

SMARTPHONE ADDICTION OF COLLEGE STUDENTS IN WEST BENGAL AND ITS EFFECT ON THEIR ACADEMIC ACHIEVEMENT

Saipriya Patra

Former M.Ed. student, Institute of Education for Women,
Hastings House, Kolkata

Dr. Subhasis Mukherjee

Principal, Syamaprasad Institute of Education & Training, Kolkata

Dr. Sujit Pal (Corresponding Author)

Principal, Institute of Education for Women, Hastings House, Kolkata

ABSTRACT

The present study was conducted to analyze the level of Smartphone addiction of college students with respect to gender, residential zone, college type and different age groups and also to investigate its relation with students' academic achievement. 100 students were randomly selected from five (5) colleges in West Bengal under four categorical variables namely gender (male & female), residential zone (rural, urban & semi urban), college type (General degree college & Teachers' training college) and different age groups (18-21 years, 22-25 years & above 25 years). English version Smartphone addiction test was prepared and used for the said purpose. In the present study, significant difference was observed among the students in their Smartphone addiction with respect to gender ($t=2.359$, $p=0.020$), but no such significant difference was observed among the students with respect to different age groups ($F=0.167$, $p=0.846$), residential zone ($F=0.973$, $p=0.382$) and college type ($t=1.670$, $p=0.098$). It was found that there was significant negative correlation between academic achievement & Smartphone addiction ($r=-0.688$, $p=.000$). Also, significant difference was found among the students in their academic achievement ($p<0.01$) in relation to different levels of Smartphone addiction (high, moderate & low). The result revealed that low Smartphone addicted students' academic performance was better in presence of the remaining two levels (high & moderate) and moderately addicted students performed better in academic subjects than that of highly addicted students. It is quite evident that Smartphone addiction is negatively correlated with academic achievement of the students.

Key words: Smartphone Addiction, Academic Achievement, College Students

INTRODUCTION

Smartphone addiction is a serious problem among the students right from school education to higher education. Mobile addiction is defined as chronic or periodic obsession caused by repeated use of mobile phones, which may lead to intense and sustained demand and reliance (Encyclopedia of Mobile Phone Behaviour, 2015). Smartphone powered by the Android System is no doubt a noteworthy invention in the field digital world. We are able to know everything relating to our daily life by using Smartphone with internet facilities. But misuse of Smartphone is harmful to socio-cultural progress. 'Addiction' is a term meaning thereby 'being abnormally dependent on something'. It is a growing tendency of many college students to be addicted to Smartphone and they can easily get the whole world through touching screen. Smartphone can be used effectively for meeting personal requirements in terms of study, research, job related activities, searching required data & information, online transaction, booking tickets for various purposes, entertainment etc. Actually, our aim is to make the world digitized. It is evident that while normal students use Smartphone for academic purposes and associated areas, addicted students mostly use Smartphone without any definite reason. Due to this reason, presently the effect of Smartphone addiction on students' academic achievement has become a widely studied topic to many psychologists and educationists. The researchers went through various research articles. For the present study, some of the research articles have been presented in synoptic way. Roy, Pal & Maiti (2016) conducted a study on internet use and internet addictive behaviour of student teachers of secondary teachers' training institutes and observed that, student teachers in general exhibited moderate to low level of internet addictive behaviour. Foenet al. (2017) observed that more students utilized their Smart phones for University learning activities, the lower their CGPA (Cumulative Grade Point Average). Chen et al. (2017) reported that factors associated with Smartphone addiction among male students were the use of game app, anxiety & poor sleep quality whereas factors for female students were use of multimedia applications, use of social networking services, depression, anxiety & poor sleep quality. Kaur (2018) conducted a study on impact of mobile phone usage on the academic performance of students and found that the college going students were influenced by mobile phones usage to greater extent and due to this their academic activities were getting hampered. Choudhury & Tripathy (2018) found that, Smartphone usage had a negative impact on academic performance. Simon & Stijn (2020) conducted a literature review on Smartphone use and academic performance. Analysis of literature revealed a predominance of empirical results supporting a negative association between students' frequency of Smartphone use and their academic success. Mukhdoomi et al. (2020) undertook a study and concluded that until and unless students were intrinsically motivated, they could not use Smartphone in a positive way. Sunday et al. (2021) focused attention on the effects of Smartphone on

learning and conclude that greater the use of Smartphone while studying, the greater the negative impact on learning. Achangwaet al. (2022) showed that Smartphone addiction was associated with physical health leading to sleep disorder and neurological problems and also observed that academic performance was negatively associated with Smartphone addiction. Alharbi & Mohamed (2022) showed a statistically significant correlation between Smartphone addiction and decrease in the academic performance of college students. The study conducted by Wang et al. (2022) revealed that the students in the high Smartphone use group were academically outperformed than those in the low Smartphone use group and simultaneously the researcher indicated that Smartphone use constituted a potential inequality in learning opportunities among elementary school children. Norazman & Mothar (2023) in their study showed that addiction to mobile phones had a negative impact on academic performance. Subba & Chingnunhoih (2023) conducted a study where male students were found to be procrastinating more than the female students, whereas female students were more prone to Smartphone addiction as compared to their male counterpart. Zhang & Zeng (2024) reported that, there was a significant negative correlation between Smartphone addiction & academic achievement. Hashemi et al. (2024) in their study showed that, undergraduate students were highly addicted to Smartphone and the excessive use of Smartphone had an adverse effect on academic performance of students. The result also revealed that there was statistically significant difference in Smartphone addiction with respect to respondents' gender. Jingqian (2024) reported that there was a significant negative correlation between mobile phone addiction and attention of the students and also observed that addicted students exhibited lower attention span and poorer academic performance. However, though a lot of studies have been conducted in the field of Smartphone addiction and its effect on academic performance, in spite of that there is a deficiency of quality research works on effect of Smartphone addiction of college students in Indian context. Taking into consideration the increasing number of Smartphone addicted college students; it was felt necessary to undertake a study on Smartphone addiction of college students (both general degree & teachers' training colleges) and its effect on their academic achievement.

OBJECTIVES OF THE STUDY

- a) To study the nature of Smartphone addiction of the college students.
- b) To study the difference, if any, between male and female students with respect to their Smartphone addiction.
- c) To study the difference, if any, among various age group students with respect to their Smartphone addiction.
- d) To study whether there exist any differences among the students towards Smartphone addiction with respect to their residential zones.

- e) To study the difference, if any, between Degree college students and Teachers' training college students with respect to their Smartphone addiction.
- f) To study the effect of Smartphone addiction on students' academic achievement.

HYPOTHESES OF THE STUDY

- H01:** There is no significant difference lies between male and female students with respect to their Smartphone addiction.
- H02:** There is no significant difference lies among various age group students (18-21 years, 22-25 years, above 25 years) with respect to their Smartphone addiction.
- H03:** There is no significant difference lies among urban, rural and semi urban students with respect to their Smartphone addiction.
- H04:** There is no significant difference lies between Degree College and teachers' training college students with respect to their Smartphone addiction.
- H05:** There is no significant relationship lies between Smartphone addiction and academic achievement of the college students.
- H06:** There is no significant difference among high, moderate & low Smartphone addicted students with respect to their academic achievement.

SAMPLE

All the students studied in General Degree Colleges and Secondary Teachers' Training Colleges in West Bengal in the age groups of 18 to 21, 22 to 25 and above 25 years were selected as population for the present study. From the list of affiliated Degree and Secondary Teachers' Training colleges in West Bengal, 5 colleges (of which 3 General Degree Colleges & and 2 Secondary Teachers' Training Colleges) were selected randomly from Kolkata, North 24 pargana and South 24 pargana districts. Of the 5 colleges 3 colleges (2 General Degree Colleges & 1 Teachers' Training College) were selected for final study and 2 colleges (1 General Degree College & 1 Teachers' Training College) were selected for pilot survey. On the basis of approval from respective college authorities, 100 students were selected for the present study following random sampling technique.

Table1: Demographic characteristics of the sample

Categorical variables	Sub category	Sample size	Total
Gender	Male	50	100
	Female	50	
Residential zones	Rural	14	100
	Urban	60	
	Semi-urban	26	
Age group	18 to 21 years	33	100
	22 to 25 years	34	
	Above 25 years	33	
College type	General Degree college	45	100
	Teachers' Training college	55	

TOOLS USED

A self-made English version Smart Phone Addiction Test (SPAT) was developed by the researchers. The SPAT comprising of 27 test items with corresponding response options arranging in a 5-point Likert type scale with options like 'Strongly agree', 'Agree', 'Neutral', 'Disagree', 'Strongly disagree'. A student taking the test had to indicate his/her position simply by ticking right (✓) in any one of the cells. The test responses were then scored and total marks obtained by the participating students in their last semester examination were also collected. The total marks in their semester examination were considered to be their academic achievement scores.

TECHNIQUES FOLLOWED

Pilot Survey

A sample comprising 50 students (Male-25, Female-25) was selected randomly from 2 different colleges (1 Degree College & 1 Teachers' Training College) and then the draft Smartphone Addiction Test was administered on them keeping in view the following objectives:

- Rectification of instruction, if any, before finalization of the test.
- Determination of item validity.
- Determination of the reliability of the test.
- Determination of norms of the test.

Item validity

Item validity was determined by computing item total correlation for each item. For the said purpose Person Product Moment Correlation technique was adopted. The results are shown in Table 2.

Table 2: Item total correlation of each item of the Smartphone Addiction Test (N=50)

Item No.	Item Total Correlation	Item No.	Item Total Correlation	Item No.	Item Total Correlation
1.	0.274*	10.	0.380**	19.	0.360**
2.	0.279*	11.	0.276*	20.	0.288*
3.	0.281*	12.	0.430**	21.	0.415**
4.	0.441**	13.	0.290*	22.	0.495**
5.	0.452**	14.	0.292*	23.	0.358**
6.	0.420**	15.	0.330*	24.	0.283*
7.	0.275*	16.	0.288*	25.	0.440**
8.	0.263*	17.	0.355**	26.	0.465**
9.	0.297*	18.	0.296*	27.	0.281*

*Significant at 0.05 level of significance, **Significant at 0.01 level of significance

All the items in Table 2 correlated significantly (ranging from 0.238 to 0.495) with the total score and also it reveals that no item was negatively correlated with the total score. Moreover, the contents of the items were rated very high by three experts. Considering this, the researchers were decided to retain the items in the final test. Good item validity is itself a guarantee of the test validity. Since all the items were scanned and rated by the experts, the content validity was also ensured for the Smartphone addiction test.

Reliability of the test

Reliability coefficient was determined by Cronbach Alpha method and was found to be 0.541 which is good to be accepted for social study.

Statistical technique used

Data analysis was carried out with the help of descriptive statistics, independent sample t-test, correlation statistics and one way ANOVA using Software Packages for the Social Sciences (SPSS) version 20.0.

Scoring procedure

The test responses were scored like 5, 4, 3, 2, 1 & 1, 2, 3, 4, 5 for positive and negative test items respectively.

Norms

For the present study, the percentile norms and norms in terms of mean and standard deviation of each sub group & combined group were developed. The percentile points calculated for the present test are presented in Tables 3, 4 & 5.

Table 3: Percentile range and corresponding Smartphone addiction scores

Test	Sample distribution	Smartphone addiction scores	No. of students	Level of addiction
Smartphone	Upper 25% (above P ₇₅)	Above 82	23	High
Addiction	Middle 50% (P ₂₅ -P ₇₅)	71 to 82	54	Moderate
Test	Lower 25% (below P ₂₅)	Below 71	23	Low

Table 4: Mean and Standard Deviation of the Smartphone addiction scores of the combined group

Mean	Standard Deviation
77	8.93241

Table 5: Mean and SD of the different categorical variables

Categorical variables		Mean	Standard Deviation
Gender	Male	78.96	9.38074
	Female	74.84	8.03401
Residential zones			
	Urban	76.53	8.69648
	Rural	80.25	6.06218
	Semi urban	76.19	10.4423
College type			
	General college	78.57	9.63853
	Training college	75.56	8.25914
Age group (Years)			
	18-21	76.61	8.54012
	22-25	76.49	8.19746
	Above 25	77.66	10.2441

ANALYSIS AND INTERPRETATION

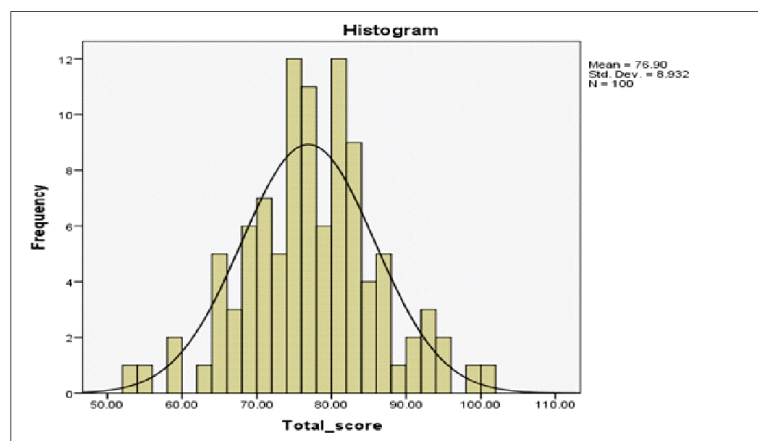
Descriptive statistics

The raw scores of Smartphone addiction test obtained by the sample (N=100) were arranged in frequency distribution. The mean, median, mode, standard deviation (S.D.), range, skewness & kurtosis were computed and presented in Table 6.

Table 6: Descriptive statistics

Mean	Median	Mode	Range	S.D.	Skewness	Kurtosis
77	77	74	47	8.93241	-0.030	0.354

The descriptive statics in Table 6 for Smartphone addiction scores reveals that the Mean, Median and Mode values are almost same. The standard deviation also reveals that variability of the scores is small. The Skewness and Kurtosis values indicate that the distribution is near normal though the curve is little flatter and negatively skewed. Frequency graph of the Smartphone addiction scores of the students under study presented in Figure 1.

**Figure 1: Frequency graph of Smartphone addiction scores**

TESTING OF HYPOTHESES

H₀₁: There is no significant difference lies between male and female students with respect to their Smartphone addiction.

Table 7: Result of independent sample t-test

Testing of Hypotheses	Dependent variable	Independent Variables	N	Mean	Mean Difference	t-value	df	Remark
H₀₁	Smartphone addiction	Male	50	78.96	4.12	2.359	98	p value is significant at 0.05 level(p=0.020)
		Female	50	74.84				

From the above table (Table 7), the result of independent sample t-test reveals that the calculated t-value (2.359) for H01 is significant at 5% level ($p=0.020$). So, there exists 'significant' difference between male (Mean=78.96) and female (Mean=74.84) in their addiction to Smartphone. The null hypothesis, H01 is, therefore, rejected. This result is also presented graphically in Figure 2.

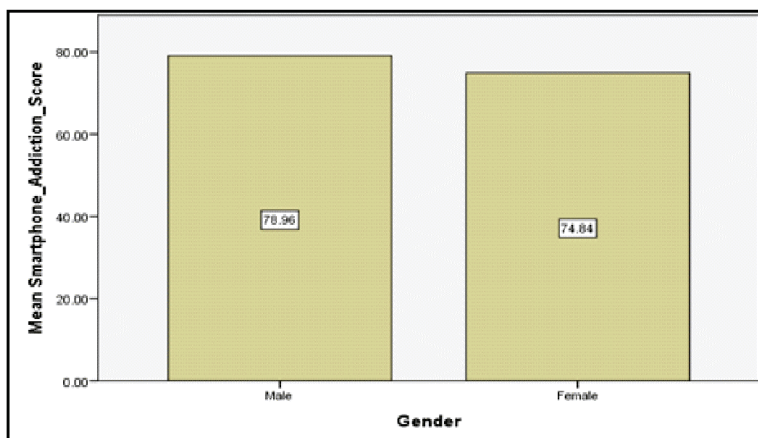


Figure 2: Graphical representation of Mean Smartphone addiction scores with respect to gender

H02: There is no significant difference among various age group students (18-21 years, 22-25 years, above 25 years) with respect to their Smartphone addiction.

Table 8: Result of One-way ANOVA based on different age groups

Testing of Hypothesis	Sources of Variance	Sum of Squares	df	Mean Square Variance	F	Remark
H ₀₂	Between Groups	27.160	2	13.580	0.167	p value is not significant at 0.05 level($p=0.846$)
	Within Groups	7871.840	97	81.153		
	Total	7899.000	99			

The result of one-way ANOVA (Table 8) reflects that, the calculated value of F (0.167) for H02 is not significant at 5% level ($p=0.846$). The null hypothesis is H02 is, therefore, accepted. So, it can be interpreted that, there is no 'significant' difference among the students of 18-21 years (Mean=76.61), 22-25 years (Mean=76.49) and above 25 years (77.66) with respect to their Smartphone addiction. This result is presented graphically in Figure 3.

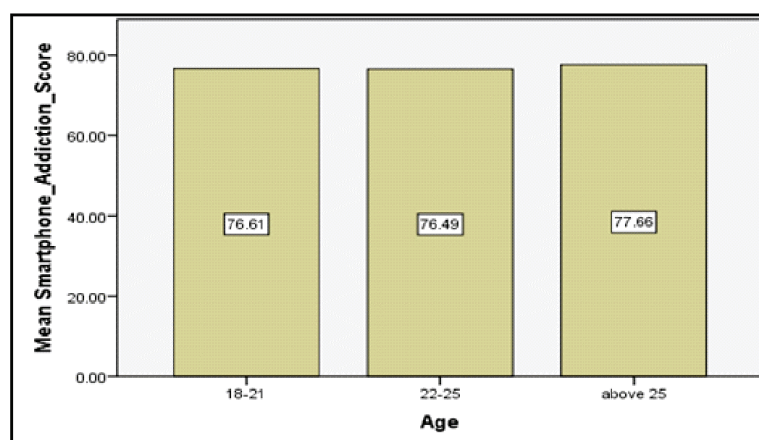


Figure 3: Graphical representation of mean Smartphone addiction scores with respect to different age groups

H03: There is no significant difference lies among urban, rural and semi urban students with respect to their Smartphone addiction.

Table 9: Result of One-way ANOVA based on residential zones

Testing of Hypothesis	Sources of Variance	Sum of Squares	df	Mean Square Variance	F	Remark
H₀₃	Between Groups	155.357	2	77.678	0.973	p value is not significant at 0.05 level (p=0.382)
	Within Groups	7743.643	97	79.831		
	Total	7899.000	99			

The result of one-way ANOVA (Table 9) reflects that, the calculated value of F (0.973) for H03 is not significant at 5% level (p=0.382). The null hypothesis H03 is, therefore, accepted. So, it can be interpreted that there is no 'significant' difference among the students of rural (Mean=80.25), urban (Mean=76.55) and semi urban (Mean= 76.19) zones with respect to their Smartphone addiction. This result is presented graphically in Figure 4.

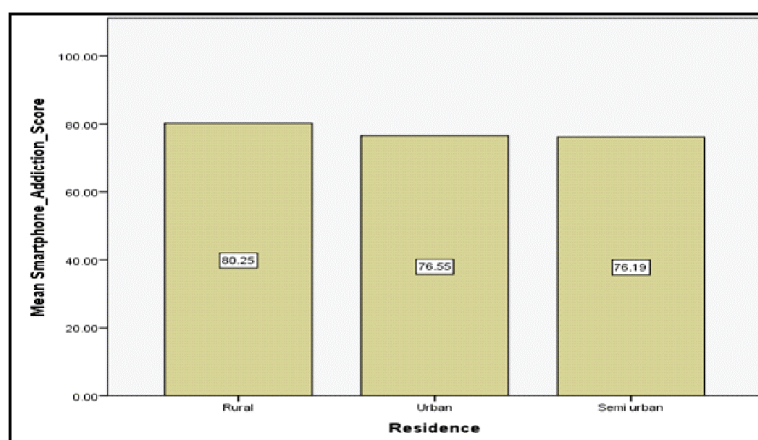


Figure 4: Graphical representation of mean Smartphone addiction scores in relation to residential zones.

H04: There is no significant difference lies between Degree College and teachers' training college students with respect to their Smartphone addiction.

Table 10: Result of independent sample t-test

Testing of Hypotheses	Dependent variable	Independent Variables	N	Mean	Mean Difference	t-value	df	Remark
H₀₄	Smartphone addiction	General college	45	78.56	3.00	1.670	98	p value is not significant at 0.05 level(p=0.098)
		Teachers' training college	55	75.56				

From the above table (Table 10), the result of independent sample t-test reveals that the calculated t-value (1.670) for H04 is not significant at 5% level ($p=0.098$). So, there exists no 'significant' difference between general college (Mean= 78.56) and teachers' training college students (Mean=75.56) in their addiction to Smartphone. So, the null hypothesis H04 is accepted. This result is presented graphically in Figure 5.

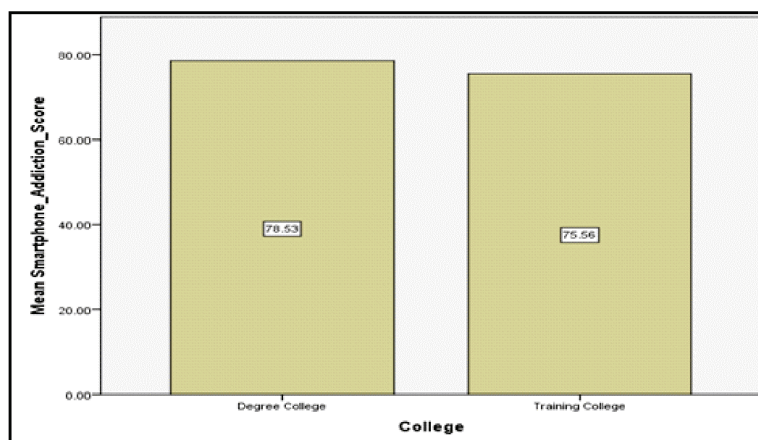


Figure: 5. Graphical representation of mean Smartphone addiction scores with respect to college type

H05: There is no significant relationship lies between Smartphone addiction and academic achievement of the college students.

Variables	Value of 'r'	Remark
Academic achievement & Smartphone addiction	-0.688	p value is significant at 0.01 level (p=.000)

The computed value of 'r' (Table 11) is significant at .01 level ($r = -0.688$, $p = .000$). So, the null hypothesis H05 is rejected. It can now be interpreted that, the level of Smartphone addiction (high, moderate or low) of the college students under study plays negative role in their academic achievement.

H06: There is no significant difference among high, moderate & low Smartphone addicted students with respect to their academic achievement.

Table 12: Result of one-way ANOVA based on students' academic achievement in relation to different groups of Smartphone addiction

Testing of Hypothesis	Sources of Variance	Sum of Squares	df	Mean Square Variance	F	Remark
H ₀₆	Between Groups	17588.863	2	8794.431	111.805	p value is significant at 0.01 level (p=0.000)
	Within Groups	7629.877	97	78.659		
	Total	25218.750	99			

The result of one-way ANOVA (Table 12) indicates that the calculated value of F (111.805) for H05 is significant at 1% level ($p=0.000$). The null hypothesis H05 is, therefore, rejected. So, it can be interpreted that, there is significant difference in academic achievement of the students under study in relation to different groups of Smartphone addiction. The scores are further subjected to t-test as follows:

Table 13: Result of Multiple Comparisons based on academic achievement of different groups of Smartphone addiction

(I) Category (J)Category	Mean Difference(I-J)	Standard Error	Significant
High Moderate	-9.88084	2.20830	.000**
Low	-37.00000	2.61532	.000**
ModerateHigh	9.88084	2.20830	.000**
Low	-27.11916	2.20830	.000**
LowHigh	37.00000	2.61532	.000**
Moderate	27.11916	2.20830	.000**

**Significant at 0.01 level of significance

The pair wise comparisons table (Table 13) contains some redundancy. The first row focusing on academic achievement of highly Smartphone addicted group (Mean=50.30) and compares the other two groups [Moderate (Mean=60.19) & Low (Mean=87.30)] to it. The result reflects that the differences are found to be significant at 1% level ($p=0.000$). Results of other two rows suggest that, the differences are also significant at 1% level ($p=0.000$). So, the null hypothesis H05 is rejected. It can be interpreted that, 'significant' difference exists among high, moderate and low Smartphone addicted groups with respect to their academic achievement. The result is presented graphically (Figure 6) to show the mean varies between various groups of data.

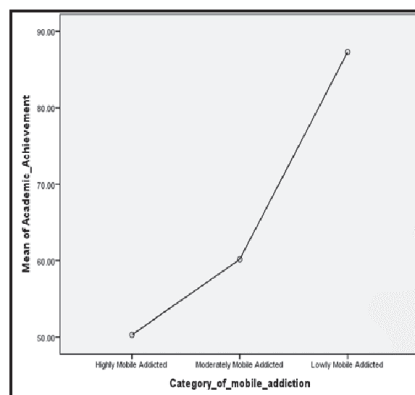


Figure 6: Mean plot based on the scores of academic achievement & Smartphone addictions

DISCUSSION

Generally, the term 'addiction' is taken from negative aspect. Usage of Smartphone varies from person to person. In the present study, significant difference has been found between male and female college students with respect to their addiction in Smartphone. Here male students are comparatively more addicted (Mean=78.96) than their female counterpart (Mean=74.84). This result finds support from the investigations of Hashemi et al. (2024) & Chen et al. (2017). This may be due to the fact that, in addition to using social networking applications, multimedia and digital transactions males are more involved in playing Smartphone games. But this finding did not get support from the study conducted by Subba & Chingnunhoih (2023) where it was found that female students were more prone to Smartphone addiction as compared to male students. No significant difference was found among the college students with respect to their residential zone, different age groups and the nature of colleges where they used to study. It is quite natural. It is because, presently advancement of android technology and availability of internet facilities & unlimited talk time offered by different companies (such as BSNL, Airtel, Jio, Vodaphone idea, etc.) make it possible to spread usage of Smartphone everywhere. Also, there was a significant negative correlation between academic achievement and Smartphone addiction of college students. This observation is in tune with the similar observations done by Zhang & Zeng (2024), Choudhury & Tripathy (2018), Sunday et al. (2021), Achangwa et al. (2022), Jingqian GU (2024), Simon & Stijn (2020), Norazman & Mothar (2023), Ng Siew Foen (2017) and Alharbi et al. (2022). In continuation of this finding, it was also observed that, students belonging to low Smartphone addicted group sowed much better in academic subjects (Mean=87.30, SD=4.81) than highly (Mean=50.30, SD=10.48) and moderately (Mean=60.19, SD=9.42) addicted groups. Again, moderately addicted students' academic achievement is better in presence of the highly addicted students. The finding of the present study is supported by the study of Sunday et al. (2021) where it was investigated that greater the use of Smartphone, the greater the negative impact on learning and academic performance. It may be due to the fact that low Smartphone addicted students used Smartphone effectively in terms of convenient study aid, proper utilization of leisure time, access to vast information on different subject areas, making themselves familiar to digital system etc. But this finding is quite contrary with the study conducted by Wang et al. (2022) where it was revealed that, the students in the high Smartphone use group were outperformed than those who were in the low Smartphone use group. Again, it is also evident that addiction to Smartphone is associated with impaired cognitive function, sleep disturbances &

neurological problems (Achangwa et al. 2022), decreased social skills, vision problems and increased stress level that can lead to poor performance in memory and attention task. Ultimately it results in decrease in the academic performance. If students are intrinsically motivated, they would be able to use Smartphone in a positive way (Mukhdoomi et al. 2020).

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