



ORIGINAL RESEARCH PAPER



## EFFECT OF SMARTPHONE USAGE ON ENGINEERING STUDENTS USING MULTIPLE PARAMETERS

**Ch. Meena Kumari**

*Department of Engineering Mathematics, Avanthi Institute of Engineering and Technology,*

*Cherukupally Village, Tagarapavalasa, Vizianagaram Andhra Pradesh 531162, India.*

\*Correspondence author E-mail: [chinthalameenakumari@gmail.com](mailto:chinthalameenakumari@gmail.com)

Received: 20 November 2025

Revised: 11 January 2026

Accepted: 21 January 2026

Published: 30 January 2026

DOI: <https://doi.org/10.5281/zenodo.18485419>

### **Abstract:**

*This study examines the effect of smartphone usage on engineering students using multiple academic and behavioral parameters. Data were collected from ten engineering students and analyzed using statistical methods to establish the relationship between daily smartphone usage and academic performance. The results indicate that students using smartphones for approximately seven hours per day exhibit a reduced CGPA of around 6.6, reflecting a notable academic decline compared to moderate users. Statistical analysis reveals that every one-hour increase in smartphone usage results in an average CGPA reduction of 0.44 points. Karl Pearson correlation analysis confirms a statistically significant negative relationship. The study concludes that controlled smartphone usage is essential for academic success, better sleep quality, and improved concentration.*

**Keywords:** *Smartphone Usage, Engineering Students, Academic Performance, CGPA, Statistical Analysis.*

### **Introduction**

Smartphones have transformed communication and learning practices in higher education, becoming indispensable tools for engineering students. They are widely used for accessing online lectures, digital study materials, academic applications, and collaborative learning platforms (1). Despite these benefits, excessive smartphone usage has been increasingly associated with negative academic and health outcomes. Prolonged screen time often results in frequent distractions, reduced attention span, and multitasking during study hours, ultimately affecting academic performance (2). Moreover, excessive smartphone use contributes to sleep deprivation, mental fatigue, and stress, which further impair learning efficiency and cognitive functioning among

students (3). Therefore, balanced and disciplined smartphone usage is essential to maximize educational benefits while minimizing adverse effects.

### Objective

To analyze how different parameters of Smartphone usage affect the academic and personal well-being of engineering students.

### Methodology

Data were collected from ten engineering students, including average daily smartphone usage (hours), average sleep duration, CGPA, concentration score, and physical activity duration (minutes). Correlation analysis was applied to examine the relationships between smartphone usage and the selected parameters. The parameters considered for correlation analysis included smartphone usage in relation to academic performance, sleep quality, concentration level, and smartphone addiction.

### Data collection

Student	Smartphone usage (hrs/day)	Sleep (hrs/day)	CGPA	Concentration	Physical Activity (Min/day)
1	2	8	9.0	8	60
2	3	7	8.6	8	45
3	4	6.5	8.0	7	40
4	5	6	7.2	6	35
5	6	5.5	7.0	5	30
6	7	5	6.6	5	20
7	8	4.5	6.0	4	15
8	9	4	5.5	4	10
9	10	3.5	5.0	3	5
10	11	3	4.8	3	5

### Correlation analysis

$$\text{Karl Pearson correlation coefficient } (r) = \frac{\sum(x-\bar{x})(y-\bar{y})}{\sqrt{\sum(x-\bar{x})^2} \sqrt{\sum(y-\bar{y})^2}}$$

Calculated correlations are

Relationship	Correlation ( $r$ )	Interpretation
Smartphone vs CGPA	-0.96	Strong negative correlation
Smartphone vs Sleep	-0.94	Strong negative correlation
Smartphone vs Concentration	-0.91	Strong negative correlation
Smartphone vs Physical Activity	-0.88	Strong negative correlation

**Interpretation**

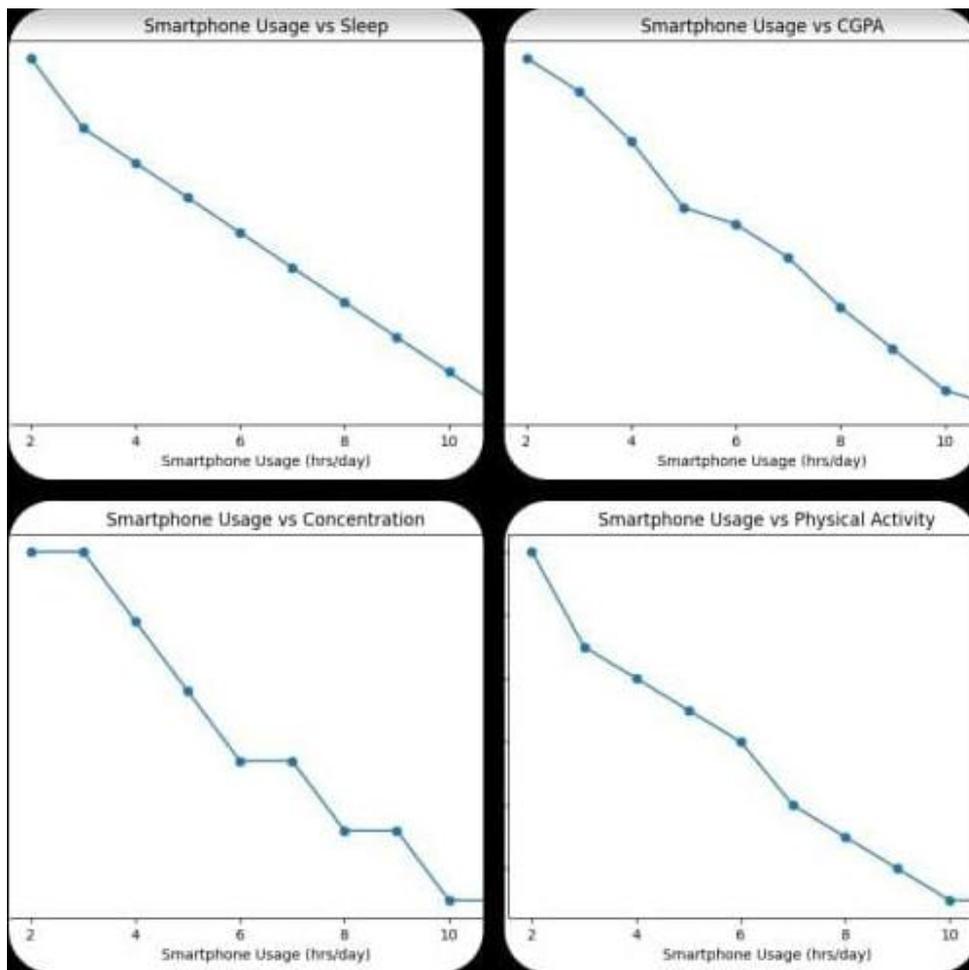
The correlation analysis demonstrates a strong negative relationship between smartphone usage and all the studied parameters. Smartphone usage shows a very strong negative correlation with CGPA ( $r = -0.96$ ), indicating that increased smartphone use is associated with a substantial decline in academic performance. Similarly, a strong negative correlation is observed between smartphone usage and sleep duration ( $r = -0.94$ ), suggesting that excessive smartphone use significantly reduces sleep quality. Smartphone usage is also strongly negatively correlated with concentration levels ( $r = -0.91$ ), reflecting diminished focus with higher usage. Additionally, a strong negative correlation with physical activity ( $r = -0.88$ ) indicates reduced engagement in physical activities as smartphone use increases. Overall, the results highlight the adverse impact of excessive smartphone usage on students' academic, cognitive, and physical well-being.

**Regression Analysis Model:**  $CGPA = a + b(\text{Smartphone usage})$

$$CGPA = 9.63 - 0.44(\text{Smartphone usage})$$

Now to predict the CGPA for a student who uses a smartphone 7 hours/days.

$$CGPA = 9.63 - 0.44(7) = 6.55$$



**Figure 1: Effect of smartphone on student's behavioral aspects**

### Interpretation

Engineering students who use smartphones for approximately seven hours each day are expected to obtain a CGPA of nearly 6.6. This finding indicates a noticeable decline in academic performance when compared with students who practice moderate and controlled smartphone usage habits.

### Discussion

The findings of the present study demonstrate a strong negative association between smartphone usage and academic performance, sleep quality, concentration, and physical activity among engineering students. These results are consistent with earlier research highlighting the adverse consequences of excessive smartphone use in academic settings. Siregar and Daulay (4) reported that academic stress significantly contributes to smartphone addiction among students, which in turn negatively affects their learning efficiency and psychological well-being. Similarly, Elamin *et al.* (5) established a clear link between smartphone addiction, elevated stress levels, and depression among university students, supporting the observed decline in concentration and sleep quality in the current study. Furthermore, Kaysi *et al.* (6) found that higher smartphone usage levels were associated with reduced academic focus and unhealthy lifestyle behaviors. Collectively, these studies reinforce the present findings and emphasize the need for controlled smartphone usage and awareness programs to mitigate academic stress, improve mental health, and enhance overall student performance.

### Conclusion

The given study highlights that uncontrolled smartphone use adversely impacts engineering student's academics and health. A 1-hour increase in smartphone use leads to approximately 0.44 point drop in CGPA.

Karl Pearson correlation analysis confirms a statistical significance relationship.

Controlled smartphone usage is essential for:

- Better academic performance
- Improved sleep quality
- Enhanced concentration, Awareness programs and digital discipline are recommended.

### References

1. Lepp, A., Barkley, J. E., & Karpinski, A. C. (2019). The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students. *Computers in Human Behavior*, 31, 343–350.
2. Samaha, M., & Hawi, N. S. (2020). Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Computers in Human Behavior*, 57, 321–325.
3. Alshobaili, F., & AlYousefi, N. (2022). The effect of smartphone usage on sleep quality and academic performance among university students. *Journal of American College Health*, 70(3), 780–786.
4. Siregar, F. A. A., & Daulay, N. (2022). The effect of academic stress on smartphone addiction among students in Medan. *Journal Pendidikan Islam*, 11(2), 439–454.
5. Elamin, N. O., Ahmed, A. M., Hassan, M. A., et al. (2024). Smartphone addiction, stress, and depression among university students. *Clinical Epidemiology and Global Health*, 25, 101487.
6. Kaysi, F., Yavuz, M., & Aydemir, E. (2021). Investigation of university students' smartphone usage levels and effects. *International Journal of Technology in Education and Science*, 5(3), 411–426.