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Article

An Empirical Study on Factors that Impact the Academic Performance of High School Students

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Abstract: Education is generally considered to be a great equalizer as well as a tool the young generation can use in becoming the nation's future leaders. It is imperative that today's young people are well equipped with good quality education to better lead a country into the future. As a consequence, it is also important that we find out the factors that affect the learning success of the youth, since knowing these factors, either positive or negative will help the government in designing programs that can help propagate the positives and rectify the negatives. This study utilized data from the elementary and high school students of a private educational institution in the Philippines. Multiple linear regression using lin-lin model was used to analyze the data. Results indicated both the over-all significance of the model and the absence of violations regarding the basic assumptions of CLRM. Three variables English proficiency, Math proficiency, and time spent in playing video games turned out to be significant. This study adds to the existing body of knowledge by showing that time spent in commuting between house and school can also at times be used to study resulting and impacting Cumulative Grade Point Average positively.

Keywords: Academic performance; classic linear regression model; econometrics

I. Introduction

a. Background

There is a saying that education is the greatest equalizer and that the young generation is the future of every country. It is therefore imperative that the young generation of today is well equipped with good education to better lead the country in the future. As such, it is very interesting to find out what factors affect the learning of the youth, since knowing these factors, either positive or negative will help the government, especially the policy makers in designing programs or formulating policies that can advanced the positives and mitigate the negatives. In addition, parents themselves would also benefit since it is them who is primarily with their children on a daily basis and therefore is in the best position to enforce what is positive and forbid what is negative with regards factors that may affect the learning process of their children.

b. Objectives and Statement of the Problem

Though ultimately one of the objectives of every econometrics study is to aid in policy making, this study will focus on identifying and empirically measuring the magnitude and direction of the factors that may affect the learning environment and learning ability of students. Hopefully, the results could be a good tool in knowing how to best guide students in terms of their learning.

c. Significance

Nowadays, we have traffic jams everywhere. We have classrooms with number of students that is way beyond the advisable size needed to maximize learning. We have teachers who are as always overworked and underpaid. Add to that the omnipresence of social media on the internet. All of these can be distractions and barriers to better learning of students.

Hopefully, the result of this study will help enlighten us in properly comprehending the magnitude and direction of the different factors affecting students' education. Hopefully, policy makers will be able to think of ways on how to ease the indirect burden placed on the shoulders of our young people in leading our future by helping them achieve their maximum potential through learning the proper way.

d. Scope and Limitations

The aim of this study is to understand the effect, magnitude and direction of the different factors that may affect students' learning. Variables sought and needed for this study is not readily available in secondary data form. Researcher therefore needed to do a primary data collection among students from grade four to grade twelve of a private educational institution situated in the Philippines. Though teachers were present in the administering of the survey question to interpret and explain the questions as well as to guide the students in filling out the questionnaire, it is still possible that some students, considering their tender ages, might have experienced some difficulty in providing to their best of ability the accurate response to each and every question. The data for the CGPAs and the grades for Mathematics and English needed in this study were provided by the school's acting registrar based on official school records.

II. Review of Related Literature

a. Facebook

Facebook (FB) is one of the most famous social media platforms nowadays. It does not discriminate between ages, gender, race, or nationality. Everyone or rather almost everyone has a facebook account. Especially in the Philippines, wherein most Filipinos could be seen checking and monitoring their accounts even while walking on the street. With this, even students of every age are not exempted from this social media addiction. It is not surprising to find students more eager to check facebook than to do their homework, thus facebook either directly or indirectly probably can and will affect a student's academic performance.

In a previous study, a significant difference was discovered between FB users and FB nonusers. FB users, in comparison with the nonusers, were found to be utilizing lower number of hours studying that resulted in lower GPA scores. Although, both groups were also found to spend similar number of hours surfing the internet. In other words, FB use did not add time spent on the Internet, possibly to the detriment of study time. In addition, students who admitted that FB has a negative impact towards their study indicated developing the habit of procrastination. Likewise, these same students alluded to having inadequate time-management skills. Furthermore, FB use seemingly has provided them a reason to put their study on the backseat while having no guilt at all in doing so (Kirschner & Karpinski, 2010). A limit on the use of FB should then be the goal of every parent if we would follow and adhere to the results of study conducted by Kirschner et al., (2010).

b. Sleep

Sleep is vital for people to maintain their normal functioning, more so for students who need to be mentally and physically healthy to maximize their learning. In a study conducted in Pakistan, results showed that adequate sleep was positively associated with student class attendance and percentage of marks obtained (Khan, Arshad, & Furqan, 2018). Another study revealed that academic sub performance can also be the result of sleep inadequateness. Significant results yielded the probability of dropping a subject goes up by 10% while cumulative GPA goes down by 0.02 for each and every day a student encounters sleeping problems (Hartmann & Prichard, 2018). These studies showed the adverse effect that sleep or rather lack of sleep can have on academic performance. It is therefore important that students should maintain adequate number of hours of sleep if they intent to perform optimally in class.

It is also worth mentioning that quality sleep should not be put aside. In addition to quantity of hours spent in sleeping, quality of sleep itself should also be given equal importance.

c. Parental Involvement

Parents role in the student's learning can never be understated nor underestimated, especially in the Philippines where parents still maintain a substantial influence over their children in terms of what they can and cannot do. This is relative of course to the usual home environment that you will find in most western countries in which children simply do whatever they want.

In the United States, three factors widely recognized to impact academic performance include parents' active participation with their children's academic activities, number of hours utilized for homework and time spent watching television. In the study conducted by Keith et al. (1986), results indicated that doing assignments or homework has a significant positive relationship with students' academic performance, while time spent on the television has a minimally negative impact. While time utilized by parents with their children has no direct relationship with examination results though positive impact towards the number of hours spent doing homework was found (Fehrmann, Aubey, Pottebaum, Keith, & Reimers, 1986). So even if parental involvement has no direct influence towards examination results, it still impacts the number of hours utilized in doing homework, thus showing that parents do have a role and impact towards a child's propensity to spend time studying his lessons. The more hours parent spent with their children the more hours students will spend in studying.

d. Video Games

Video games is one of those activities that students, albeit anyone for that matter, can engage in with minimal costs. Long time ago, you need to spend a substantial amount of money to purchase the Atari, Nintendo, Sega game consoles. Then came out the even more fancy and expensive consoles in the form of Sony play station, and the Xbox. And finally, came the advent of the online games, wherein people of all sizes and age can play and engage virtually anywhere with the help of wi-fi internet connection. And again, students are not exempted from this phenomenon. And as expected and most probably that the more time students spent playing video games, the less time they might probably spent with studying, thus possibly affecting their academic performances.

In one study that examined the relationship between hours spent playing video games and academic performance in which both the scholastic aptitude test and grade-point average (GPA) scores were utilized to measure academic performance showed that the number of hours a student spends playing video games has a negative relationship with GPA and SAT scores. The more a student utilized his time playing video games, the more the decline will be in both GPA and SAT results (Anand, 2007). Playing video games should be put at a minimum if we want better results for our young people.

e. Overcrowding

Likewise, focus and concentration are also needed in studying. If the environment is noisy, crowded with too many people, then how could anyone, albeit a student to maintain his focus and concentration. Over-crowding in a single house is prevalent especially in the slum areas in Metro Manila, you need not go that far to see this.

In view of the above, a study conducted recently in Latin America revealed that overcrowding has a statistically significant negative influence towards math and language examination results. Likewise, it was further discovered that overcrowding has a significant influence that is much worst compared to other poverty related determinants toward the student's capacity to comprehend his lessons thereby putting a negative impact on the student's academic achievements. The results seem to indicate the importance of taking into account overcrowding in pursuit of crafting public policies towards the goal of enhancing academic results (Contreras, Delgadillo, & Riveros, 2019). It is therefore important that parents or guardians understand the importance of space and tranquility in the environment if they expect their child to prosper academically. I could just imagine how a young student can really focus with its studies when there is constantly a crowd anywhere and everywhere,

he or she goes in his domicile home. Lucky are those who are afforded a huge amount of space and peace at home as they pursue their studies.

f. Time Studying

There is no exemption to the common knowledge that time is needed to study and learn. And that more time is necessary outside of the class to learn and understand even further. Outside the class can be in the library or at home as long as sufficient time is being allocated to further studying and learning. Based on previous empirical studies, it is commonly recognized that individuals who spend more time on academic related activities like reading the textbook, completing assignments, studying, and writing reports perform substantially better than individuals who utilize lower amount of time on these activities. For instance, in a study involving the investigation of 143 college students, it was reported that total study time influenced expected course grades (Nonis & Hudson, 2006).

Another study showed that studying hours is a significant factor in predicting a college student's academic performance. The number of hours students use to study per day is significantly and positively related to the academic performance of students (Endalamaw, 2017). It is therefore recommended that students allocate more of their time to studying if they want to get positive results with their studies. There is simply no shortcut in learning.

g. English Proficiency

The importance placed on English language skills towards academic performance was met with conflicting results based on extant literature. Studies have shown that English language proficiency is not a good indicator of academic performance as indicated by CGPA (Al-Ansari & Al-Musawi, 1999; Cho & Bridgeman, 2012). Studies further revealed the generally weak correlation between grade point average and TOEFL scores. However, results show that pupils with better English language skills perform much better than their counterparts with weak English skills with regards specific academic activities like written examinations (Geide-Stevenson, 2018). Though excellent command of the English language may not be a prerequisite to ensure academic success, but since the medium of instruction and manner of testing in the Philippines is predominantly in English, it is very interesting then to find out if this has an impact on students over all academic performance.

h. Smartphone

One study examined the correlation between academic performance and hours per day spent by pupils on their mobile phones. And unlike prior research in which researchers relied on the respondents self-reported smartphone usage information, researchers this time utilized mobile phone applications so as to accurately quantify actual usage. Analysis based on data gathered from student participants from a business school in Brazil showed that the association between academic performance and total time utilized for smartphones is negative. In this study, Felisoni et al. (2018) controlled widely recognized predictors self-efficacy and historical academic performance (Felisoni & Godoi, 2018). Excessive smartphone usage then can also be considered a very important factor in the academic outcomes of students.

i. Traffic

Traffic in the greater Metro Manila area is horrendous. This traffic situation is nowadays also very common in the outlying provinces surrounding Metro Manila. Time spent by a student on the road is time removed from studying. Not to mention the fact that traffic can cause mental anguish, anxiety, and fatigue. All of this makes it more obvious and critical that traffic has an impact in the learning of students. In a study conducted by Tigre, et al. (2017), results showed a strong and consistent evidence that duration of commuting has a negative causal effect on academic achievement of students (Tigre, Sampaio, & Menezes, 2017). It is therefore not surprising to find parents looking for schools that minimize distance and travel time for their children as one of the main criteria in the selection of a school. Parents know that traffic can and will affect not only their children's academic

performance but their over-all health as well. And since Metro Manila and the outlying provinces are now not exempted to the everyday hassle of severe traffic congestions, it is therefore very interesting to discover if traffic does really affect students’ learning in this study.

j. Math Proficiency

Mathematics is only one of the several subjects that students do study and learn in the course of their academic progress. It is also but interesting to know if their performance in mathematics will have a bearing in their over-all academic performance. Furthermore, it was found out in a recent study that has linked high-quality math instruction at the earliest grade levels to improved academic performance up to high school and this is not just only in math-related subjects (<https://www.educationdive.com>). No wonder there are programs being offered outside of the usual class instruction that are supposed to provide extra learning in the field of Mathematics. These programs might be based on the premise being propagated that mastering Math can help in shaping one’s over-all academic success.

III. Operational Framework

a. Description of Variables

Below in Table 1 is a list and description of the variables utilized in this study.

Table 1. Description of Variables.

Dependent Variable	Variable	Definition
CGPA	Cumulative Grade Pont Average	Represents the latest cumulative grade point average of the student.
Independent Variables		
TT	Travel Time	Average number of hours a student spends each day going to and from school.
SL	Sleep	Average number of hours of sleep a student has each night.
TV	Watching TV	Number of hours a student spends each day in watching TV
FB	Facebook	Number of hours each day a student spends on his/her FB account
ST	Studying Lessons	Number of hours each day a student spends on his/her FB account
PR	Parents	Number of hours each day, a parent spends with his/her child in studying lessons or doing assignments.
SP	Smartphone	Number of hours each day a student spends playing with his smartphone for texting, calling or leisure surfing of the internet.
VD	Videogames	Number of hours each day a student spends on playing video games.
EN	English Subject	Final grade in English last academic year.
MT	Mathematics Subject	Final grade in Mathematics subject last academic year.
PL	People residing in the domicile house	Number of people living in the student’s house.

b. Hypothesized Economic Model

The linear model to be used in this study will be a lin-lin model that will directly measure the impact of the different variables towards the regressant CGPA.

$$CGPA = \beta_0 - \beta_1 (TT) + \beta_2 (SL) - \beta_3 (TV) - \beta_4 (FB) + \beta_5 (ST) + \beta_6 (PR) - \beta_7 (SP) - \beta_8 (VD) + \beta_9 (EN) + \beta_{10} (MT) - \beta_{11} (PL) + u_i$$

c. A-priori Expectations

Table 2. A-priori Expectations.

Variable	A-priori Expectation	Expected Sign (+), (-)
TT	The higher the number of hours spent by the student on the road, the lower his CGPA will be since he will have lesser time for studying.	Negative
SL	The higher the number of hours a student spends on sleeping, the higher the CGPA will be.	Positive
TV	The higher the number of hours a student spends on watching TV, the lower the CGPA will be.	Negative
FB	The higher the number of hours a student spends with his FB account, the lower the CGPA will be.	Negative
ST	The higher the number of hours a student spends in studying his lessons, the higher the CGPA will be.	Positive
PR	The higher the number of hours parent spend with their children in studying, the higher the CGPA will be.	Positive
SP	The higher the number of hours a student spends on tinkering and playing with this smartphone, the lower the CGPA will be.	Negative
VD	The higher the number of hours a student spends on playing videogames, the lower the CGPA will be.	Negative
EN	The higher the grade for English, the higher the CGPA will be.	Positive
MT	The higher the grade for Mathematics, the higher the CGPA will be.	Positive
PL	The higher the number of people residing in the domicile house of the student, the lower the CGPA will be.	Negative

IV. Methodology

a. Data

Data was gathered thru primary research. A questionnaire containing basic straightforward questions was prepared by the researcher. Questionnaire was then sent to a private educational institution operating in the province of Cavite offering programs from elementary till senior high school. Respondents totaling 104 students from grade 6 to grade 10 were able to participate in this study. Teacher in charge was asked to interpret and explain the questions to the respondent students. Teachers were also asked to guide the students in this activity.

b. Empirical Procedures

The researcher utilized Gretl software to conduct multiple regression analysis to test the model that was presented above. After doing regression analysis, researcher then checked the model for any violations of the classical linear regression model (CLRM). Test for heteroscedasticity using Breusch-Pagan Test, White’s Test and Koenker Basset Test were utilized. After which, test for multicollinearity was done by computing for the variance inflation factor (VIF). Incidence of specification errors was checked using the Ramsey’s RESET Test. Researcher likewise checked the normality of the residuals of the model. Lastly, since this study is cross sectional, violations of auto correlations were not tested.

V. Empirical Testing and Analysis of Results

a. Initial Regression

Table 3. Model 1: OLS, using observations 1 – 104. Dependent variable: CGPA.

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>	
const	16.4220	4.27655	3.840	0.0002	***
travel	0.223133	0.149238	1.495	0.1383	
sleep	0.0807273	0.134431	0.6005	0.5496	
tv	-0.0738896	0.0981106	-0.7531	0.4533	
fb	-0.126405	0.111827	-1.130	0.2613	
study	-0.00088793	0.124538	-0.007130	0.9943	
parents	-0.00755985	0.175285	-0.04313	0.9657	
smartp	0.0713534	0.0939279	0.7597	0.4494	
video	-0.227662	0.0882202	-2.581	0.0114	**
eng	0.568322	0.0629677	9.026	<0.0001	***
math	0.246361	0.0513504	4.798	<0.0001	***
people	0.0154016	0.0936667	0.1644	0.8698	
Mean dependent var	87.94231		S.D. dependent var	4.121520	
Sum squared resid	290.0070		S.E. of regression	1.775458	
R-squared	0.834249		Adjusted R-squared	0.814431	
F(11, 92)	42.09538		P-value(F)	4.22e-31	
Log-likelihood	-200.8963		Akaike criterion	425.7927	
Schwarz criterion	457.5254		Hannan-Quinn	438.6485	

Based on the above results of the initial regression, we can now generate the estimated coefficients of the hypothesized model:

$CGPA = 16.4 + 0.22 (TT) + 0.081 (SL) - 0.074 (TV) - 0.13 (FB) - 0.001 (ST) - 0.008 (PR) + 0.071 (SP) - 0.23 (VD) + 0.57 (EN) + 0.25 (MT) + 0.015 (PL) + u_i$

Based on the initial regression results, only three variables yielded significant results, and these are video usage, English grade and Math grade which turned out to be significant predictors of CGPA. In addition, these three variables met the a-priori expectations. Although all the other variables used in the hypothesized model turned out not significant, we cannot just remove them without further testing the model for possible violations. The adjusted R-square of the model is 0.81 coupled with a p-value of 4.22e-31 which indicates that the over-all model is significant.

b. Test for Heteroscedasticity

White’s test for heteroskedasticity -

Null hypothesis: heteroskedasticity not present
Test statistic: LM = 66.7188
with p-value = P(Chi-square(77) > 66.7188) = 0.79222

Breusch-Pagan test for heteroskedasticity -

Null hypothesis: heteroskedasticity not present
Test statistic: LM = 7.20763
with p-value = P(Chi-square(11) > 7.20763) = 0.782028

Breusch-Pagan test for heteroskedasticity (robust variant) -

Null hypothesis: heteroskedasticity not present
Test statistic: LM = 9.65409
with p-value = P(Chi-square(11) > 9.65409) = 0.561744

Based on the above results derived from the various tests looking for heteroscedasticity in the model, all the p-values were above the 0.05 significance level, therefore it can be concluded that there is absence of heteroscedasticity in this model. Though heteroscedasticity does not result in biased coefficient estimates, it does make them less precise which then increases the likelihood that the coefficient estimates are not as close as possible from the correct population value.

c. Test of Normality of Residuals

Test for normality of residual -

Null hypothesis: error is normally distributed

Test statistic: Chi-square(2) = 2.81268

with p-value = 0.245038

In order to be sure that the residuals are all independent and identically distributed (IID), researcher tested the normality of the residuals. Based on the results indicating a p-value of 0.24 which is higher than the .05 level of significance, we therefore reject the hypothesis that the residuals are not normally distributed.

d. Test for Specification Errors

RESET test for specification (squares and cubes)

Test statistic: F = 0.542134,

with p-value = $P(F(2,90) > 0.542134) = 0.583$

RESET test for specification (squares only)

Test statistic: F = 0.929785,

with p-value = $P(F(1,91) > 0.929785) = 0.337$

RESET test for specification (cubes only)

Test statistic: F = 0.916834,

with p-value = $P(F(1,91) > 0.916834) = 0.341$

To check for specification errors, the author ran the Ramsey's RESET test, all tests for specifications errors either for squares and cubes, squares only, and cubes only turned out to show that we should reject the hypothesis that there is misspecification error in the model. P-values for Ramsey's RESET tests are all more than 0.05.

e. Test for Multicollinearity

Linear models will still be BLUE (best linear and unbiased estimate) even in the presence of multicollinearity; however, presence of multicollinearity will result in bloated standard errors and will make the model rather erratic in terms of the coefficients. Nonetheless, it is still the desire that models should be void of the presence of multicollinearity. To test for it, variance inflation factors (VIF) were computed using Gretl. As indicated below, all the VIFs are way below the maximum threshold of 10.0. With this, it can be said that there is an absence of multicollinearity in the model.

Variance Inflation Factors

Minimum possible value = 1.0

Values > 10.0 may indicate a collinearity problem

travel 1.082

sleep 1.124

tv 1.130

fb 1.384

study 1.215

parents 1.260

smartp 1.515

video 1.447

eng 2.495

math 2.437

people 1.069

$VIF(j) = 1/(1 - R(j)^2)$, where $R(j)$ is the multiple correlation coefficient between variable j and the other independent variables

Frequency distribution for uhat1, obs 1-104
number of bins = 11, mean = 4.09929e-015, sd = 1.77546

interval midpt frequency rel. cum.

```
< -3.7201 -4.1135 2 1.92% 1.92%
-3.7201 - -2.9334 -3.3268 1 0.96% 2.88%
-2.9334 - -2.1467 -2.5401 14 13.46% 16.35% ****
-2.1467 - -1.3600 -1.7534 7 6.73% 23.08% **
-1.3600 - -0.57330 -0.96665 13 12.50% 35.58% ****
-0.57330 - 0.21341 -0.17995 15 14.42% 50.00% *****
0.21341 - 1.0001 0.60676 18 17.31% 67.31% *****
1.0001 - 1.7868 1.3935 22 21.15% 88.46% *****
1.7868 - 2.5735 2.1802 9 8.65% 97.12% ***
2.5735 - 3.3602 2.9669 0 0.00% 97.12%
>= 3.3602 3.7536 3 2.88% 100.00% *
```

Test for null hypothesis of normal distribution:
Chi-square(2) = 2.813 with p-value 0.24504

VI. Corrective Measures and Final Regression

The resulting model was checked for violations of the classical linear regression model (CLRM) assumptions. It was checked for the presence of heteroscedasticity, specification errors and multicollinearity. In addition, a test was conducted for the normality of the residuals. There were no violations. Test for auto correlation was not done since this study is cross sectional, Auto correlation is inherent only in time series type of study.

In view of the above, author therefore has concluded to keep intact the result of the initial regression of the hypothesized model along with the initial estimates of its coefficients.

$$\text{CGPA} = 16.4 + 0.22 (\text{TT}) + 0.081 (\text{SL}) - 0.074 (\text{TV}) - 0.13 (\text{FB}) - 0.001 (\text{ST}) - 0.008 (\text{PR}) + 0.071 (\text{SP}) - 0.23 (\text{VD}) + 0.57 (\text{EN}) + 0.25 (\text{MT}) + 0.015 (\text{PL}) + u_i$$

VII. Conclusion and Implications

a. Conclusion

This empirical study sought to find out the factors that may be affecting the academic performance of students. In particular and in this study, respondents were students from the elementary department of a private educational institution situated in the province of Cavite in the Philippines.

Factors that were used to predict academic performance based on CGPA were derived at from different studies sought and found in the extant relevant literature wherein it was found out that these factors have an impact, either positive or negative, towards academic performance.

The over-all model was significant. It was tested for violations of the basic assumptions of CLRM; and there were none. Only three variables turned out to be significant predictors and these are English proficiency, Math proficiency, and amount of time spent in playing video games. Although the rest of the variables turned out to be not significant, the same cannot be removed just like that considering the significance of the over-all model.

It is also very interesting to note that some of the a-priori expectations were not met. One in particular is with regards the amount of time spent in commuting between house and school. The coefficient turned out to be positive. It might be an explanation that these students who spent considerable time on the road with their daily commute between their homes and school might have used this time to study, thus indicating that more time spent with commuting on the road can predict an increase in CGPA.

This is a very interesting, intriguing, and very relevant topic to study considering that this is about the education of the nation's young population, future leaders of the country. It might be very worthwhile that future research should look even deeper into which variables will have significant impact on students' academic performances.

b. Implications

For the academic institution involved in this study, it is best that they utilize and apply the results. Especially and with regards the impact of English proficiency in the over-all CGPA of the student wherein it was found that English language score significantly predicted CGPA scores ($\beta = .57, p < .001$). For every 1 unit increase in English language score, there is a .57 increase in CGPA. In addition, also considering the significant impact as well of Math scores in predicting CGPA scores ($\beta = .25, p < .001$) in which for every 1 unit increase in math scores leading to a .25 increase in CGPA, it is then but prudent for the academic institution to ramp up its efforts in making sure that its students are getting the best available teaching materials and support towards English and mathematical excellence, since both of these subjects have a direct impact towards the over-all academic performance. In addition, it might also be worthwhile for the school administrators to come up with policy that will discourage the use of video games at least within the school grounds. Needless to say, the academic institution has no right nor jurisdiction to implement such policy towards non-use of videogames once the student has left the school grounds. But this should not stop them from getting creative and equally proactive. School administrators then can extend support by providing an advisory addressed to the parents explaining the results of the study in which it was found out that the number of hours spent by the student playing video games having a direct and significant negative impact on the CGPA of their children ($\beta = -.23, p = .011$). Results showed that for every 1 unit increase in the number of hours spent playing videogames, there is a .23 decrease in CGPA scores. School administrators should find ways on how they can work with the parents concerned on how to discourage children from spending too much time playing videogames at home. One possible solution is by having constant communication whereby the school administrators constantly brief the parents about pending or current school assignments of children so that parents themselves have an idea of what projects or assignments their children currently have. This might help parents in better and properly supervising their children at home moving them away from video games while moving them closer towards their school assignments.

On the side of the parents, results of this study can also serve as an eyeopener. Parents now has a piece of evidence indicating the harsh effects of playing video games on their children's academic performance. This being said, parents therefore should be more vigilant and proactive in reminding their children of the negative consequences of playing video games towards their scholastic achievements. Likewise, parents should also be proactive in further developing their children's mathematical and English capabilities not only inside the confines of a formal academic setting but also outside as well. It might help if the children can be enrolled in special or tutorial classes that helps in enhancing or developing further the English language and mathematical abilities of children. Based on this study, it can be a worthwhile investment to set aside time and funds in further developing English and math skills with an eye and expectation that the future will be brighter for their children given these specific set of special skills.

For the government policy makers, especially those who are directly responsible for the educational development and well-being of students, it is best that they take note of this result and tinker on how they can best utilize the results to help students further develop their academic and scholastic capabilities. There might be some sense and prudence in proposing to increase academic units or courses to teach English and math. Or it might be also possible to provide alternative learning programs or schemes that can enhance this as well. Another good idea is to increase the grading standards, if not for all subjects, but especially for English and math. It might be also feasible for the government to establish educational institutions that focus and specialize in English and mathematics. As a matter of fact, there are two famous government educational institutions in Manila, well renowned for producing top caliber high school graduates, these are: Manila Science

high School and the Philippine Science high school. These institutions are well known for running intensive mathematics programs for their high school program. Result of which are high school graduates who continue to provide stellar academic performance after stepping to and right thru college and the university level. It can be said that what was started and nurtured in the elementary and high school levels usually has a long term and straight trajectory positive impact right through college and the university level. It might be wise for the government to add new institutions like Manila Science and Philippine Science high school wherein the advocacy for mathematical excellence is given priority. More so, it might also be advisable for the government to create a law requiring all private elementary and high school institutions in the Philippines to follow and adopt the template of the two abovenamed institutions. By doing this, hopefully the outstanding results and achievements attained by the graduates by both Manila Science and Philippine Science high schools can be replicated by students coming in from other private educational institutions.

For the research community, this study is a good addition to the extant literature that has examined in the past the above topic. Likewise, this study has provided a somewhat more comprehensive inclusion of different variables individually found before to impact academic performance. What this study did was to aggregate a big number of variables into one study that can predict academic performance. And although the results indicated a majority of the variables having no significant impact, the over-all equation was found to be significant. Therefore, it might be worthwhile to dig deeper into the other variables used in this study that gave a somewhat counter intuitive type of result. Smartphone usage was expected to have a negative impact on academic performance, but results showed that it has a positive impact though results were not significant. Smartphone is believed to be a distraction for students, and that the greater number of hours spent on this, the lesser number of hours will be left that can be devoted to studying. More so, a high number of people in the household was expected to negatively impact a student's academic performance, but in this study, results indicated positive impact though result was not significant. In addition, researchers might also want to further explore the other factors that can positively impact academic performance. Lastly, given the distinct culture of Asian countries, like the Philippines, it might also be interesting and equally intriguing to explore if the results of this study can be replicable in other countries where culture is distinctively different from Asian nations.

References

- Al-Ansari, S. H., & Al-Musawi, N. M. (1999). Test of English as a foreign language and first certificate of English tests as predictors of academic success for undergraduate students at the University of Bahrain. *System*, 27, 389–399.
- Anand, V. (2007). A Study of Time Management: The Correlation between Video Game Usage and Academic Performance Markers. *CyberPsychology & Behavior*, 10(4), 552–559. <https://doi.org/10.1089/cpb.2007.9991>
- Cho, Y., & Bridgeman, B. (2012). Relationship of TOEFL iBT® scores to academic performance: Some evidence from American universities. *Language Testing*, 29(3), 421–442. <https://doi.org/10.1177/0265532211430368>
- Contreras, D., Delgadillo, J., & Riveros, G. (2019). Is home overcrowding a significant factor in children's academic performance? Evidence from Latin America. *International Journal of Educational Development*, 67(March), 1–17. <https://doi.org/10.1016/j.ijedudev.2019.01.006>
- Endalamaw, M. (2017). The Determinants of Academic Performance of Under Graduate Students: In the Case of Arba Minch University Chamo Campus. *Advances in Sciences and Humanities*, 3(4), 35. <https://doi.org/10.11648/j.ash.20170304.12>
- Fehrmann, P. G., Aubey, L. W., Pottebaum, S. M., Keith, T. Z., & Reimers, T. M. (1986). Parental involvement, homework, and TV time: Direct and indirect effects on high school achievement. *Journal of Educational Psychology*, 78(5), 373–380. <https://doi.org/doi:10.1037/0022-0663.78.5.373>
- Felisoni, D. D., & Godoi, A. S. (2018). Cell phone usage and academic performance: An experiment. *Computers and Education*, 117(October 2017), 175–187. <https://doi.org/10.1016/j.compedu.2017.10.006>
- Geide-Stevenson, D. (2018). Does English proficiency affect academic performance? *International Review of Economics Education*, 28(April), 41–48. <https://doi.org/10.1016/j.iree.2018.04.002>
- Hartmann, M. E., & Prichard, J. R. (2018). Calculating the contribution of sleep problems to undergraduates' academic success. *Sleep Health*, 4(5), 463–471. <https://doi.org/10.1016/j.sleh.2018.07.002>
- Khan, H., Arshad, A., & Furqan, A. (2018). Effect of Sleep Pattern on the Academic Performance of Undergraduate Students. *Ophthalmology Update*, 1(2), 386–391. <https://doi.org/10.21125/iceri.2016.1096>

- Kirschner, P. A., & Karpinski, A. C. (2010). Facebook® and academic performance. *Computers in Human Behavior*, 26(6), 1237–1245. <https://doi.org/10.1016/j.chb.2010.03.024>
- Nonis, S. A., & Hudson, G. I. (2006). Academic Performance of College Students: Influence of Time Spent Studying and Working. *Journal of Education of Business*, (February), 151–160.
- Tigre, R., Sampaio, B., & Menezes, T. (2017). The impact of commuting time on youth's school performance. *Journal of Regional Science*, 57(1), 28–47. <https://doi.org/10.1111/jors.12289>

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