How Mobile Phone Impacts on Engineering Students' Academic Performance: A Case Study

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Abstract

In the present world, every university student and young generation use a mobile phone and this rate is increasing day by day. The aim of this study was to investigate the negative and positive impacts on educational performance due to the use of mobile phone. To collect the primary data, a survey was conducted on randomly selected 210 undergraduate students of Rajshahi University of Engineering & Technology. The result showed that, when students use mobile phone at low rate then it shows a positive effect on learning; whereas, when they use mobile phone at high rate then it shows a negative effect on learning achievement. In this study, the linear regression analysis was performed to estimate the students CGPA from the daily use of mobile phone. The correlation coefficient between the daily use of mobile phone and CGPA was found statistically significant and negatively correlated. However, proper use of mobile phone can bring a good figure to the students' academic performance.

Keywords: Smartphone, Mobile Applications, Academic performance, CGPA.

1. Introduction

Now-a-days, mobile phone is a potential tool to access information for active teaching and learning [1]. Mobile phone promotes collaborative learning through sharing information and knowledge using the internet. The availability of online learning is gaining popularity day-to-day. The National Programme on Technology Enhanced Learning (NPTEL) is one of the best examples in this direction [2]. Use of the internet has become a part of the life of every student. These days, the use of mobile phones for internet purposes has become a habit with all students. According to Vinay Goel [3], head of products, Google India, a total of 40 million users access the internet through mobile phones in India. It also further estimated that, the number of mobile internet users have been surpassing those entering the net via their laptops or desktops [3]. It has been observed that 55% of the internet users (only in mobile) were the students in India [4].

Collaborative study has also influenced to a great extent through social networking sites where students can form groups and share their knowledge [5]. Social networking sites have become an addiction for the students, which have a bad impact on the academic performance, health and security issues of the students. This impact has been alarming with the increasing rate of the spending time behind social sites [6].

In an experiment testing whether texting negatively impacts the students' ability to learn information, Wood et al. [7] observed a small but consistent negative effect on exam performance when students engaged in simulated texting, emailing, or posting on Facebook. They reasoned that when students engage in multiple simultaneous tasks, like texting and listening to lectures, one or both behaviors suffer. Similarly, Wei et al. [8] found support for a causal model identifying texting as a significant mediating variable in the relationship between students' self-regulation, a key aspect of metacognition, and cognitive learning. Specifically, when higher rates of texting behavior are present, students tend to be less able to self-regulate their behaviors in ways that allow them to succeed on performance assessments [8]. Alaba [9], and Lepp et al. [10] revealed some negative effect of mobile phone on the students' education. However, they also recommended that, by using proper guidance and appropriate legislations, the negative effect of mobile phone among the students can be eliminated.

During a study to understand both positive and negative impacts of smartphone technology in the classroom, it has found many negative aspects of using mobile phone in the classroom [11]. In another study [12], it has found that, students who do excessive use of mobile phone has less learning ability than those who make limited use. Because, students who use their mobile phones during class hours, tend to write down less information, learning less and consequently perform worse than those students who avoid using their mobile phones during class. The cell phone can be a source of distraction depending on the attitude and use pattern of a student [13]. Uncontrollable use of mobile phone is responsible for poor academic performance of students and if the use of mobile phone can be managed properly, it would definitely improve the academic performance of students [14]. However, no research has been conducted on the impact of mobile technology usages on engineering and technology students academic performance. Therefore, the purpose of this study was to investigate the positive and negative impact of the use of mobile phone on the educational performance of engineering students.

2. Methodology

The sample included 210 undergraduate students, 107 male and 103 female, of Rajshahi University of Engineering & Technology (RUET). In this study, a set of well-structured questionnaire containing 18 questions was used for collecting the information from the respondents through a survey. The questionnaires were prepared using two types of 5-point Likert scale to measure the students's responses ranging from "always = 5" to "never = 1", and "strongly agree = 5" to "can't say = 1". The collected data were analyzed through percentage and frequencies. The questionnaires adopted in this study was developed by Sundari in 2015 [15]. Regression analysis was also done to develop the relationship between the daily use of mobile phone and the students CGPA. Data were analyzed using the Microsoft Excel 2013.

3. Result and Discussion

3.1 Impact of the Use of Mobile Phone on Learning

Table 1 represents the impact of mobile phone use on learning about the RUET student's life. Based on this learning achievement, the impact of mobile phone on student learning was found out by using the 5-point Likert scale. This result presents a comparison speaks on behalf of the use of mobile phone or against the use of mobile phone on their learning and study. The survey result shows that, the majority of respondents (40.00%) agreed that the rapid use of mobile phone seldom interfere with their learning, whereas 31.90% of the respondent's felt that it also assists in their learning in sometimes and 12.38% agreed often. However, 11.42% of the students thought that, mobile phone always hamper their learning; in contrast, only 9.52 % never thought that it interferes. About 67(31.90%) students felt that mobile phone assist in their learning in the classroom, whereas, 23(10.95%) never, 57(27.14%) seldom, 39(18.57%) often and 24(11.42%) always agreed. 29.04% of the respondents given their idea that the call/messages received just before class impact on their ability to concentrate sometimes, 28.09% expressed that it happen to them often and 28.09% expressed often. Most of the respondents (43.80%) stated that the use of mobile phone during their study time distracts them often. On the other hand, 10.95% said never, 9.04% said seldom, 20.00% said sometimes and the rest said always that it distracted in their learning. Among the respondents, about 70.48% (23.80% sometimes, 23.33% often, 23.33% always) students believed that the mobile phone assists sometimes-to-always in their learning.

Table1. Impact of mobile phone use on learning

Variable	Never	Seldom	Sometimes	Often	Always	Total
How often does the use of Mobile Phone in class interfere your learning?	20	84	56	26	24	210
	9.52%	40.00%	26.66%	12.38%	11.42%	100.0
How often does the use of Mobile Phone in class assist your learning?	23	57	67	39	24	210
	10.95%	27.14%	31.90%	18.57%	11.42%	100.0
How often do the calls/messages received just before class impact on your ability to concentrate?	23	45	61	59	22	210
	10.95%	21.42%	29.04%	28.09%	10.47%	100.0
How often does the use of Mobile Phone during your study time distract you?	23	19	42	92	34	210
	10.95%	9.04%	20.00%	43.80%	16.19%	100.0

How often does the use of Mobile Phone during your study time assist you in learning?	42	20	50	49	49	210
	20.00%	9.52%	23.80%	23.33%	23.33%	100.0

Table 2 represents the positive effects of mobile phone on learning achievements. Now-a-days, mobile is an essential part of student's daily life and by using this magical device students are getting beneficial. Now every RUET student use internet access through mobile phone and they took many academic information from the internet, their classmates and their teachers. Many student confidently said that this smart phone has increased their academic performance. In this section, it was tried to find out the positive effects of learning achievements of students. About 45.71% respondents agreed that they can easily contact with their teachers for their study purposes and 22.38% strongly agreed. Most of the students (44.76%) strongly agreed that they can easily contact with their classmates to get help with studies. 34.76% respondents agreed that their academic performance has been increased by the use of mobile technology, whereas, 21.42% strongly agreed and 24.76% disagreed. 46.19% agreed that the mobile phone has helped for improving the level of quality of education, whereas 19.52% disagreed and 6.67% disagreed. 25.71% agreed and disagreed that the teacher uses the mobile phone in the classroom and majority (41.90%) of respondents agreed that they use dictionary/thesaurus/calculator in the classroom and 22.85% strongly agreed.

Table 2. Positive effects of mobile phone on learning achievements

Variables	Can't Say	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
I can easily contact teachers for study purposes	17	18	32	96	47	210
	8.09%	8.57%	15.23%	45.71%	22.38%	100.0
I can easily contact classmates to get help in studies	11	19	19	70	94	210
	5.23%	9.04%	9.04%	33.33%	44.76%	100.0
My academic performance has been increased due to mobile Technology	20	20	52	73	45	210
	9.52%	9.52%	24.76%	34.76%	21.42%	100.0
The Mobile Phone has helped to improve the level of the quality of education.	26	14	41	97	32	210
	12.38%	6.67%	19.52%	46.19%	15.23%	100.0
The teacher uses the mobile phone in the classroom	16	55	54	54	31	210
	7.61%	26.19%	25.71%	25.71%	14.76%	100.0
Students use dictionary/thesaurus/calculator of mobile phone in Classes	19	26	29	88	48	210
	9.04%	12.38%	13.80%	41.90%	22.85%	100.0

Table 3 represents the negative effects of mobile phone on learning achievements. Mobile phone represents a useful device for the young students, but it has some bad effect on the student's life. In this section, it was tried to examine the negative effects of smart phone on the student's educational performance. The majority of the students ($n=94$, 44.76%) agreed that they keep their mobile phone on and the ring tone disturbs the class, whereas, minority ($n=13$, 6.19%) strongly agreed.

Table 3. Negative effects of mobile phone on learning achievements

Variables	Can't Say	Strongly Disagree	Disagree	Agree	Strongly Agree	Total
I keep my mobile phone on and the ring tone disturbs the class	17	94	38	48	13	210
	8.09%	44.76%	18.09%	22.85%	6.19%	100.0
I purchased the mobile phone without the permission of the Parents	19	121	45	15	10	210
	9.04%	57.61%	21.42%	7.14%	4.76%	100.0
I send missed calls to class fellows to disturb the classes	22	129	28	14	17	210
	10.47%	61.42%	13.33%	6.67%	8.09%	100.0
I waste my time by using Facebook during class work.	32	36	48	41	53	210
	15.23%	17.14%	22.85%	19.52%	25.23%	100.0
The students use mobile phone in the examination hall as a source of unfair means	37	63	75	30	15	210
	17.61%	30.00%	35.71%	14.28%	7.14%	100.0
The mobile phone is a waste of	23	34	58	46	39	210

time for students	10.95%	16.19%	27.61%	21.90%	18.57%	100.0
Mobile phone is responsible for	42	17	44	59	48	210
my low academic performance	20.00%	8.09%	20.95%	28.09%	22.85%	100.0

Most of the students (n=121, 57.61%) strongly disagreed with the opinion that they purchased the mobile phone without the permission of their parents, but 7.14% agreed and 4.76% strongly agreed. The majority of the respondents, about 61.42%, strongly disagreed that they send missed calls to class fellows to disturb the classes, however, 13.33% strongly disagreed, 6.67% agreed and 8.09% strongly agreed. One of the alarming results was about 44.75% (25.23% of respondents strongly agreed and 19.52% agreed) waste their time by using Facebook during class work. Most of the student about 35.71% (n=75) disagreed that they use a mobile phone in the examination hall as a source of unfair means, whereas 30% n=(63) agreed. In contrast, alarmingly, 14.28% agreed and 7.14% strongly agreed which is very serious for the university. 27.61% disagreed that the mobile phone is a waste of time for them but 21.90% agreed and 18.57% strongly agreed. 28.09% agreed and 22.85% strongly agreed that mobile phone was responsible for their low academic performance, whereas 8.09% strongly disagreed, 20.95% disagreed and the rest can't say.

3.2 Regression Analysis

In this section, a linear regression model is developed (Eq.1) to estimate the student's cumulative grade point average (CGPA) from the daily use of mobile phone. In this regression model, the independent variable is the daily use of mobile phone (in hour) and the dependent variable is CGPA.

$$Cummulative\ grade\ point\ average\ (CGPA) = -0.0674\,(daily\ use\ of\ mobile\ phone) + 3.5154 \qquad (1)$$

The value of the coefficient of correlation between the CGPA and the daily use of mobile phone was found statistically significant (p<0.001) and negatively correlated (R = - 0.466). The value of the coefficient of determination (R^2) was 0.021. The value of the standard error of estimation (SEE) computed by the linear regression analysis was very low and it was 0.29. This indicates a high reliability in the estimated regression model.

4. Conclusion

The use of the mobile phone has a great negative impact on academic performance of students along with some positive impacts. Students can be benefitted by using this wonderful technology in a better way by sharing useful information with their classmates and teachers. They can also be benefitted through collaborative and distant learning using this technology from anywhere and anytime in this world. Students along with their parents can contact with each other anytime they want which provides them a sense of security. On the other hand, the mobile phone is also misused by the students. It was statistically identified that, students who has less use rate of mobile phone had attained better academic result. Therefore, from this study it can be concluded that, the usage of mobile phone has significant negative relation to the student's academic performance. Though mobile phone has both positive and negative impacts on students' academic performance; therefore, it is suggested that controlled use of mobile phone can bring great success to students.

5. Limitations and Future Work

Though mobile phone has a negative impact not only on academic performance, but also on social values, health threat, privacy and security issues. These factors can also be studied further for the better understanding of impacts of mobile phone with them. Further research must be needed to see the impact of smart phone on students' health, especially on the head and brain, which may distract them from proper learning and may affect their academic performance.

This study was conducted on the engineering students of Rajshahi University of Engineering & Technology. Therefore, to generalize the findings further research should be conducted on other engineering university students with larger sample size.

6. Acknowledgement

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