Smartphone Addiction among University Students and Its Implications for Learning

Karma Yoezer [a*]

[a] *Department of Economics and Science, Sherubtse College, Royal University of Bhutan, Bhutan.*

Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

Original Research Article

ABSTRACT

This research paper aims to investigate the impact of smartphone addiction on the academic performance of higher education institutions students. Primary data (n=500) was collected from students under five departments using simple random sampling technique. Smartphone Addiction Inventory Scale (SPAI) and multiple logistic regression method was employed in the study. Results show that factors like age, age of first-time smartphone use were found to be statistically significant and positively associated with college students' academic performance. The paper presents supporting evidence to higher education institutions authorities to design a strategy for the interventions in higher education institutions to enhance academic performance of students who are very vulnerable to excessive smartphone users.

1. INTRODUCTION

Smartphone that has almost same function of the computer having screen interface, internet access, and an operating system capable of running downloaded applications is the one of the outcomes of many rapid advancements in technology (Nishad & Rana, 2016). Smartphone

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*Corresponding author: Email: karmayoezer.sherubtse @rub.edu.bt;

provides multiple uses ranging from entertainment to communication purposes. It has become a prevalent social phenomenon today due to its multiple purpose [1]. The mobile connections have has expanded drastically by 25000 between year 2019 to 2020 in the Bhutanese society (Kemp, 2020). This has resulted into benefiting thousands of people in the country by making their lives simpler in terms of communication and other use in their daily lives. However, with the rapid expansion of telecommunication services in the country, it has also equally created issues in the society. One of many such issue is the excessive time invested in the use of smartphone by the younger generation. In other words, smartphone addiction is one of the main challenges among youths in the society today. Ghosh (2020) defines addiction to the excessive usage of cell phones to the point that it interferes with the user's everyday life.

"Addiction to smartphone includes not only physical consequences, but also psychological and intellectual; consequences. Excessive smartphone usage, along with a negative attitude, anxiety, and dependence on electronics, has been linked to an increased risk of anxiety and depression" (Rosen et al. 2013; Thomée et al. 2011). "Furthermore, excessive smartphone usage causes problems in daily life by distracting individuals, distorting their perception of time, and severely affecting productivity and interpersonal interactions. Smartphone addiction is a prevalent problem among individuals throughout the world, and it may have a detrimental impact on work, health, academic, and relationships in the community" (Alhassan et al. 2018). Among the many users of smartphone, higher education institution students are the rapid adopters of cell phone technology and studies [2-5] have found associations between cell phone use and their academic achievement. Therefore, the objective of the paper is to study the association between smartphone use and academic performance of the college students in Bhutan taking a case study of Sherubtse College students under Royal University of Bhutan.

2. LITERATURE REVIEW

There are extensive studies done on impact of smartphone on students' learning (Pushter, 2016; Jogendra et al, 2018; Santhi et al, 2020); [6-8]. Although there are extensive studies on

impact of smartphone on students' learning, there are very few study (Depika et al. 2021) on the smartphone use and academic result of students in Bhutan.

In an early study by Jacobsen and Forste [9] "on phone use and academic performance identified a negative relationship between phone use and self-reported grade point average (GPA) among university students in the United States". Similar conclusion was made by Hong et al, [10] in their study of a sample of female, Taiwanese university students. Kim et al., [11] carried "a study on a group of 210 females selected from a university in Korea and found that to have higher average self-regulated learning and average learning flow, two proxy measures of academic achievement, than those at high/potentially high risk for smartphone addiction". Similarly, Hawi et al. (2016) using "249 students selected from a university in Lebanon also found a negative association between GPA and risk of smartphone addiction".

Baert et al. [12] used "correlational research design to study smartphone use on educational performance using smartphone use, exogenous predictors of the use, and other drivers of academic performance with the exam scores of first-year students at two Belgian universities. They found out that a one-standard deviation increase in daily smartphone use results a decrease in average exam scores of about one pint (out of 20) of students' academic performance". A similar study by Gerosa et al., [13] used "smartphone pervasiveness scale for adolescent (SPS-A) method to study the association between smartphone usage and academic outcome using a sample of 3289 Italian high school students. Results indicated that SPS-A was moderately correlated with smartphone addiction and showed measurement invariance (across ethnic origins, parental education, and gender), and negatively predicted language and math test scores". Alinejad et al. [14] employed "cross-sectional research design to study association between academic outcome and smartphone usage using 447 Urmia university medical sciences students. They used questionaries and Przybylsks's FoMO scale, Pham and Taylor's academic performance questionnaire and Kwon's smartphone addiction scale and found that there was a negative association with smartphone addiction and students' academic performance". Therefore, many prior studies have studied association between smartphone usage and academic

achievement and have concluded a negative association between the two.

3. METHODOLOGY

A sample of 500 undergraduate students was randomly selected from Sherubtse College, Royal University of Bhutan, Bhutan. Students from multiple departments were included in the study area based on simple random sampling technique. A google survey was prepared and self-administered questionnaire was shared with the students for the data collection. Data were collected for the academic year 2021-2022. The question on Socio-demographics (age, sex, department), academics (academic score in last semester end exam in percentage, smartphone use (age at first use, duration of use on a weekday, reason for use) were included in the online questionnaire. The question on academic was as follows (indicate your current semester end examination academic percentage: A. 50-60% b. between 60-70%; c. between 70-80%; d. more than 80%). Semester end examination score in percentage is a measure of a student's academic achievement at colleges under Royal University of Bhutan. Excessive smartphone use was defined by 5 hours or more on a weekday (median number of hours of smartphone use on a weekday). The questionnaire also included a 26-item Smartphone Addiction Inventory (SPAI) Scale (Lin et al., 2014), that is constructed of four subscales: compulsive behavior, functional impairment, withdrawal and tolerance. The Cronbach's alpha for the total SPAI scale was reported to be 0.94 (Lin et al., 2014). Participants were asked to rate items on a 4-point Likert scale, 1= "strongly disagree", 2= "somewhat disagree"; 3= "somewhat agree"; 4= "strongly agree" so that the total SPAI score (addiction score) ranges from 26 to 104. The "strongly disagree", "somewhat disagree" categories were combined into one category called "disagree". Similarly, the "somewhat agree" and the "strongly agree" categories were combined into one category called "agree". Sample T-Test including Mann-Whitney-U-test and analysis of variance and the chi square test were employed in the study. Multilinear logistic regression analysis was applied to examine the association between smartphone use and the students' academic performance in the study area [15-18].

4. RESULTS AND DISCUSSION

Associations between academic performance and continuous/categorical variables were assessed using independent 2-sample T-Test and the chi square test, respectively. In the in the bivariate analyses, independent variables were found to be significantly associated with academic score ($p < 0.05$) and were entered into the models. Model 1 was unadjusted, showing the main effect of smartphone usage on academic performance (dependent variable); model 2 was adjusted for age, sex, and age at first use of smartphone. Model 3 was adjusted for age, sex, and age at first use of smartphone. Model 4 was our fully adjusted model in which we additionally controlled for academic-related variables (use of smartphone for study-related purposes, department and programme). "The data were analyzed using the Statistical Package for Social Sciences (SPSS) version 22 for Windows. The level of statistical significance for all tests was set at p-value < 0.05" [1].

The actual sample included in the student were 500 undergraduate students including 53% male and 47% female respondent with a mean age of 21.52 years. Respondents belong to five departments, with about 64% of them reporting to have academic performance between 60-70%. Their mean age at first use of smartphone and total addiction score (SPAI score) were found to be 15.04±2.31 years and 47.93±13.04, respectively, with 55% reporting use for at least more than 5 hours/weekday. The top three reasons for smartphone use were reported to be texting (99.6%), calling family members (80.6%) and study related reasons (74.8%) (Table 1).

Table 2 shows the result of Multilinear logistic regression model used to examine the association between smartphone use and the students' academic performance. In the unadjusted model (Model 1), smartphone addiction level (total SPAI score) was found to be not significantly associated with academic score. The full model IV contains all explanatory variables and it was found that it was statistically significant (X^2=10.69, $p < 0.05$), indicating that the model was able to distinguish between respondents who reported and those who did not report [19-21].

Table 1. Descriptive statistics

	n (%)	Mean$\pm$SD(n)
Age		21.52$\pm$1.69 (500)
Departments		
a. Arts and Humanities	104 (20.8)	
b. Social Science	120 (24)	
c. Environmental and life Sciences	91 (18.2)	
d. Physical Science	87 (17.4)	
e. Mathematics and Computer Science	98 (19.6)	
Academic Score		
a. 50%-60%	36 (24.4)	
b. 60%-70%	64 (43.5)	
c. 70%-80%	21 (21.3)	
d. More than 80%	16 (10.8)	
Age at first use of smartphone		15.04$\pm$2.31 (500)
Total SPAI Score		47.93 $\pm$13.04
Duration of smartphone use		
a. 0 - 1 hour	4 (0.8)	
b. 1 - 2 hours	44 (8.8)	
c. 2 – 3 hours	58 (11.6)	
d. 3 – 4 hours	107 (21.4)	
e. More than 4 hours	276 (55.2)	
Reason for using smartphone		
a. Calling family members	403 (80.6)	
b. Texting to others	498 (99.6)	
c. Entertainment	325 (65)	
d. Reading online news	179 (35.8)	
e. Other	106 (21.2)	
f. Study related reasons	374 (74.8)	

Table 2. Association between academic performance and SPAI score

Variables	β	S.E.	P-Value
Model - I			
Total Addiction Score	0.003	0.006	0.529
Model - II			
Total Addiction Score	0.005	0.006	0.470
Age	0.201	0.031	0.001
Sex	-0.236	0.116	0.107
Age at first use of smartphone	-0.006	0.201	0.674
Model - III			
Total Addiction Score	0.010	0.173	0.102
Age	0.102	0.103	0.107
Sex	-0.075	0.176	0.621
Age at first use of smartphone	0.071	0.061	0.103
Model - IV			
Total Addiction Score	0.018	0.127	0.062
Age	0.147	0.304	0.076
Sex	-0.041	0.270	0.653
Age at first use of smartphone	0.124	0.183	0.041
Use of smartphone for study related reasons	1.014	0.291	0.000
Arts and Humanities	-0.682	0.362	0.268
Social Science	-1.038	0.431	0.237

5. CONCLUSION

The study evidence shows that students' poor academic performance is associated with enrolment of students in different departments, and other non-use of smartphone for academic purposes. The findings of the study have an important implication on policy makers in higher education institutions. Tertiary level education policy makers should develop a strategy for the interventions in higher education institutions to enhance academic performance of students who are very vulnerable to excessive smartphone users. The study recommends that if physical health, psychological and mental health, attitudes and other observed effects of smartphone addiction could be explored while studying the impact of smartphone addiction on student.

CONSENT

As per international standard or university standard, participants' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Author has declared that no competing interests exist.

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