loss of academic performance among students (Bansal & Kranti, 2022).

Although this has some negative consequences, there are also some positive effects of moderated online gaming. Strategy based games have the potential to enhance critical thinking, decision-making, creativity and hand-eye coordination. These competencies may be applicable in the programming of the robotics, debugging systems, and technological problem solving. Online games enhanced the social interaction, teamwork skills and the ability to solve problems in students (Li et al, 2023). Multiplayer games can also aid students to unwind in academic tasks. The good however, can only be good when there is control and balance of gaming and academic duties. Students that value academics and use gaming as a recreation activity have lower chances of experiencing an academic decline.

The present study is significant in that online gaming is gaining more popularity among undergraduates thanks to the popularity of smartphone usage, the availability of the internet and the rise of online entertainment platforms. Those students who study Biology Education are especially vulnerable due to their regular contact with technological equipment and online spaces. Although research has been conducted on overall consequences of gaming among the students on their performance in school, there has been little focus on the specific technology disciplines among the students in Nigeria. Investigation the problematic gaming and academic performance among Chinese college students on a global scale (Alzahrani & Griffiths, 2024). Whereas, the positive developmental outcomes of online gaming among Chinese college students on a global scale (Li et al, 2023). In a similar fashion, Anjum (2024) did not specifically focus on Nigerian universities or Biology Education students, but rather on general student populations. In Nigeria, empirical literature on online gaming is mostly on the adolescent stage and social media usage leaving a gap on the undergraduate stage on technology driven programmed. As Biology Education students need intensive practical work, concentration and command of programming, excessive gaming practices may have a unique impact on their academic performance. Thus, this contextual and disciplinary gap is filled by the seminar and it offers evidence to educators, parents and policymakers.

Objectives: the objectives of this study were to (1) determine the extent of online gaming among male and female Biology Education students in Nigerian universities, (2) compare the academic performance of male and female final-year Biology Education students based on their cumulative grade point average (CGPA), and (3) examine the relationship between online gaming and academic performance among final-year Biology Education students.

Research Questions: The study was guided by the following research questions: (1) What is the extent of online gaming among male and female Biology Education students in Nigerian universities? (2) What is the academic performance of male and female final-year Biology Education students based on their CGPA? and (3) What is the relationship between online gaming and academic performance among final-year Biology Education students?

Hypotheses: The following null hypotheses were tested: (1) There is no significant difference in the extent of online gaming between male and female Biology Education students, (2) there is no significant difference in academic performance (CGPA) between male and female final-year Biology Education students, and (3) there is no significant relationship between online gaming and academic performance among final-year Biology Education students.

2. Method

2.1. Research Design

The research design embraced in this study was a correlational research design. A non-experimental type of research, correlational research is used to establish the nature, direction, and strength of relations between two or more variables without control (Gapira et al., 2020). It determines the positive, negative, or no relationship of variables. The design is suitable since it investigates the correlation between online gaming behaviour and academic performance among Biology Education students in universities of Nigeria. It enables the researcher to see how changes in online gaming behaviour of the students affects the difference in their CGPA, without affecting their natural behaviour. The data related to online gaming will be collected with the help of a structured questionnaire, and the academic performance will be determined with the help of official CGPA records of final-year students. In this way, they will be able to objectively measure the variables and analyze their relationship correctly. The design is appropriate to explain the current patterns and produce evidence on how online gaming can be related to academic performance of students in universities in Nigeria.

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2.2. Study Area

This research was carried out in universities and Colleges of Education (degree awarding) in Nigeria offering Biology Education. This is the selection of those institutions that offer systematic academic training in digital and technology-based subjects where students have high interactions with computers, internet services and online platforms. The area was deemed suitable as internet access and exposure to digital gaming environments amongst students in these programmed is widespread. Final-year students of Biology Education-related programmed were sampled since academic performance can be objectively determined based on cumulative grade point average (CGPA) records.

2.3. Sample and Sampling Technique

This study sample consisted of 100 final-year students who were sampled in the universities and degree-awarding Colleges of Education in Nigeria who offer Biology Education and related programmed. The simple random sampling method was applied to sample four institutions because it was necessary to have fair representation of various types of institutions. In each of the chosen institutions, final-year students were also randomly selected by simple random sampling to provide an equal opportunity to all the students in the institution. This helped to select without bias and enhance the generalizability of findings. The performance in academics was determined by finding the cumulative grade point average (CGPA) of students based on their official school records to ensure objective measure of performance. Table 1 shows the sample distribution in the institutions.

Table 1. Sample Distribution

School Name	Department	Total Students Sampled
Nwafor Orizu College of Education Nsugbe in affiliation with UNN	Computer and Robotic Education	20
Nnamdi Azikiwe University Awka	Computer Science/Education	30
Chukwuemeka Odumegwu Ojukwu University Igbariam	Education/Computer Science	30
Federal College of Education (Tech) Umunze	Computer Science Education	20
Total		100

2.4. Instrument for Data Collection

Two data collection tools were used to gather data to be used in this study: Online Gaming Behaviour Questionnaire (OGBQ) and Students Academic Performance Record (SAPR). The OGBQ is a researcher constructed instrument based on other existing literature on the topic, to measure the level of involvement of students in online gaming activities. It will have questions that measure frequency of play, duration of gaming, playing with others and preference of gaming over academic activities. The measure of responses was based on a four-point Likert scale: Very High Extent (4), High Extent (3), Low Extent (2), Very Low Extent (1). The cumulative grade point average (CGPA) of students based on official academic records was obtained using the SAPR. This gave objective information on academic performance of end-year Biology Education students.

2.5. Instrument validation.

Online Gaming Behaviour Questionnaire (OGBQ) and the Students' Academic Performance Record (SAPR) face and construct validity were determined. The researcher involved three experts, who included two Educational Measurement and Evaluation specialists and one Educational Psychologist of the Department of Educational Foundations, Chukwuemeka Odumegwu Ojukwu University, Anambra State. The specialists analyzed the research objectives, items in the OGBQ, and their suitability to measure the online gaming behaviour of Biology Education students. They made remarks in terms of clarity, relevance, accuracy of language as well as compatibility with the objectives of the study. Recommendations and challenges were included to enhance the tool. In the case of the SAPR, the validation used was to ensure that the CGPA which is obtained through an official academic record is reliable in terms of reflective ability of students with respect to their academic performance. This exercise boosted the credibility, relevancy, as well as suitability of the instruments to the study.

2.6. Reliability of the Instrument

The test-retest method was used to determine the reliability of the Online Gaming Behaviour Questionnaire (OGBQ). The researcher used the twenty (20) final-year students in Biology Education related programmes of a tertiary institution not part of the actual study. The finished ones were obtained following administration. Two weeks later a re-shuffling, re-arranging and re-administering of the same questionnaire items were carried out to the same group of respondents. All responses concerning the two administrations were added and then the Pearson Product Moment Correlation Coefficient was used to determine the consistency of the responses over time. The reliability coefficient obtained during the analysis is 0.87, and the reliability is high. This indicates that the instrument is reliable, stable, in addition to being appropriate to measure online gaming behaviour among students to use in the study.

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2.7. Data collection method.

The researcher used a direct delivery/retrieval system to administer the Online Gaming Behaviour Questionnaire (OGBQ) to the respondents. Research assistants were oriented on the aim of the research, ethical issues, as well as right procedure in administration to achieve correct data collection and minimize bias in responses. Questionnaires were administered to the sampled students of the sampled institutions across Nigeria in final year Biology Education. The research assistants were in charge of the questionnaire completion so as to be sure of clarity of items and independent responses by the participants. To ensure that all the completed questionnaires were not lost or changed, all the questionnaires were retrieved immediately after the questionnaire was administered. Moreover, the data on academic performance of the student were collected with the help of the Students' Academic Performance Record (SAPR). Students cumulative grade point average (CGPA) was retrieved based on the official academic records and accurately recorded to be analyzed.

2.8. Method of Data Analysis

The data obtained with the help of the Online Gaming Behaviour Questionnaire (OGBQ) and the Students' Academic Performance Record (SAPR) were analyzed with the help of the appropriate statistical methods. The research question of the extent of online gaming among Biology Education students in the Nigerian universities was answered with the help of mean and standard deviation. Descriptive statistics were used to summarize the cumulative Grade Point Average (CGPA) scores to determine the performance of students in terms of academic performance.

Pearson Product Moment Correlation (r) was used to determine the relationship between online gaming and academic performance. It was tested on SPSS Version 26 at 0.05 level of significance. The decision rule for interpreting correlation strength followed Nworgu (2015): 0.01–0.39 (weak), 0.40–0.59 (moderate), 0.60–0.99 (strong). A p-value that is less than 0.05 indicates a significant relationship whereas a p-value that is above 0.05 indicates that there is no significant relationship. All the analysis was carried out in SPSS.

3. Results and Discussion

3.1. Results

The result in Figure 1 shows the gender distribution of respondents in the study. Out of 100 Biology Education students sampled, 75 (75.0%) were male while 25 (25.0%) were female. This indicates a higher representation of male students compared to females in the study population. The cumulative percentage shows a complete distribution of 100% across both gender groups. The result implies that the sample is male-dominated, which may reflect the general gender imbalance often observed in technology-related academic programmed in Nigerian universities. However, both genders were adequately represented for comparative analysis in the study.

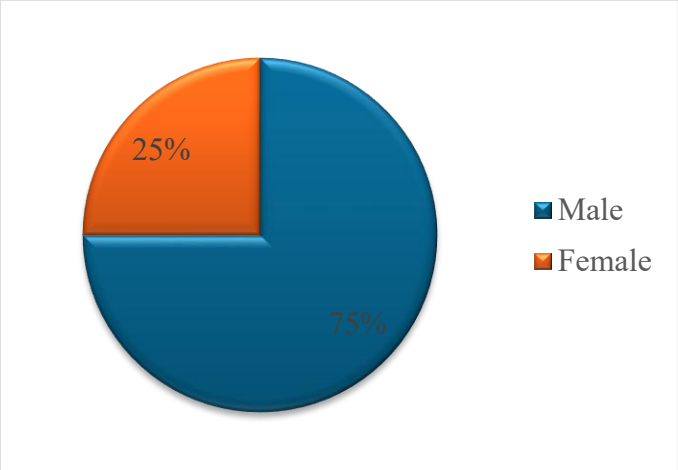

Figure 1. Gender Distribution of Respondents

Research Question 1: What is the extent of online gaming among male and female Biology Education students in Nigerian universities?

Table 2 shown a descriptive Statistics on extent of online gaming among male and female Biology Education students.

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Table 2. Descriptive Statistics on extent of online gaming among male and female Biology Education students

	Gender	N	Mean	Std. Deviation	Std. Error Mean
I play online games on a daily basis using my mobile phone or computer.	Male	75	2.20	1.252	.145
	Female	25	1.88	1.236	.247
I spend several hours per day engaging in online gaming activities.	Male	75	2.57	1.176	.136
	Female	25	2.72	1.173	.235
I often play online games during lecture periods or academic activities.	Male	75	2.60	1.162	.134
	Female	25	2.68	1.180	.236
I engage in online gaming more during weekends than on weekdays.	Male	75	1.56	1.003	.116
	Female	25	1.40	.866	.173
I frequently play multiplayer online games such as PUBG, FIFA, or Call of Duty.	Male	75	3.09	.841	.097
	Female	25	2.52	1.327	.265
I find myself playing online games even when I intend to study.	Male	75	1.91	.701	.081
	Female	25	2.36	1.221	.244
I regularly prioritize online gaming over academic tasks or assignments.	Male	75	3.20	.885	.102
	Female	25	2.76	1.128	.226

The result in Table 2 shows that male students reported slightly higher engagement in daily online gaming activities (M=2.20, SD=1.25) compared to females (M=1.88, SD=1.24). Females, however, reported more time spent gaming per day (M=2.72, SD=1.17) than males (M=2.57, SD=1.18). Both genders showed similar patterns in gaming during lectures (male M=2.60, female M=2.68). Males engaged more in multiplayer games (M=3.09) than females (M=2.52). Females reported higher distraction from study (M=2.36).

Research Question 2: What is the academic performance of male and female final-year Biology Education students in Nigerian universities based on CGPA records?

Table 3 shown a descriptive Statistics on the academic performance of male and female final-year Biology Education students.

Table 3. Descriptive Statistics on the academic performance of male and female final-year Biology Education students

Gender	Mean	N	Std. Deviation	Minimum	Maximum	Range	Variance
Male	3.236	75	.5466	2.1	4.2	2.1	.299
Female	3.232	25	.5293	2.4	4.1	1.7	.280
Total	3.235	100	.5397	2.1	4.2	2.1	.291

The result in Table 3 shows that male students obtained a slightly higher mean CGPA (M=3.236, SD=0.547) compared to female students (M=3.232, SD=0.529). The difference between both groups is very minimal. The minimum and maximum scores for males ranged from 2.1 to 4.2, while females ranged from 2.4 to 4.1, indicating a slightly narrower spread among females (Range=1.7). The overall mean CGPA for all students was 3.235 (SD=0.540). This suggests that academic performance among Biology Education students is relatively similar across gender groups with no noticeable disparity.

Research Question 3: What is the relationship between online gaming and academic performance among final-year Biology Education students in Nigerian universities?

Table 4 shown a Descriptive Statistics Showing the relationship between online gaming and academic performance among final-year Biology Education students.

Table 4. Descriptive Statistics Showing the relationship between online gaming and academic performance among final-year Biology Education students

Gender	Mean	N	Std. Deviation	Minimum	Maximum	Range	Variance
Male	2.4476	75	.49114	1.29	3.57	2.29	.241
Female	2.3314	25	.79188	1.14	3.71	2.57	.627
Total	2.4186	100	.57869	1.14	3.71	2.57	.335

The result in Table 4 shows that male students recorded a slightly higher mean score for online gaming and academic performance relationship (M=2.4476, SD=0.49114) compared to female students (M=2.3314, SD=0.79188). Females however exhibited greater variability in responses (Var=0.627) than males (Var=0.241), indicating more diverse gaming patterns and academic effects. The minimum and maximum scores ranged from 1.14 to 3.71 across the sample, with females showing a wider range (2.57) than males (2.29). The overall mean

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score was 2.4186 (SD=0.57869), suggesting a moderate relationship between online gaming and academic performance among final-year Biology Education students.

Hypothesis 1: There is no significant difference in the extent of online gaming between male and female Biology Education students in Nigerian universities. Table 5 shown a t-test showing the difference in the extent of online gaming between male and female Biology Education students

Table 5. T-test Showing the difference in the extent of online gaming between male and female Biology Education students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Students' Academic Performance	Equal variances assumed	.073	.787	.032	98	.975	.0040	.1253	-.2446	.2526
	Equal variances not assumed			.032	42.361	.974	.0040	.1233	-.2447	.2527

The result in Table 5 shows that there is no significant difference in the extent of online gaming between male and female Biology Education students. Levene's test indicates homogeneity of variance (F=0.073, p=0.787). The t-test result shows a very small mean difference (MD=0.0040) between males and females, which is not statistically significant (t=0.032, df=98, p=0.975). Since the p-value is greater than 0.05, the null hypothesis is accepted. The confidence interval (Lower=-0.2446, Upper=0.2526) further confirms no meaningful difference in online gaming between both gender groups.

Hypothesis 2: There is no significant difference in academic performance (CGPA) between male and female final-year Biology Education students in Nigerian universities. Table 6 shown a t-test Showing the difference in academic performance (CGPA) between male and female final-year Biology Education students

Table 6. T-test Showing the difference in academic performance (CGPA) between male and female final-year Biology Education students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Online Gaming	Equal variances assumed	12.219	.001	.868	98	.387	.11619	.13381	-.14935	.38173
	Equal variances not assumed			.691	30.387	.495	.11619	.16822	-.22718	.45957

The result in Table 6 shows that there is no significant difference in academic performance (CGPA) between male and female final-year Biology Education students. Levene's test indicates unequal variances (F=12.219, p=0.001), so the "equal variances not assumed" row was considered. The t-test result shows that the mean difference between male and female students is small (MD=0.11619) and not statistically significant (t=0.691, df=30.387, p=0.495). Since the p-value is greater than 0.05, the null hypothesis is accepted. This implies that gender does not significantly influence academic performance among the students studied.

Hypothesis 3: There is no significant relationship between online gaming and academic performance among final-year Biology Education students in Nigerian universities. Table 7 shown a Pearson correlation showing the relationship between online gaming and academic performance among final-year Biology Education students.

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Table 7. Pearson Correlation Showing the relationship between online gaming and academic performance among final-year Biology Education students

		Students' Academic Performance	Online Gaming
Students' Academic Performance	Pearson Correlation	1	-.017
	Sig. (2-tailed)		.0087
	N	100	100
Online Gaming	Pearson Correlation	-.017	1
	Sig. (2-tailed)	.0087	
	N	100	100

Table 7 indicates that the relationship between online gaming and academic performance among final year Biology Education students is very weak (r = -0.017, N = 100). The correlation between the two variables has statistical significance (p = 0.00868), as the p-value is less than 0.05. This shows that there is a strong yet extremely weak negative relationship between academic performance and online gaming. Thus, null hypothesis is dismissed. The conclusion is that the rise in online gaming is linked to a small drop in student performance among the students that the researchers examined.

3.2. Discussion

Research Question One was aimed at establishing the level of online gaming between the male and female Biology Education students in the Nigerian universities. The results indicated that the male students reported slightly more hours of daily online gaming activities and playing with other people such as PUBG, FIFA, and Call of Duty, whereas female students spent slightly more hours of online gaming activities and playing with other people in a day. Both the male and the female students also confessed that they play games during lecture time and that online gaming is no longer an exception but a norm among the students regardless of their gender. That male university students were more actively engaged in competitive online gaming activities compared to females, especially in a multiplayer gaming environment (Shirshov & Razumnikova, 2023). The students spent several hours playing on average daily, which had a negative impact on their concentration in lectures and on the amount of time they spent on academic activities (Gabrito et al., 2023). On the same note, Bansal and Kranti (2022) discovered that unchecked gaming among college students led to poor quality of sleep and high levels of stress, which tended to interfere with college students learning activities. Conversely, Li (2023) found that moderate involvement of students in online gaming enhanced teamwork, creativity, and problem-solving skills of students, thereby indicating that gaming may not necessarily lead to negative consequences when well-regulated. The current result thus shows that although both male and female students actively participate in online gaming, the trend of participation differs slightly between the male and female students.

Research Question Two was aimed at investigating the academic performance of both male and female final-year Biology Education students with their CGPA records. The outcome revealed that male students had a slightly higher mean CGPA (M = 3.236) than female students (M = 3.232), although the difference was very minimal meaning that there was not much difference between the academic performance of both genders. The outcome also indicated that the range of scores among female students was smaller, indicating the possibility of a little more consistency in the academic performance of female students. This observation concurred with Mahmor et al (2024) who did not find any significant difference in academic performance among male and female students despite the differences in gaming habits. That despite the students being involved in online gaming activities, there was no significant difference in the academic performance of students based on gender (Gabrito et al., 2023). In a related study, it was found that male and female students were alike in terms of gaming behaviors, especially in connection with stress and academic tasks (Bansal & Kranti, 2022). Gaming was a contributing factor to academic procrastination and school burnout which could ultimately reduce the academic performance of students (Kaya & Sarpkaya, 2025). This paper thus indicates that gender is not an important factor in determining academic success in students of Biology Education.

Research Question Three aimed at investigating the correlation between online gaming and academic performance among final year students of Biology Education in Nigerian universities. The findings showed that there was a very weak negative relationship between online gaming and academic performance (r = -0.017) which indicated that an increase in online gaming was accompanied by a slight decrease in academic performance. Despite a weak relationship, the relationship was statistically significant, meaning that excessive involvement in online gaming could have a gradual, although statistically significant, impact on the academic performance of students. This observation concurred with Alzahrani and Griffiths (2025) who came up with the conclusion that problematic gaming has the tendency of limiting study time, increasing absenteeism and contributing to poor academic performance among students. In the same way, the study by Anjum et al. (2024) revealed that the addiction to online gaming adversely impacted the academic performance of students because of the lack of concentration and the inability to study properly. Excessive gaming affected the academic productivity of students and also diminished their effectiveness at classrooms (Shirshov & Razumnikova, 2023). That controlling gaming can enhance the cognitive growth, interpersonal communication, and strategy formation of students (Li et al, 2023). The implication of the current finding is that although online gaming may

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not have drastic negative effects on academic performance, uncontrolled and excessive participation by students in online gaming may cause gradual negative impact on academic performance of the students.

3.3. Educational implications: Online gaming and gender in biology education performance.

This observation of the absence of a significant difference between the extent of online gaming and academic performance (CGPA) according to gender status highlights an important paradigm shift in today's Nigerian schooling system. As the traditional knowledge, there was a difference in terms of digital resource use and academic performance between men and women. But these findings show a uniformity of digital culture and academic skills among male and female students from the Biology Education department, consistent with the findings of Okelue (2025) on the shifting gender dynamics in higher education. This consistency suggests that there is a uniform threat to both sexes in terms of digital distraction. From descriptive data it was found that many male and female students play online games during lectures and give more priority to playing games than to studying. This ubiquitous distraction is indicative of a deficiency in self-regulation, which has been mentioned by Rita and Henrieta (2025) as one of the most important factors that can contribute to academic success or failure in primary and secondary students. Digital engagements always take over the formal instructional time when self-regulation fails.

The structural educational implication is not so much the punishment for online gaming but rather a change in how the faculty structures its teaching by adopting innovative and technologically advanced methods. Pupils already have an innate curiosity about digital interfaces and this should be directed in a positive way by lecturers. The use of computer-generated animations and other tools, in addition to innovative strategies (Christian-Ike et al., 2024) can make the passive lecture to active learning experience, which significantly enhances academic achievement (Nnalue et al., 2024) and students' interest in biological sciences (Nnalue et al., 2023). Moreover, rather than considering gaming as a deterrent for students, teachers and educators can take advantage of technological gamification. Structured gamification has proven to be a powerful strategy for improving students' learning achievement and subject interest, as shown in the study conducted by Enem et al (2025). Institutions can therefore fill the gap between recreational digital spaces and formal educational needs by using simulations or virtual classrooms in the form of games (Christian-Ike et al., 2025a).

The negative correlation between the excessive gaming and CGPA ($r = -0.017$, $p < 0.05$) is not strong but statistically significant. It demonstrates that unsupervised electronic activities have a regular and systematic negative impact on grades. To reverse this trend, lecturers must be highly digital literate and be able to adapt their pedagogical approach in the digital world (Nneka & Okafor, 2013). Teachers need to develop expertise in using AI tools and adaptive systems in the classroom in the modern digital era (Ofozoba et al., 2024; Muogbo et al., 2026). Finally, biological education programs need to be based on the attainment of basic skills. Educating students to understand complex concepts, like green nanomaterials and sustainability (Ofozoba et al., 2025; Anakpua et al., 2025), can be achieved through the use of advanced tech frameworks, such as AI-driven service-learning. This integrated approach ensures that students develop essential undergraduate science process skills throughout their encounters with digital spaces, a skill all predictors of sustainable academic achievement, irrespective of age, location of schools, and gender limitations (Okafor, 2019; Chukwunazo et al., 2025). More wide-scale institutional factors, including parental and community motivation (Christian-Ike et al., 2025b), are still critical to reinforcing these academic outcomes.

4. Conclusion

To conclude, the study found that online gaming is a prevalent activity among the Biology Education students in the Nigerian universities with both male and female students actively engaging in different forms of online gaming. Despite the fact that the differences in gaming patterns between male and female students were slightly different, but the differences were not statistically significant. It was also found that the academic performance of the students was not much different in the gender groups hence gender does not play a significant role in influencing the academic performance of the students. Moreover, the results indicated that there is a significant yet very weak negative correlation between online gaming and academic performance, implying that the higher the students engage in online gaming, the lower the academic performance of students. Based on these findings the study concludes that although online gaming can be a source of relaxation and entertainment, excessive engagement with online gaming can adversely impact study habits and academic performance of students. This is why, it is necessary to maintain moderation in gaming activities by students so that their academic responsibilities, especially in challenging courses like Biology Education, are not affected.

4.1. Recommendations

The university management and lecturers in the Biology Education departments should organize regular seminars, workshops and awareness programmed to inform the students on the impacts of excessive gaming of the internet and how they can manage their time effectively to ensure that they balance recreation with the academic duties.

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Students are supposed to engage in self-regulation by establishing their own schedules of studying and by limiting the amount of hours that they spend playing online games, particularly during lectures, when due to submit assignments, exams etc. in order to enhance their academic focus and performance.

The gaming habits of students should be monitored by their parents, guardians and school counsellors who should then advise the students on the proper use of the digital devices and encourage them to engage in constructive academic and extracurricular activities which can help them to reduce excessive reliance on gaming online.

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Data Availability

The datasets generated during and/ or analysed during the current study are available from the corresponding author on reasonable request.

Declaration on AI Use

The authors declare that no artificial intelligence (AI) or AI-assisted tools were used in the preparation of this manuscript.

References

Alzahrani, A. K. D., & Griffiths, M. D. (2025). Problematic gaming and students' academic performance: A systematic review. *International Journal of Mental Health and Addiction, 23*(5), 4062–4095. https://doi.org/10.1007/s11469-025-01566-7

Anakpua, B. C., Inweregbuh, O. C., Odimkpa, C. O., Enemuo, C. J., Ofozoba, C. A., Isidi, P. A., Muogbo, U. F., Nnalue, O. H., Obiadazie, R. E., & Okudo, O. C. (2025). Enhancing STEM education through AI-driven service-learning: Fostering student understanding of nanotechnology-based green materials for sustainability. *International Journal of Environmental Sciences, 11*(20S).

Anjum, R., Nodi, N. H., Das, P. R., Roknuzzaman, A. S. M., Sarker, R., & Islam, M. R. (2024). Exploring the association between online gaming addiction and academic performance among school-going adolescents in Bangladesh: A cross-sectional study. *Health Science Reports, 7*(9), Article e70043. https://doi.org/10.1002/hsr2.70043

Bansal, H., & Kranti, S. K. (2022). Gaming disorder among college students and correlation of gaming with self-esteem, perceived stress, and sleep quality. *Annals of Indian Psychiatry, 6*(3), 244–248. https://doi.org/10.4103/aip.aip_56_22

Christian-Ike, N. O., Chukwuemenam, J. P., Nnalue, O. H., & Ibeh, J. (2025). Influence of parental attitudes towards basic education students' academic achievements and motivation in basic science in Anambra State. *JISTECH: Journal of Information Science and Technology, 5*(2), 629–639.

Christian-Ike, N. O., Nnalue, O. H., & Nwuba, I. S. (2024). Teachers' awareness and utilisation of innovative strategies for teaching and learning in Awka South. *Inornatus: Biology Education Journal, 4*(1), 36–45. https://doi.org/10.30862/inornatus.v4i1.***

Christian-Ike, N. O., Nnalue, O. H., & Obili, M. O. (2025). Perception and attitudes of basic science teachers towards the use of virtual classrooms in Awka Education Zone. *Journal of Science Education and Research, 3*(1), 45–60.

Chukwunazo, O. M., Ebele, A. E., Obioma, N. H., Amobi, U. V., & Uche, E. D. (2025). Undergraduate students' science process skills as predictors of academic achievement in science education courses. *Journal Plus Education, 38*(Special Issue), 371–384.

Enem, E. S., Enemuo, C. J., & Okafor, T. U. (2025). Effect of technological gamification on upper basic education students' achievement and interest in computer studies in Awka Education Zone. *South Eastern Journal of Research and Sustainable Development, 18*(1), 67–83.

Gabrito, R. C., Ibañez, R. Y., & Velza, J. F. P. (2023). Impact of online gaming on the academic performance of DEBESMSCAT-Cawayan Campus students. *Scientific Journal of Informatics, 10*(4), 423–434. https://doi.org/10.15294/sji.v10i4.*****

Kaya, B., & Sarpkaya, A. (2025). Over-gaming burns me out: The indirect role of academic procrastination between digital game addiction severity and school burnout among adolescents. *School Psychology International, 46*(5), 499–518. https://doi.org/10.1177/01430343251348172

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ISSN: 3110-2557

Li, F., Zhang, D., Wu, S., Zhou, R., Dong, C., & Zhang, J. (2023). Positive effects of online games on the growth of college students: A qualitative study from China. *Frontiers in Psychology, 14*, Article 1008211. https://doi.org/10.3389/fpsyg.2023.1008211

Mahmor, N., Rozita, R., & Zarida, S. (2024). The impact of online gaming on academic performance. *Malaysian Journal of Innovation in Engineering and Applied Social Sciences, 4*(1), 327–331.

Muogbo, U. F., Okafor, T. U., & Umezulike, F. M. (2026). Teachers' readiness and competence in integrating AI-based educational tools in computer studies classrooms in Nnewi Education Zone, Anambra State, Nigeria. *STEM Journal of Anambra STAN, 6*(2), 72–81.

Nnalue, O. H., Christian-Ike, N. O., & Orafu, G. T. C. (2023). Effect of computer animation on secondary school students' interest in biology in Anambra State. *African Journal of Educational Management, Teaching and Entrepreneurship Studies, 10*(1), 127–137.

Nnalue, O. H., Nnorom, R. N., & Christian-Ike, N. O. (2024). Computer animation as a vehicle for enhancing secondary school students' academic achievement in biology. *UNIZIK Journal of Educational Research and Policy Studies, 17*(1), 92–102.

Nneka, R. N., & Okafor, T. U. (2013). Assessment of science teachers' level of computer literacy and usage in colleges of education: Implication for global competitiveness. *African Journal of Education, Science and Technology, 1*(1), 250–258.

Obikezie, M. C., Onyebuch, E. D., Akachukwu, E. E., & Nnalue, O. H. (2025). School location and gender as predictors of students' science process skills and academic achievement in senior secondary schools. *Eureka: Journal of Educational Research, 4*(1), 1–7.

Ofozoba, C. A., Henry, E. U. M., Henrietta, N. O., Oguechuo, G. A., & Ofozoba, O. P. (2024). Educational leadership and artificial intelligence: Implications for adaptive learning outcomes. *AJSTME, 10*(6), 1086–1094.

Ofozoba, C. A., Okafor, P. C., Ikegbusi, N. G., Manafa, F. U., Egwu, J. U., Nwobu, C. M., Okafor, S. O., Onafowope, M. A., Olofinkua, V. K., Adeagbo, J. O., & Gbaeprekumo, O. V. (2025). AI-driven service-learning to enhance students' understanding of green nanomaterials in sustainability education. *Multidisciplinary Reviews, 8*(12), Article e2025429. https://doi.org/10.31893/multirev.e2025429

Okafor, T. U. (2019). Influence of age on students' alternative conceptions of scientific phenomena. *Journal of Education and Practice, 10*(9), 190–204.

Okelue, C., Henrietta, N. O., & Alado, M. I. (2025). Gender dynamics and infrastructural challenges in the implementation of blended learning in higher education. *International Journal of Research and Innovation in Social Science, 9*(3), 2276–2284.

Rita, N. N., & Henrieta, N. O. (2025). Students' self-regulatory skills as correlates of academic achievement in biology in public secondary schools in Anambra State. *UNIZIK Journal of STM Education, 8*(2), 180–191.

Shirshov, I. S., & Razumnikova, O. M. (2023). Influence of computer gaming technologies on university students' academic performance. *Russian Journal of Education and Psychology, 14*(4), 163–178.

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