The Effect of Computer Games on Student Performance

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Abstract

Video games tend to be addictive. Addiction to these games can take time out of a students' busy schedules and hinder their focused in class. Thus, it is important to find out if computer games can harm a student's GPA. This study builds on prior studies that use a student's GPA as the dependent variable and time spent playing video games as the independent variable. Prior literature on the subject found that students who play video games have, on average, a GPA that is 0.2 points lower than their peers who don't play video games. Our study uses a sample of 205 Johns Hopkins University students. One limitation on the study is that there is some non-random sampling, because 20% of the survey responds were economics majors. After running two regressions with Last Semester GPA and Overall GPA as the dependent variables, the study finds that computer games have a negative impact on college students' GPAs.

Introduction

Many people believe that computer games are addictive. These addictive games can take time out of a student's busy schedule. Students at a prestigious university such as Johns Hopkins are required to spend a lot of time studying and working on other assignments to maintain and improve their GPA. When students are not studying, many try to invest in extra curriculars. Thus, the addictive nature of video games can cut into a student's study schedule and lower their GPA. This paper will examine how the amount of time spent playing computer games per week impacts the GPA of a JHU student. This topic is interesting because it provides one reason as to why smart students have a lower academic performance than expected.

In addition, there are plenty of other factors, such as time spent watching TV, that can negatively impact a students' academic performances. This study also hopes to explore how

much of an impact computer games have on a student's GPA in comparison with how much these other electronic distractions impact student academic performance. The results of this study will be compared with the results found in existing literature on this subject.

Hypothesis Testing

The Null Hypothesis that will be tested (H_o), is that time spent playing computer games does not lower a student's GPA at Johns Hopkins University. The Alternative Hypothesis (H_a) is that playing computer games does lower a student's GPA.

To test this null hypothesis, we will need to run a regression in Stata, using data that we collected for this study. This regression will find the OLS coefficients, their standard errors, and the Robust Standard Errors for all our independent variables. Afterwards, we will interpret these coefficients to determine the effect of the explanatory variables on the dependent variables. In addition, we will interpret the correlation between the explanatory and the dependent variables.

We will run two regressions for the standard OLS coefficients, and two more to find the robust standard errors for these coefficients. The dependent variables in our regression are a student's overall GPA (*OverallGPA)* and a student's last semester GPA (*LastSemesterGPA).* Our independent variables will remain consistent. The explanatory variable that we are most interested in is the number of hours a student spends playing computer games each week (*HoursPlayingCompGamesEachWeek).* In addition, we will use the following explanatory variables: time spent on Facebook (*TimeOnFBPerDay*), tweets sent out per week (*TweetPerWeek*), hours on snap chat each day (*HoursSnapChatPerDay*), texts sent per day (*TextsPerDay*), time spent talking on the phone (*MinPhonePerDay*), and hours spent watching TV each week (*HoursWatchingTVEachWeek*). These variables are the various kinds of electronic

distractions that can waste students' time. Thus, these factors can hurt a student's academic performance and lower their GPAs. We will not use time spent on the internet as an explanatory variable (even though it was part of the dataset) because variables such as *HoursWatchingTVEachWeek* and *TimeOnFBPerDay* overlap with time spent on the internet. In addition, because a lot of students spend time doing their HW on the internet, it is difficult to determine whether internet use is a distraction. Because of these issues, this variable will be partly represented in the error term. Thus, it will not be an explanatory variable in the regression.

Literature Review

The following five sources that were used as background reading for this paper will be described in this section.

1. The article "The Effects of Video Game Play on Academic Performance" by Jancee Wright uses a sample size of 198 university students. It finds that the average GPA for students that claimed they regularly played video games was 3.2. However, 3.4 was the average GPA for students that claimed that they did not regularly play video games (2011). Thus, the study concluded that video game usage had a negative correlation with student GPA (Wright, 2011, 41).
2. In addition, the article "The Impacts of Serious Game Play on the Study Habits of the Community College Student: An Exploratory Study" by Owen Johnston explores the impact of video games on student's time management skills (2014). This study uses a community college student population as its sample size. It concludes that there was no statistically significant correlation between gaming and study habits. Therefore, this article suggests that time spent playing video games does not statistically affect study time (Johnston, 2014, 79)

3. The article by Jordan Weaver titled “The Impact of Video Games on Student GPA, Study Habits, and Time Management Skills: What’s the Big Deal?” confirms the negative correlation between time spent playing video games and GPA. Weaver uses a sample of college students from a private university in Ohio. In addition, Weaver compares the usage of video games with time management skills and study habits (Weaver, 2013, 5). Weaver also does not find any correlation between time spent playing video games and these dependent variables (2013).
4. Furthermore, the paper, “A Conceptual Framework for Assessing Motivation and Self-Regulated Learning in College Students” by Pintrich, looks at techniques that students can use to stay motivated in college. The paper compares this technique with other approaches and concludes that Self-Regulated Learning is the best way for college students to succeed (Pintrich, 2004, 401). Thus, this paper implies that students need to stay motivated to succeed in college.
5. Finally, to understand how video games and other electronics might impact students’ college experiences, one must look at mental health on college campuses. Therefore, the article “The Mental Health Needs of Today's College Students: Challenges and Recommendations” by Martha Kitzrow is important background reading for this paper. This article examines causes, such as the increase in the use of electronics, that have led to an increase in students seeking mental health counseling at the start of the twenty-first century (Kitzrow, 2003, 176).

These articles conclude that video games lower a student’s GPA, but do not impact student study habits. Thus, they imply that video games lower student motivation to succeed

academically, because motivation is the most important factor to a college student's success (Pintrich, 2004, 401).

Data

This study will use data collected from a sample size of 205 undergraduate students at Johns Hopkins University. Two of those observations did not provide information on GPA and were thus not usable for this study. The sampled population was asked to complete a survey of sixty-nine questions. Examples of question asked to students were: what was their GPA last semester? how much time did they spend playing computer games every week? How much time did they spend watching TV each week? and how much time they spend studying?

The summary statistics for all the variables that we will be using are presented below.

Variable	Obs	Mean	Std. Dev.	Min	Max
LastSemest~A	203	3.635517	.2903192	2.6	4
OverallGPA	203	3.587291	.340313	.48	4
TimeOnFBPe~y	203	1.580772	2.873769	0	28
TweetPerWeek	203	2.681034	19.83308	0	200
HoursSnapC~y	202	1.361386	3.830792	0	50
HoursPlayi~k	203	1.587192	4.50694	0	40
TextsPerDay	203	81.26108	119.6277	0	600
MinPhonePe~y	203	16.86207	19.41285	0	120
StudyTimeA~e	203	19.68473	14.99766	0	100
StudyTimeI~p	203	8.325123	10.08001	0	100
HoursWatch~k	203	4.426108	4.502965	0	21

All our dependent variables and independent variables are listed above. The minimum value for Overall GPA is very low and is thus an outlier. This value will be discussed in the outlier section of the discussion portion of this paper. In addition, the variables for group study

and individual study time last semester are listed. We will use these variables in the discussion section where we will show that reverse causality is not an issue with this study.

Results

After running the regressions in STATA for the OLS coefficients and errors, as well as for the Robust Standard Errors, we get the following results:

Table 1: OLS with robust SE

VARIABLES	(1) OLS LastSemesterGPA	(2) OLS OverallGPA	(3) Robust LastSemesterGPA	(4) Robust OverallGPA
HoursPlayingCompGamesEachWeek	-0.00578	-0.00651	-0.00578	-0.00651
	(0.005)	(0.004)	(0.004)	(0.005)
TimeOnFBPerDay	0.00303	-0.00108	0.00303	-0.00108
	(0.007)	(0.007)	(0.006)	(0.004)
TweetPerWeek	-0.00154	-0.00010	-0.00154	-0.00010
	(0.001)	(0.001)	(0.001)	(0.000)
HoursSnapChatPerDay	-0.00308	-0.00226	-0.00308	-0.00226
	(0.005)	(0.005)	(0.003)	(0.003)
TextsPerDay	-0.00002	-0.00013	-0.00002	-0.00013
	(0.000)	(0.000)	(0.000)	(0.000)
MinPhonePerDay	-0.00085	-0.00133	-0.00085	-0.00133
	(0.001)	(0.001)	(0.001)	(0.001)
HoursWatchingTVEachWeek	-0.01644***	-0.01166***	-0.01644***	-0.01166***
	(0.005)	(0.004)	(0.005)	(0.004)
Constant	3.73690***	3.70287***	3.73690***	3.70287***
	(0.039)	(0.035)	(0.036)	(0.032)
Observations	201	201	201	201
R-squared	0.088	0.068	0.088	0.068

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

These results give us the following regression equations:

LastSemesterGPA = -0.00578*__HoursPlayingCompGamesEachWeek__ + 0.00303*__TimeOnFBPerDay__ + -0.00154*__TweetPerWeek__ + -0.00308*__HoursSnapChatPerDay__ + -0.00002*__TextsPerDay__ + -0.00085*__MinPhonePerDay__ + -0.01644*__HoursWatchingTVEachWeek__ +3.73690 + 1.64e-10

OverallGPA = -0.00651*__HoursPlayingCompGamesEachWeek__ + -0.00108*__TimeOnFBPerDay__ + -0.00010*__TweetPerWeek__ + -0.00226*__HoursSnapChatPerDay__ + -0.00013*__TextsPerDay__ + -0.00133*__MinPhonePerDay__ + -0.01166*__HoursWatchingTVEachWeek__ +3.70287 + 2.02e-10

1.64e-10 and 2.02e-10 are the error terms *u.* The error terms for each coefficient are observed to be different when using the Robust Standard Error method.

Running the regression does indeed confirm the expected result that time spent playing computer games has a negative impact on students' last semester GPAs. For every hour that a student spends playing computer games each week, their GPA will decrease by 0.00578. Thus, the results are consistent with existing literature on the subject. The goodness of fit, when the dependent variable is last semester's GPA, is 0.088.

In addition, running the regression does indeed confirm the expected result that time spent playing computer games has a negative impact on a student's overall GPA. Interpreting the results, for every hour that a student spends playing computer games each week, their GPA will decrease by 0.00651. These results are also consistent with existing literature on the subject. The goodness of fit, when the dependent variable is overall GPA, is 0.068.

Moreover, the results show that for JHU students, video games have the second largest negative significant impact on both Last Semester's and Overall GPA. Thus, according to the

regressions, computer games lower GPA more than some of the other electronic distractions that are represented as independent variables. The only electronic distraction that, according to the regression results, has a worse impact on a student's GPA for every hour spent on the activity is the amount of time a student spent watching TV. Therefore, after observing these results, we reject the null hypothesis that was created in the Hypothesis Testing section. We reject this H_o because video games do have a negative impact on a student's GPA.

The correlation between all the independent and dependent variables is far less than 0.9. Thus, these variables are good to use for this regression. The correlation between the hours spent playing computer games each week and last semester GPA is -0.1244. The correlation between hours spent playing computer games and last semester GPA is -0.1402. Thus, these values have an inverse relationship. The only independent variable that has a higher absolute value correlation with the dependent variables is the hours a student spends watching TV per week. Those correlation values are -.2565 for last semester GPA and -0.1996 for overall GPA. The full correlation table is in the discussion section of this paper.

Tests and Discussions

Specifications/Functional Forms

To see whether the functional form of our regressions is correct, we run the Ramsey Reset Test. The Null Hypothesis for this test is that the model has no omitted variables. Thus, the null hypothesis states that we are not missing the log or the square of any independent variable in our equation.

Running this test after we regress for the OLS coefficients in the equation where the dependent variable is the Last Semester GPA gives us a p-value of 0.415. Because this is greater

than 0.05, we don't reject the null hypothesis. Therefore, the functional form of this equation is correct. When we run the test after regressing for the OLS coefficients in the equation where Overall GPA is the dependent variable, we get a p value of 0.0484. Because this value is greater than 0.05, we reject the null hypothesis in this case as well. However, the p value is 0.14 if we run the Ramsey reset test before we remove our outliers. Thus, even though the functional form, when the dependent variable is overall GPA, is a limitation, it is only a slight one.

Heteroscedasticity

To test for heteroscedasticity with robust standard error, we will run the regression for robust standard errors and then generate the error term for each of the regressions. We will then generate the variable, diff. The variable is the difference between the error term u and each u hat. Summing up this diff variable for each regression gives the following result for Overall GPA:

Variable	Obs	Mean	Std. Dev.	Min	Max
diff2	201	-1.98e-10	.25254	-.4453972	.8825352

And for Last Semester GPA:

Variable	Obs	Mean	Std. Dev.	Min	Max
diff1	201	-1.64e-10	.2786772	-.50774	1.12935

After observing the mean and standard deviation of this variable, it becomes evident that the variance is constant for the error term. Therefore, there is no heteroscedasticity with this study.

Outliers

One respondent did not fill in any of his/her GPA values. Another respondent did not include their overall GPA. This left these observations unusable for this study. Thus, the two students that did not report their GPA were removed from the dataset.

Of all the data that was filled out, there was one outlier for the dependent variables. The Last Semester GPA was listed as 3.69. However, the Overall GPA was listed as 0.48. This outlier was removed, because it is highly unlikely, if not impossible for this information to be true. If this student was in their final semester of their senior year, they would have had seven semesters behind them. Even if they received a GPA of 0.0 for 6 of those seven semesters, their overall GPA would be 3.69 + (0.0 * 6)/7 = 0.527. This value is greater than the GPA listed. Furthermore, someone with such deficient performance would have been expelled from the university after two consecutive semesters with such as low GPA. Thus, this observation will be removed. The following regressions will observe the impact of removing the observation from the dataset.

Table 2: Before removing GPA Outlier

VARIABLES	(1) OLS	(2) OLS	(3) LastSemesterGPA	(4) OverallGPA
HoursPlayingCompGamesEachWeek	-0.00586	-0.00427	-0.00586	-0.00427
	(0.005)	(0.005)	(0.004)	(0.005)
TimeOnFBPerDay	0.00312	-0.00350	0.00312	-0.00350
	(0.007)	(0.009)	(0.006)	(0.004)
TweetPerWeek	-0.00154	0.00004	-0.00154	0.00004
	(0.001)	(0.001)	(0.001)	(0.000)
HoursSnapChatPerDay	-0.00309	-0.00202	-0.00309	-0.00202
	(0.005)	(0.006)	(0.003)	(0.003)
TextsPerDay	-0.00002	-0.00009	-0.00002	-0.00009
	(0.000)	(0.000)	(0.000)	(0.000)
MinPhonePerDay	-0.00087	-0.00066	-0.00087	-0.00066
	(0.001)	(0.001)	(0.001)	(0.001)
HoursWatchingTVEachWeek	-0.01629***	-0.01587***	-0.01629***	-0.01587**
	(0.005)	(0.005)	(0.005)	(0.006)
Constant	3.73733***	3.69135***	3.73733***	3.69135***

	(0.039)	(0.046)	(0.036)	(0.034)
Observations	202	202	202	202
R-squared	0.087	0.052	0.087	0.052

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: After Removing GPA outlier

VARIABLES	(1) OLS	(2) OLS	(3) LastSemesterGPA	(4) OverallGPA
HoursPlayingCompGamesEachWeek	-0.00578	-0.00651	-0.00578	-0.00651
	(0.005)	(0.004)	(0.004)	(0.005)
TimeOnFBPerDay	0.00303	-0.00108	0.00303	-0.00108
	(0.007)	(0.007)	(0.006)	(0.004)
TweetPerWeek	-0.00154	-0.00010	-0.00154	-0.00010
	(0.001)	(0.001)	(0.001)	(0.000)
HoursSnapChatPerDay	-0.00308	-0.00226	-0.00308	-0.00226
	(0.005)	(0.005)	(0.003)	(0.003)
TextsPerDay	-0.00002	-0.00013	-0.00002	-0.00013
	(0.000)	(0.000)	(0.000)	(0.000)
MinPhonePerDay	-0.00085	-0.00133	-0.00085	-0.00133
	(0.001)	(0.001)	(0.001)	(0.001)
HoursWatchingTVEachWeek	-0.01644***	-0.01166***	-0.01644***	-0.01166***
	(0.005)	(0.004)	(0.005)	(0.004)
Constant	3.73690***	3.70287***	3.73690***	3.70287***
	(0.039)	(0.035)	(0.036)	(0.032)
Observations	201	201	201	201
R-squared	0.088	0.068	0.088	0.068

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Comparing the two tables shows that removing this outlier would increase the OLS coefficient for Hours Playing Computer Games each week. It also decreases the OLS coefficient for the number of hours spent watching TV each week. Thus, the results in Tables 2 and 3 show that removing this outlier will slightly increase the negative impact of watching TV on a student's GPA, and it will slightly decrease the impact of playing computer games on a student's

GPA. Furthermore, removing this observation increases the R^2 for all regressions, and will thus increases the goodness of fit between the dependent and explanatory variables.

In addition, there was one student, who stated that they spent 40 hours per week playing computer games and 10 hours per week watching TV as well as other distractions, all while maintaining a high GPA. This is a possible outlier, because the student's result indicates that he or she spends almost all his or her time during the week with these electronic distractions. Running a regression without this observation gives us the following outcome:

Table 4: Regression without possible Independent Variable Outlier

VARIABLES	(1) OLS	(2) OLS	(3) LastSemesterGPA	(4) OverallGPA
HoursPlayingCompGamesEachWeek	-0.00979*	-0.01252**	-0.00979*	-0.01252***
	(0.006)	(0.005)	(0.005)	(0.004)
TimeOnFBPerDay	0.00351	-0.00036	0.00351	-0.00036
	(0.007)	(0.007)	(0.006)	(0.004)
TweetPerWeek	-0.00155	-0.00011	-0.00155	-0.00011
	(0.001)	(0.001)	(0.001)	(0.000)
HoursSnapChatPerDay	-0.00294	-0.00205	-0.00294	-0.00205
	(0.005)	(0.005)	(0.003)	(0.003)
TextsPerDay	-0.00002	-0.00012	-0.00002	-0.00012
	(0.000)	(0.000)	(0.000)	(0.000)
MinPhonePerDay	-0.00091	-0.00143	-0.00091	-0.00143
	(0.001)	(0.001)	(0.001)	(0.001)
HoursWatchingTVEachWeek	-0.01632***	-0.01148***	-0.01632***	-0.01148***
	(0.005)	(0.004)	(0.005)	(0.004)
Constant	3.74050***	3.70828***	3.74050***	3.70828***
	(0.039)	(0.035)	(0.035)	(0.031)
Observations	200	200	200	200
R-squared	0.094	0.086	0.094	0.086

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Removing this outlier does significantly change the outcome of the regression. The OLS coefficient for Hours Playing Video Game Each Week increases to -0.00979, while the hours

watching TV each week decreases to -0.01632. The R-squared constant also increases to 0.094. Because this outlier does change the OLS coefficients of the data, it is important to consider whether we need to remove it or not. Because playing video games for 40 hours and watching tv for 10 hours each week is possible, we will need to keep the outlier. Thus, this study does include the outlier observation and the table in the results section is the same as Table 3.

Multicollinearity

To test for multicollinearity, we need to look at the pairwise correlation tables for each of the two regressions that we run. No variable should have a correlation greater or equal to 0.9. Otherwise, multicollinearity would be present, and the parameters would be biased. Below are the correlation tables for each of the two regressions.

	LastSe~A	TimeOn~y	TweetP~k	HoursS~y	HoursP~k	TextsP~y	MinPho~y
LastSemest~A	1.0000						
TimeOnFBPe~y	0.0188	1.0000					
TweetPerWeek	-0.0903	0.0039	1.0000				
HoursSnapC~y	-0.0190	0.2127	0.0004	1.0000			
HoursPlayi~k	-0.1244	0.0467	-0.0262	0.0036	1.0000		
TextsPerDay	0.0072	0.0916	-0.0175	0.0727	0.0249	1.0000	
MinPhonePe~y	-0.0080	0.2039	-0.0667	0.0247	-0.0896	0.1406	1.0000
HoursWatch~k	-0.2565	-0.0552	-0.0313	-0.0694	0.1739	-0.0905	-0.1114

	HoursW~k
HoursWatch~k	1.0000

	Overal~A	TimeOn~y	TweetP~k	HoursS~y	HoursP~k	TextsP~y	MinPho~y
OverallGPA	1.0000						
TimeOnFBPe~y	-0.0386	1.0000					
TweetPerWeek	0.0097	0.0039	1.0000				
HoursSnapC~y	-0.0290	0.2127	0.0004	1.0000			
HoursPlayi~k	-0.1402	0.0467	-0.0262	0.0036	1.0000		
TextsPerDay	-0.0608	0.0916	-0.0175	0.0727	0.0249	1.0000	
MinPhonePe~y	-0.0769	0.2039	-0.0667	0.0247	-0.0896	0.1406	1.0000
HoursWatch~k	-0.1996	-0.0552	-0.0313	-0.0694	0.1739	-0.0905	-0.1114

	HoursW~k
HoursWatch~k	1.0000

The independent variables that have the highest correlation with last semester GPA and Overall GPA are hours spent playing computer games per week (-0.1402 and -0.1244), and hours spent watching TV per week (-0.2565 and -0.1996). All other correlations, except in cases where variables correlate with themselves, are less than the correlations mentioned above. Because the absolute value of the highest correlations is significantly lower than 0.9, the model does not suffer from multicollinearity.

Omitted variables

One omitted variable was the amount of time per week that a student spends playing console (non-computer) video games. The survey does not include a question for how much time a college student spends playing console games per week. To those who play video games, Computer Games and Console video games are in separate categories. Thus, there might be some students who play console games in addition to computer games. This key distraction is an omitted variable that would have gave a more accurate description of how video games affect student performance. The only proxy for this variable would be the amount of time students

spend playing computer games, since computer games have a similar behavioral impact (Wright, 2011, 38).

Measurement error

Since our dependent variable is the GPA of a student, it is unlikely that we will have measurement error in our dependent variable. Student's usually clearly remember what their last semester's and overall GPA's. are. Therefore, the OLS y intercept value will not be biased due to measurement error of the dependent variable.

In addition, we do expect for there to be a measurement error with our independent variables because these explanatory values focus on the present. Thus, students are easily able to determine how many hours they spend playing computer games as well as how many hours they spend on other distractions. Therefore, the independent variables are not correlated with the error term and their coefficients are not biased. In addition, we have exogeneity because the sample was not chosen based on student's GPA.

Non-random sampling

The study does have some non-random sample. Twenty percent of the survey was taken by students who are currently taking Econometrics, the last required course for Economics majors at JHU. It is highly likely that everyone taking Econometrics is an Economics major. Therefore, the survey has an overrepresentation of economics majors. Thus, the study does have a limitation of non-random sampling.

Reverse causality

This study does not have any reverse causality. There is a possibility that reverse causality is present in this study. There might be some students that used to play computer games. After seeing poor results in the past, these students might have stopped playing computer games, but their overall GPAs would have remained lower. However, the study is consistent in how video games negatively impact a student's GPA.

We can show that if a student plays video games, they will be more likely to have a lower GPA. Thus, we can prove that our regression isn't affected by reverse causality. We will create a dummy variable called *plays_games.* For each observation, if the amount of time playing computer games is greater than zero, then *plays_games* is set to one. Otherwise, it is set to zero. We now run two regressions with the dependent variables, OverallGPA and LastSemesterGPA. The independent variables are student individual study time, student group study times, and the *plays_games* dummy variable.

Impact of playing video games on GPA

	(1)	(2)
VARIABLES	LastSemesterGPA	OverallGPA
StudyTimeAlone	0.00063	0.00078
	(0.001)	(0.001)
StudyTimeInGroup	-0.00289	0.00015
	(0.002)	(0.002)
plays_games	-0.06574	-0.08200**
	(0.046)	(0.041)
Constant	3.66553***	3.60917***
	(0.037)	(0.034)
Observations	202	202
R-squared	0.022	0.023

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Both regressions show a negative OLS coefficient for the plays_games variable. The coefficients mean that if a student plays video games, his or her last semester GPA is expected to be less than the GPA of a student that doesn't play video games by 0.06574 points. And his or her overall GPA is expected to be lower by 0.0820 points.

Therefore, this regression backs up the assertion that video games are negatively correlated with a student's GPA. Thus, the issue of reverse causality is not a major limitation on this study.

Conclusion and Limitation

Overall, this study finds that gaming does have a negative impact on student's GPA and on a student's academic performance. Therefore, our findings are consistent with the findings in existing literature. However, the findings in this study show that gaming has a smaller impact on GPA than what was found in prior studies. According to this study, watching TV has a larger negative impact on a JHU student's GPA. With this exception, video games do have a larger negative impact on GPA than all the other electronic distractions that this study utilized as independent variables.

The most significant limitation of this study was non-random sampling. Because around 20% of those who took the survey were economics majors, that population of students was non-randomly overrepresented in the dataset. With just over 200 observations, the sample size was small. Thus, non-random sampling is a limitation with this study. In addition, there were a few outliers from the original sample that had to be removed. However, removing the outlier created a limitation on the functional form of the equation where OverallGPA is the dependent variable. Furthermore, the amount of time that students play console or non-computer video games was a

missing variable in this study. Despite these limitations, the study concludes that computer games hinder a student's academic performance.

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