
Nexus Between Internet Use and Academic Performance: Evidence from University Students of Bangladesh

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Abstract: This paper mainly explores the nexus between Internet use and academic performance among university students in Bangladesh. In addition, this study also investigates what is the overall scenario of students' CGPA and how do they use Internet. To achieve these objectives, this paper uses primary data that are collected from 1553 students of different universities of Bangladesh through online survey with Google form. Besides, several statistical methods are also used in this paper to test the hypothesis of the study. A one-way ANOVA test is used to examine the mean difference among the different categories of the socio-economic and demographic variables of the students in terms of their academic performance. On the other hand, a linear regression model is used to investigate the extent to what Internet use impacts on students' academic performance. Using the primary data and statistical methods, this paper finds some interesting findings. Majority of the students of Bangladesh use Internet by 8.01 and above hours a day and they have CGPA by 3.01 to 3.50. This article also finds that academic performance of students may be increased by 0.1309 if a student uses Internet by one hour more per day. Therefore, this study suggests policymakers to utilize Internet use as one of most influential factors affecting students' academic performance in Bangladesh. This study also suggests students to use Internet in academic purposes mostly to enhance their academic performance.

Keywords: Internet Use, Academic Performance, University Students, Bangladesh

1. Introduction

This is the era of information and communication technology. In this era, there is no hindrance to communicate one another from one country to another [1]. Now-a-days, exploring the whole world is not a big deal to people across the globe because the world has now been turned into a global village due to blessings of globalization as well as incredible innovation information and communication technology, especially after the drastically expansion of Internet around the world [2]. In today's world, people cannot think a moment without Internet. The uses of Internet have been expanding rapidly day by day. Now-a-days, uses of Internet are not limited to scientific or information and communication purposes only but also it has spread in every spheres of life [3]. After the technological revolution, the flood of electronic devices like computer, smartphone, tablets, and so on is found everywhere. Thus, people, especially young generation or students, are using these devices significantly along with

Internet [4]. The use of Internet in education sector is also significant [5]. Especially, use of Internet in education sector has been accelerated notably amid COVID-19 pandemic [4]. In education sector, Internet is used in many purposes by the stakeholders. Among all the stakeholders, students are one of the major parts. Students are found to use Internet in many purposes but their uses are not equally important in each purpose [6]. Using Internet for academic purpose by the students is expected to be more crucial. It is yet to investigate how many students are using Internet for academic purposes mainly, and to what extent Internet use affects students' academic performance, especially in the context of Bangladesh as well.

After reviewing earlier literature deliberately, it is found that researchers have used several methods in finding out the impacts of Internet use on students' academic performance and found different sorts of findings. A study found that Internet addiction significantly and negatively affected academic excellence of university undergraduate students. This study also found that male students are highly addicted to

Internet than female ones [7]. On the other hand, Kim [8] revealed that Korean girls used the Internet for watching online education classes and blog purposes more frequently and longer than boys, contrarily, boys used the Internet for playing online games more frequently and longer than girls. This research also revealed a significant and positive correlation between Internet use for educational purposes and adolescents' academic achievement, and a negative and significant correlation between Internet use for social and recreational purpose and academic achievement. In addition, another study indicated that using Internet from laboratory, mobile phones, Wi-Fi, and cyber cafes had a positive impact on academic performance of the high school students. At the same time, this research also revealed no influence of Internet uses for other purposes except education among students on their academic achievement [2].

Excessive Internet use degrades the probability of obtaining higher CGPA while more moderate use has a positive impact on the probability [9]. Another study revealed that time (hours) spent on Internet has an effect on the student's academic excellence. In addition, the study revealed that Internet use for academic purposes and academic performance are directly comparative to each other [3]. Although entertainment, social interaction, information seeking, and economic motives significantly affect students to use Internet excessively, excessive use of Internet has a negative effect on students' academic achievement [10]. In this regards, Zamir et al. [11] carried out an investigation and found a mixed findings that 60.4% students faced a positive effect of Internet on academic performance, and 31.6% students obtained low CGPA/poor results as an effect of Internet usage.

Ogheneakoke et al. [12] carried out a research where they revealed a significant relationship between Internet usages for academic purposes and students' academic performance. They also found a significant relationship between time (hours) spent on Internet and academic performance of the students. In a study, it is found that majority of the students (41.4%) scored Internet Addiction (IA) by 45 who obtained marks in the range of 61-70% marks while only 0.9 percent students scored IA by 5 who secured marks greater than 80% [1]. This finding revealed that the more the Internet addiction, the lower the academic performance of the students. On the other hand, using both types of statistical methods, Senthil [13] found a marginal impact of Internet usage on students' academic performance. Internet use for academic purposes and academic excellence is directly proportional to each other while inversely proportional to students' social life [14]. Internet is found as one the most effective factors in enhancing student's academic achievement to the final year among all years' students. Besides, different types of findings are found that social media use for education also helps students in enhancing their academic performance [15].

In the context of Bangladesh, there are a few studies on the ongoing issue. Among these studies, a study found that hours of regular Internet use inversely and significantly influenced student's average results [5]. On the other hand, another study

found some negative impacts of Internet on student's academic performance such as creates disturbances at reading time, loses time allocation for study, reduces the attention to courses study, and causes mental stress that degrade the academic examination results [6]. Majority of the students (59.33%) used the Internet not only for academic purposes but also for non-academic purposes, and they agreed that Internet use increased their academic performances notably [16]. Besides, Chowdhury et al. [4] found a positive correlation between study hours, and uses of Internet for study purpose and academic performance of the students and a negative correlation between uses of Internet for non-study purpose and academic performance.

Although there are several studies published on the ongoing issue in the global context, studies in the context of Bangladesh is not notable. A few researchers have carried out research on this issue. Moreover, these studies are incurred with several drawbacks. No studies have been carried out in the context of whole country but a case study of a particular university despite there are more than one hundred and fifty universities in Bangladesh such as Chowdhury et al. [4]; A. Hossain et al. [5]; Rahman [16] and Said [6]. In addition, these studies have several methodological pitfalls and have not used proper analytical tools. In the context of Bangladesh, there are some studies exploring on Internet use or addiction of students but not on the impact of academic performance [17-19]. These gaps evoke to investigate the impact of Internet use on academic performance among the university students in Bangladesh.

2. Materials and Methods

2.1. Study Area and Sample Selection

This is mainly a primary data based study which is carried out to investigate the nexus between Internet use and academic performance of the university students in Bangladesh. In this regard, the whole Bangladesh is considered as the study area, and the university students who read in Bachelor and Master Degree level are considered as population. Due to the lockdown cause of COVID-19 pandemic, it was not possible to collect data from the students through face to face interview method. That is why, this study uses the snowball sampling technique in collecting data.

In collecting data, firstly a well-structured questionnaire is developed in Google Form and distributed it among the students of different universities of the country through different social media platforms so that the sample size becomes larger. The larger the sample size reveals the higher the external validity and the greater the generalizability of the study [20]. After receiving the link of the questionnaire, students filled and passed it to other students. About 856726 students study in the tertiary level (Bachelor and Master Degree level) in Bangladesh that is the population size of this study [21]. From the population, representative sample size is determined with a sample size calculator [22]. Using a margin of error of ± 4 percent, a confidence level of 99 percent, a 50

percent response distribution, and 856726 students, the sample size calculator results the sample size of 1036. By this way, data are collected from 20 April 2021 to 05 May 2021 and finally the number of data reached at 1565. After revising, sorting and editing, data from 112 students are omitted due to incomplete response, and finally data from 1453 respondents are used for this study as sample.

2.2. Impact of Internet Use on Academic Performance

To examine the impact of Internet use on academic performance of the university students in Bangladesh, this research postulates a linear function where academic performance of students is considered as the dependent variable and a set of variables as independent variable. That function is formed as:

$$AP_i = f(X_i) \tag{1}$$

Table 1. Explanation of independent variables considered in regression model.

Variables	Type	Measurement	Expected Sign
Age (AG)	Continuous	Age of the students (years)	+
Gender (GE)	Dummy	1 if the student is male, 0 otherwise	-
Year of Study (YS)	Continuous	Students' current year of study (Honors 1 st year to Masters)	+
Area of Schooling (AS)	Dummy	1 if the area of schooling at secondary level is urban, 0 otherwise	+
Father's Education (FE)	Continuous	Years of schooling of students' father	+
Family Income (FI)	Continuous	Total income of the family (Tk./month)	+
Internet Use (IU)	Continuous	Total time (hours) spent for using Internet by the students per day	+

Where, AP_i is academic performance and X_i is a group of independent variables. Academic performance, dependent variable, is measured by the students' last year's/semester's Cumulative Grade Point Average (CGPA) that ranges from 0 to 4. As CGPA is a continuous variable and the function is linear, this paper employs a multiple regression model estimated through Ordinary Least Squares (OLS) method in investigating the relationship between dependent and independent variables. Considering all variables, the regression model can be written as follows:

$$AP_i = \beta_0 + \beta_1 AG + \beta_2 GE + \beta_3 YS + \beta_4 AS + \beta_5 FE + \beta_6 FI + \beta_7 IU + u_i \tag{2}$$

Where, β_0, \dots, β_7 are parameters and u_i is error term. The description of independent variables taken in the regression model is described in Table 1.

Table 2. Mean difference of academic performance.

Variable	Categories	Frequency	Mean	F (Sig.)
Age (Years)	18 years and below	16	0.77	1385.21*** (0.00)
	19 to 21 years	562	3.00	
	22 to 24 years	700	3.51	
	25 to 27 years	146	3.90	
	28 years and above	29	3.70	
Gender	Male	926	3.56	1322.45*** (0.00)
	Female	527	2.90	
Year of Study	First year	174	2.51	858.98*** (0.00)
	Second year	497	3.15	
	Third year	358	3.45	
	Fourth year	265	3.66	
	Masters	159	3.88	
Field of Study	Arts	233	3.27	3.24*** (0.00)
	Social Science	472	3.31	
	Business Studies	168	3.28	
	Engineering	221	3.34	
	Biological Science	141	3.46	
Area of Schooling (at Secondary Level)	Agriculture	71	3.35	3.51** (0.03)
	General Science	147	3.31	
	Urban	708	3.35	
	Sub-urban	289	3.30	
	Rural	456	3.29	
Father's Education	Primary	195	3.29	0.608 (0.69)
	Secondary	196	3.34	
	Higher Secondary	286	3.33	
	Graduation	395	3.35	
	Post-graduation	301	3.30	
Family Income (Tk./Month)	Higher Studies	80	3.30	789.96*** (0.00)
	Tk. 10000 and below	215	2.61	
	Tk. 10001 to Tk. 20000	261	3.09	
	Tk. 20001 to Tk. 30000	353	3.33	
	Tk. 30001 to Tk. 50000	304	3.53	
Tk. 50001 and above	320	3.79		

Variable	Categories	Frequency	Mean	F (Sig.)
Internet Use (Hours/Day)	2 hours and below	69	2.03	2219.61*** (0.00)
	2.01 to 4.00 hours	157	2.89	
	4.01 to 6.00 hours	203	3.07	
	6.01 to 8 hours	276	3.27	
	8.01 hours and above	748	3.62	

Note: *** and ** reveals 1 percent and 5 percent level of significance, respectively
 Source: Online survey, 2021.

3. Results and Discussion

3.1. Socio-demographic and Institutional Features of the Students

Socio-demographic and institutional features of the students is analyzed through a one-way ANOVA test and the estimated result is shown in Table 2.

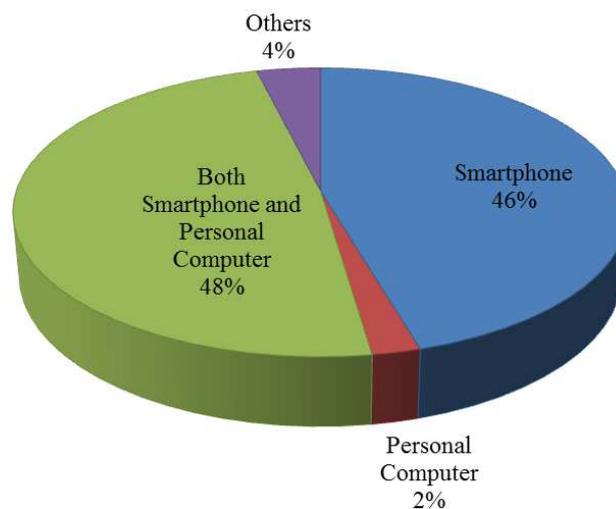
From Table 2, it is found that the mean academic performance, that is CGPA, is gradually increasing over the increase of students' age. In addition, it is found that the mean CGPA of male students is greater than female students, and this difference is statistically significant. Similarly, it is found that CGPA of senior year's students is higher than juniors. The mean difference of academic performance among different categories of different socio-economic and demographic features is statistically significant except father's education.

3.2. Sources of Internet Use

This paper analyzes the distribution of students by the sources of Internet use with a pie chart which is presented in Figure 1.

From the above figure, it is found that maximum students (48%) used both personal computer and smartphone while 46 percent students used smartphone distinctly. It is also found that only 2 percent students used computer and 4 percent

students used other sources (tablet, cyber cafe, university lab, and so on.



Source: Online survey.

Figure 1. Sources of Internet use by the students.

3.3. Purposes of Using Internet

Purposes of using Internet by the students are measured by the Relative Importance Index (RII) and the estimated findings are presented in Table 3.

Table 3. Purposes of using Internet by the students.

Purposes	Never	Sometimes	Frequently	Always	WN	RII	Rank
Using of Social Media	12	178	355	908	5065	0.87	1
Academic	16	190	397	850	4987	0.86	2
Watching Movies/Songs	45	408	427	573	4434	0.76	3
Getting News Updates	88	416	408	541	4308	0.74	4
Searching for Jobs	254	408	446	345	3788	0.65	5
Playing Games	366	360	458	269	3536	0.61	6
Freelancing	601	268	436	148	3037	0.52	7

Source: Online survey, 2021.

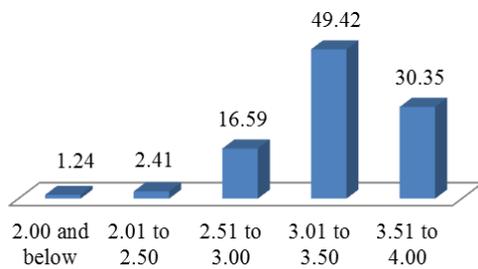
Table 3 reveals that students basically use Internet for several purposes. Among those purposes, using social media is the top most purpose which is shown by the highest value of RII, 0.87, and rank 1. Besides, academic, watching movies/songs, getting news updates, job searching are found as the second, third, fourth and fifth purpose of using Internet by the students, respectively. Students use Internet very least for freelancing purpose which is shown by the lowest value of RII, 0.52, and rank 7.

3.4. Distribution of Students by CGPA

Students' academic performance is measured by the Cumulative Grade Point Average (CGPA) that is obtained after their each academic year. Students' CGPA ranges from 0 to 4. The percentage distribution of students by their CGPA is presented in Figure 2.

From the above figure, it is found that majority of the students (49.42 percent) had CGPA from 3.01 to 3.50 in the

scale of 4.00. Besides, 30.35 percent students had the highest level of CGPA that ranges from 3.51 to 4.00. On the other hand, only 1.24 percent students had the lowest level of CGPA, 2.00 and below.



Source: Online survey, 2021.

Figure 2. Percentage distribution of students by CGPA.

3.5. Impacts of Internet Use on Academic Performance

The impact of Internet use on students’ academic performance is measured by a linear regression and the estimated result is presented in Table 4.

Table 4. Results of linear regression.

Variables	Coefficients	Robust Std. Err.	t value	P value
Age**	0.0876	0.0238	3.69	0.00
Gender**	-0.1115	0.0321	-3.47	0.00
Year of Study**	0.0934	0.0221	4.22	0.00
Area of Schooling	-0.0554	0.0118	-4.69	0.00
Father’s Education	-0.00074	0.0014	-0.53	0.58
Family Income*	-1.44e-06	7.32e-07	-1.97	0.05
Internet Use**	0.1309	0.0149	8.77	0.00
Constant	0.4136	0.4771	0.87	0.39

F (7, 1445) = 1424.30 (0.000); R-squared = 0.77, Root MSE = 0.219; DW = 1.99

Note: ** and * represent 1 percent and 5 percent level of significance, respectively

Source: Online survey, 2021.

The value of R-squared (0.77) interprets that independent variables explains the dependent variable by 77 percent. On the other hand, the value of F statistic, F (7, 1445) = 1424.30 (0.000), reveals that the model is overall good at fit. This paper tested Variance Inflation Factors (VIF) to detect the problem of multicollinearity and found a negative finding that reveals no multicollinearity. Besides, this paper tested Durbin-Watson test and found no autocorrelation in data that is denoted by the value of DW = 1.99. All variables are found significant except area of schooling and father’s education.

Age of the students is significantly associated with their academic performance which is shown by the p value, 0.00. The coefficient of age reveals that academic performance of students may be increased by 0.0876 if the age of the students is increased by one year. This result can be justified by the fact that senior students understand the subjective concepts well which helps them to make their academic performance better than others.

If a student is male, academic performance of that student

may be decreased by 0.1115, and it can be explained by the fact that male students are generally involved more in some activities along with study like co-curricular activities-outdoor games, exercises, open group discussions, debate, recitation, acting; part-time jobs and tuition; politics, bad accompany, drug addiction, time pass with friends, and so on than female students. For these reasons, they have to lose a lot of time of the day, and consequently they cannot study attentively that degrades their academic performance. This finding is also as similar as the finding revealed by Senthil [13].

The academic performance of the students may be increased by 0.0934 if a student reads in an upper class. This finding is statistically significant at 99 percent level of confidence and can be explained in a way that students of upper class understand the subjective concepts pretty well which helps them to make their academic performance better. This finding is in line with Javaeed et al. [1] and Ahmed et al. [17].

Students’ CGPA may be decreased by 1.44e-06 if income of that student’s family is added by one unit. This finding is significant at 5 percent level of significance and it can be explained in such a way that students of higher income households are in generally found as unaware of their study, hence, their academic performance is not so good as others.

Finally, academic performance of students may be increased by 0.1309 if a student uses Internet more by one hour in a day. This finding is statistically significant at 99 percent confidence level, and can be explained in such a way that students who use Internet can gather knowledge more either in academic aspect or in other aspect that influences their academic performance. Similar result is found by Chowdhury et al. [4], Ahmed et al. [17], Ogheneakoke, et al [12], and Shahibi and Rusli [15].

4. Conclusions

This article basically explores two research problems: how much are students involved in Internet use? and to what extent Internet use affects students’ academic performance? Using primary data collected from 1453 students and several statistical methods, this paper finds some exclusive findings.

Majority of the students use Internet by 8.01 and above hours a day while 49.42 percent students had CGPA from 3.01 to 3.50 in the scale of 4.00. About 48 percent students used both personal computer and smartphone and 46 percent students used smartphone distinctly in using Internet. This study finds that majority of the students use Internet for the purpose of using social media. Finally, it is found that academic performance of students may be increased by 0.1309 if students use an additional hour of Internet daily.

Therefore, this paper recommends policymakers to utilize Internet use as one of most influential factors to improve students’ academic performance. This study also suggests students to use Internet in academic purposes mostly to enhance their academic performance.

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