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Effects of Online Gaming Behaviors of Filipino Students' Perceived Academic Performance Through Multiple Regression Analysis

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ABSTRACT

With the changes brought about by the Covid-19 pandemic, playing online games significantly increases as it lessens stress and reduces the adverse effects of self-isolation which cope with the problems encountered by most students. Several studies have shown that online games worsened learning ability, and attention issues, and lowered the students' academic performance, which shows the negative consequences of playing online games. This study aimed to identify the statistically significant factors affecting the perceived academic performance of Filipino students due to online gaming. A self-administered questionnaire with 13 questions, was deployed among five hundred Filipino online gamer students from across cities of NCR. Stepwise multiple regression analysis was utilized to determine the fittest predictor of academic performance. Results show that time spent playing online games during weekdays (p-value = 0.001), gender (p-value = 0.001), number of subject loads (p-value = 0.005), attendance (p-value = 0.001), number of close friends (p-value = 0.001), and career preferences of E-sports (p-value = 0.021) and Law (p-value = 0.047) are significant predictors of academic performance. The study recommends that students monitor their time spent playing online games on weekdays and weekends, avoid absences from class, practice group discussions and enroll in manageable units to improve their academic performance.

Keywords: Online games, Academic performance, Stepwise multiple regression

INTRODUCTION

For the past few years, online games have been the activity of people to escape from their problems, relieve their stress, and for their own entertainment. Since the start of the global pandemic, COVID-19, physical distancing has become a societal restriction that drives people to consider leisure activities that could be done without the physical presence of other people, leading them to electronic gaming [Rozgonjuk et al., 2022]. Teenagers and adolescents can stay up all night playing games without worrying about school and work due to the virtual class and work-from-home setup caused by the

recent pandemic. The closing of schools, lockdowns, and staying-at-home has allowed gamers to increase their playing duration. There are adverse effects when a person is engaged in online games; this can affect their individual behavior, leading to personal issues [Columb et al., 2019]. Students in universities who have an addiction to online gaming suffer excessive fatigue and daytime sleepiness, which can affect their academic performance [Ohayon & Roberts, 2021].

These students that have poor academic performance show significant characteristics, these include lack of motivation and interest in learning [Wu & Xin, 2019]. As students tend to lean on the negative effects of online gaming, the researchers will focus on the positive result of gaming towards their learning styles and school performance. This research would provide crucial information to the involved sectors to develop a deeper understanding of the effects of online gaming behaviors to the academic performance of the students. The study would also extract relevant data concerning gamers' actual experience that would help provide practical recommendations that may be useful in the welfare of the students and the academe.

The framework (see Figure 1) presents the variables extracted from the related literature. Demographics include age, gender, type of school, subject loads, attendance (absences), education background, career preference, and number of close friends. Gaming behavior includes time spent playing online games (class days & weekends) and number of played online games. The researchers aim to find the relationship between the eleven (11) factors mentioned above and conclusively determine if the identified factors significantly affect the dependent variables: Perceived Academic Performance. It shows the relationships of the twelve (12) hypotheses (see Table 1) to one another.

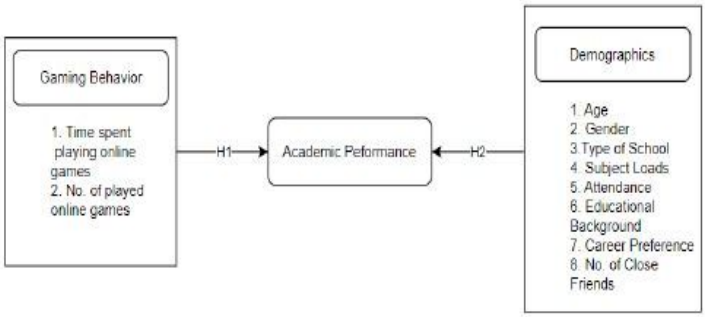

Figure 1: Conceptual framework.

METHODS

A self-administered survey was distributed among Filipino online gamer students from the National Capital Region, Luzon, Philippines, to determine the significant predictors of the academic performance of students playing games. The researchers gathered a total of five hundred (500) responses.

Multiple Linear Regression, specifically the backward Stepwise Method, was used to analyze the data considering that the study involves several independent variables, which determine the effects of online gaming behaviors of

Table 1. Summary of hypotheses.

No.	Hypotheses
H1	Gaming habit does not affect Academic Performance
H1.1	Time spent playing online games does not affect Academic Performance
H1.2	No. of played online games does not affect Academic Performance
H2	Demographics affect Academic Performance
H2.1	Age does not affect Academic Performance
H2.2	Gender does not affect Academic Performance
H2.3	Type of School does not affect Academic Performance
H2.4	Subject Loads does not affect Academic Performance
H2.5	Attendance does not affect Academic Performance
H2.6	Educational Background does not affect Academic Performance
H2.7	Career Preference does not affect Academic Performance
H2.8	No. of Close Campus friends does not affect Academic Performance

Filipino students towards perceived academic performance. This technique is a sequential process for fitting least squares models in which a single explanatory variable is modified to fit into the model at each step. The researchers utilized SPSS to perform the calculations with the gathered data to measure the descriptive statistics in the study. The significance level of 0.10 was also used in the study to further know the significance predictors in the analysis.

RESULTS

The final model in the stepwise multiple regression analysis shows that time spent playing online games during weekdays, gender, number of subject loads, number of close friends and career preferences of e-sports and law are significant predictors of academic performance. The values indicating an increase in semestral average translates to poorer academic performance as the grading system used in the analysis measures 1.0 as the highest to 5.0.

Value shows that for every hour increase of time spent in online gaming during class days, the semestral average of a student increases by 0.01984 on the average, holding all other factors constant, indicating poorer academic performance. This result follows the study of Garcia et al. (2018) that online gaming negatively impacts students' academic grades by significantly affecting assignments, quizzes, recitation, and examination results.

Moreover, the semestral average of a student increases by 0.16616 if they are male compared to a female holding all other factors constant, indicating a poorer academic performance. This result is consistent with the previous study of Alharajraf & Alasfour (2004) in which results showed a significant difference between male and female performance as evaluated by academic grade and that female achievement is higher than male achievement.

Results also show that for every additional subject load, the semestral average of a student increases by 0.02216 on the average, holding all other factors constant, indicating poorer academic performance. This finding contradicts the result of a previous study of Szafran (2001) that higher academic grades are typically attained by students who take more credits, however, it

Table 2. Profile of respondents (n = 500).

Characters	Category	N	%
Gender	Male	345	69.0
	Female	155	31.0
Age	13	5	1.0
	14	6	1.2
	15	3	0.6
	16	22	4.4
	17	34	6.8
	18	38	7.6
	19	63	12.6
	20	94	18.8
	21	107	21.4
	22	110	22.0
	23	13	2.6
	24	5	1.0
Type of School	Private	456	91.2
	Public	44	8.8
Educational Background	Junior High School	26	5.2
	Senior High School	90	18
	College	384	76.8
Number of Subjects/Courses currently enrolled to	1	4	0.8
	2	4	0.8
	3	11	2.2
	4	10	2.0
	5	25	5.0
	6	29	5.8
	7	49	9.8
	8	127	25.4
	9	98	19.6
	10	119	23.8
	11	19	3.8
	13	1	0.2
	14	1	0.2
	16	2	0.4
	17	1	0.2
What is your career preference?	Accounting Business and Management (ABM)	105	21.0
	Agricultural	0	0.0
	Arts & Design Track	21	4.2
	Humanities and Social Sciences (HUMSS)	58	11.6
	Sports Track	1	0.2
	Science, Technology, Engineering, and Math (STEM)	296	59.2
	Others		
Grades	1.0	19	3.8
	1.06	6	1.2

Continued

Table 2. Continued.

Characters	Category	N	%
	1.0625	1	0.2
	1.12	1	0.2
	1.14	1	0.2
	1.16	1	0.2
	1.175	1	0.2
	1.19	1	0.2
	1.2	1	0.2
	1.21	1	0.2
	1.236	1	0.2
	1.25	27	5.4
	1.263	1	0.2
	1.27	1	0.2
	1.29	1	0.2
	1.3	3	0.6
	1.31	1	0.2
	1.313	1	0.2
	1.352	1	0.2
	1.37	1	0.2
	1.375	1	0.2
	1.391	1	0.2
	1.4	5	1.0
	1.408	1	0.2
	1.41	1	0.2
	1.42	2	0.4
	1.43	2	0.4
	1.44	1	0.2
	1.45	2	0.4
	1.46	3	0.6
	1.47	1	0.2
	1.50	48	9.6
	1.507	1	0.2
	1.52	1	0.2
	1.542	1	0.2
	1.56	4	0.8
	1.59	2	0.4
	1.6	6	1.2
	1.61	3	0.6
	1.614	1	0.2
	1.62	4	0.8
	1.625	1	0.2
	1.635	3	0.6
	1.64	1	0.2
	1.641	3	0.8
	1.647	1	0.2
	1.65	1	0.2
	1.652	1	0.2
	1.654	1	0.2

Continued

Table 2. Continued.

Characters	Category	N	%
	1.67	3	0.6
	1.68	4	0.8
	1.69	1	0.2
	1.7	3	0.6
	1.71	1	0.2
	1.721	1	0.2
	1.73	3	0.6
	1.735	1	0.2
	1.741	1	0.2
	1.742	1	0.2
	1.746	1	0.2
	1.748	1	0.2
	1.75	87	17.4
	1.752	1	0.2
	1.76	2	0.4
	1.761	1	0.2
	1.762	3	0.6
	1.77	4	0.8
	1.773	1	0.2
	1.78	3	0.6
	1.79	1	0.2
	1.795	2	0.4
	1.798	1	0.2
	1.8	5	0.1
	1.825	1	0.2
	1.826	1	0.2
	1.832	2	0.4
	1.841	1	0.2
	1.85	4	0.8
	1.86	1	0.2
	1.863	1	0.2
	1.87	1	0.2
	1.88	4	0.8
	1.89	2	0.4
	1.9	4	0.8
	1.909	1	0.2
	1.91	2	0.4
	1.92	1	0.2
	1.929	1	0.2
	1.93	1	0.2
	1.95	1	0.2
	1.96	12	2.4
	1.97	2	0.4
	1.98	1	0.2
	2.0	51	10.2
	2.0125	1	0.2
	2.014	4	0.8

Continued

Table 2. Continued.

Characters	Category	N	%
	2.016	1	0.2
	2.017	1	0.2
	2.018	1	0.2
	2.03	1	0.2
	2.036	1	0.2
	2.037	1	0.2
	2.038	1	0.2
	2.039	1	0.2
	2.056	1	0.2
	2.057	1	0.2
	2.08	1	0.2
	2.083	1	0.2
	2.103	2	0.4
	2.11	1	0.2
	2.128	1	0.2
	2.13	2	0.4
	2.132	1	0.2
	2.14	4	0.8
	2.146	1	0.2
	2.147	1	0.2
	2.15	2	0.4
	2.153	1	0.2
	2.154	1	0.2
	2.16	1	0.2
	2.162	1	0.2
	2.167	1	0.2
	2.19	1	0.2
	2.2	1	0.2
	2.215	1	0.2
	2.217	1	0.2
	2.219	2	0.4
	2.221	1	0.2
	2.23	1	0.2
	2.237	1	0.2
	2.24	2	0.4
	2.25	33	6.6
	2.256	1	0.2
	2.257	1	0.2
	2.268	1	0.2
	2.27	1	0.2
	2.3	1	0.2
	2.32	1	0.2
	2.33	1	0.2
	2.347	1	0.2
	2.41	2	0.4
	2.43	1	0.2
	2.438	1	0.2

Continued

Table 2. Continued.

Characters	Category	N	%
	2.441	1	0.2
	2.45	1	0.2
	2.46	1	0.2
	2.47	1	0.2
	2.482	1	0.2
	2.5	12	2.4
	2.51	1	0.2
	2.512	1	0.2
	2.55	2	0.4
	2.557	1	0.2
	2.6	1	0.2
	2.63	1	0.2
How many hours do you spend playing online games during class days?	0	9	1.8
	0.5	2	0.4
	1	63	12.6
	2	154	30.8
	2.5	7	1.4
	3	123	24.6
	3.5	4	0.8
	4	62	12.4
	4.5	2	0.4
	5	32	6.4
	6	19	3.8
	7	4	0.8
	8	12	2.4
	9	1	0.2
	10	1	0.2
	10.5	1	0.2
How many hours do you spend playing online games during weekends?	0	1	0.2
	1	20	4.0
	1.5	2	0.4
	2	63	12.6
	2.5	2	0.4
	3	90	18
	3.5	6	1.2
	4	68	13.6
	4.5	1	0.2
	5	96	19.2
	5.5	2	0.4
	6	46	9.2
	6.5	1	0.2
	7	29	5.8
	7.5	1	0.2
	8	36	7.2
	8.5	1	0.2
	9	9	1.8
	10	12	2.4

Continued

Table 2. Continued.

Characters	Category	N	%
	11	3	0.6
	12	7	1.4
	12.5	1	0.2
	15	2	0.4
	16	1	0.2
How many absences did you incur in class this semester?	0	205	41.0
	1	78	15.6
	2	100	20
	3	67	13.4
	4	26	5.2
	5	11	2.2
	6	7	1.4
	7	1	0.2
	8	2	0.4
	10	3	0.6
How many online games did you play this year?	1	56	11.2
	2	164	32.8
	3	92	18.4
	4	68	13.6
	5	61	12.2
	6	24	4.8
	7	12	2.4
	8	6	1.2
	9	5	1.0
	10	6	1.2
	12	2	0.4
	15	3	0.6
	20	1	0.2
How many are your considered close friends in your school/university/campus?	0	7	1.4
	1	4	0.8
	2	46	9.2
	3	71	14.2
	4	63	12.6
	5	84	16.8
	6	50	10
	7	52	10.4
	8	49	12.6
	9	9	16.8
	10	27	5.4
	11	4	0.8
	12	8	1.6
	13	5	1.0
	14	1	0.2
	15	8	1.6
	16	1	0.2
	18	1	0.2
	20	7	1.4
	25	1	0.2
	30	2	0.4

Model Coefficients

Predictor	Estimate	SE	t	p
Intercept [a]	1.97242	0.35657	5.53163	< .001*
Time spent during weekdays	0.01984	0.00904	2.19544	0.029*
Gender:				
Male – Female	0.16616	0.03475	4.78184	< .001 *
Subject Loads	0.02216	0.00788	2.81329	0.005 *
Absences	0.04086	0.00963	4.24275	< .001 *
Career:				
Aviation – JHS	-0.46545	0.41824	-1.11288	0.266
GAS – JHS	-0.37907	0.4178	-0.9073	0.365
E-Sports – JHS	-0.92685	0.40179	-2.30679	0.021 *
Arts and Design – JHS	-0.5348	0.35268	-1.51637	0.13
ABM – JHS	-0.45301	0.34487	-1.31358	0.19
STEM – JHS	-0.42648	0.3442	-1.23905	0.216
HUMSS – JHS	-0.38941	0.3475	-1.12061	0.263
Hospitality and Tourism – JHS	-0.50586	0.39314	-1.28672	0.199
Health – JHS	-0.41725	0.41752	-0.99936	0.318
Computer – JHS	-0.54322	0.41748	-1.30118	0.194
Sports – JHS	-0.45119	0.47929	-0.94138	0.347
Engineering – JHS	-0.00111	0.48113	-0.0023	0.998
Marketing – JHS	-0.27277	0.41385	-0.65912	0.51
Law – JHS	-0.95646	0.47998	-1.99271	0.047 *
No. of Close Friends	-0.02209	0.00426	-5.18312	< .001 *

[a] Represents reference level

Figure 2: Stepwise multiple regression final model.

Table 3. Model fit measures.

Model Fit Measures		
Model	**R**	**R2**
1	0.457	0.209

includes that registering for more loads of challenging courses results in lower grades.

Furthermore, for every additional absence, the semestral average of a student increases by 0.04086 on average, holding all other factors constant, indicating a poorer academic performance similar to the study of Guleker (2014). Attendance and performance had a significant positive correlation with one another in that the higher the attendance or the lesser the absence, the lower the probability of a failing mark.

Lastly, the result suggests that for every additional close campus friend, the semestral average of a student decreases by 0.02209 on the average, holding all other factors constant, indicating better academic performance. This result confirms Braxton et al.'s (2013) hypothesis that student integration—as demonstrated by close campus friends in this study—is favorably connected to persistence. The study's findings also found a positive relationship between improvements in college grade averages and the presence of more close campus friends.

Model fit measures show that the final model can explain about 21% of the variation in semestral average. This includes the variables time spent online gaming during class days, gender, number of subject/course loads, number of absences, career preference, and number of close friends.

The normality tests resulted in a Kolmogorov-Smirnov p-value of 0.328 and test statistic of 0.0424. Since the value of the test statistic is less than the critical value of 0.05, the researchers do not reject the null hypothesis

Table 4. Normality test.

Normality Tests		
	Statistic	**p**
Shapiro- Wilk	0.993	0.017
Kolmogorov-Smirnov	0.0424	0.328
Anderson-Darling	1.07	0.008

Table 5. Heteroskedasticity test.

Heteroskedasticity Tests		
	Statistic	**p**
Breusch-Pagan	67.2	≤0.017
Goldfeld-Quandt	0.906	0.773
Harrison-McCabe	0.522	0.77

Table 6. Collinearity statistics.

Collinearity Statistics		
	VIF	**Tolerance**
Time spent during weekdays	1.1	0.906
Gender	1.07	0.936
Subject Loads	1.09	0.918
Absences	1.08	0.923
Career	1.01	0.986
No. of Close Friends	1.08	0.93

[Riffenburgh, 2006], concluding that the residuals are normally distributed. Hence, the assumption is satisfied.

The Heteroskedasticity test showed a p-value greater than 0.05 for Goldfeld-Quandt and Harrison-McCabe tests. After that, the researchers cannot reject the null hypothesis because the p-value is not less than 0.05 and lacks sufficient proof to conclude that the regression model contains heteroscedasticity [Zach, 2020]. Therefore, the researchers conclude that the residuals are homoscedastic. Hence, the assumption is satisfied.

The result of the collinearity statistics shows values of VIFs no greater than 5 for all significant variables. According to Bhandari (2020), a VIF value of 1 means there is no correlation between the independent variables and a value greater than 5 indicates high multicollinearity. Therefore, there is no multicollinearity. Hence, the assumption is satisfied.

CONCLUSION

The findings in the study revealed that under the independent variables, Time spent playing online games during weekdays, Gender, Number of subject loads, Number of close friends, and Career preferences of e-sports and

law are significant in predicting the Academic Performance. Accordingly, the study suggests that to achieve high academic performance of students, educational institutions should incorporate group discussions of students with their friends into their supplementary materials, as having more close friends or people they interact with can improve their academic performance relative to their GPAs [Braxton et al., 2013]. Moreover, students should lessen their playing time during weekdays, as it affects their academic performance. Regarding the subject loads, students should only enroll in the proper load of their courses for them to efficiently handle their responsibilities in school [Lau, 2017]. Even though the findings of this study are encouraging, the researchers acknowledge that there are still several areas that might use improvement and additional research. Future research could try to apply several hypotheses related to academic achievement, and online gaming which will highlight a different set of factors important to this topic.

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