

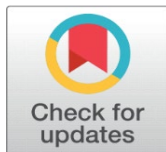
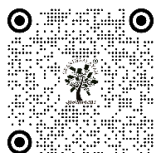
A STATISTICAL INVESTIGATION OF SMARTPHONE USAGE PATTERNS AND ACADEMIC ACHIEVEMENT AMONG HIGHER EDUCATION STUDENTS

M. Karthik ¹, Dr. S. Alagu ², Deborah Dilip A. ³

¹ Assistant Professor, Hindustan College of Arts and Science, Padur, Chennai, India

² Assistant Professor, Hindustan College of Arts and Science, Padur, Chennai, India

³ Assistant Professor, Hindustan College of Arts and Science, Padur, Chennai, India



Received 08 March 2026

Accepted 03 May 2026

Published 21 May 2026

Corresponding Author

M. Karthik, mkarthikmurthy@gmail.com

DOI

[10.29121/shodhkosh.v7.i11s.2026.8229](https://doi.org/10.29121/shodhkosh.v7.i11s.2026.8229)

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Copyright: © 2026 The Author(s).

This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

With the license CC-BY, authors retain the copyright, allowing anyone to download, reuse, re-print, modify, distribute, and/or copy their contribution. The work must be properly attributed to its author.



ABSTRACT

Smartphones have become an essential part of students' daily lives, especially in higher education. They are widely used for communication, entertainment, social networking and academic purposes. While smartphones provide easy access to learning resources and information, excessive usage may negatively affect students' concentration, study habits and academic performance. The present study investigates how smartphone usage habits influence the academic performance of higher education students. The research focuses on understanding how mobile usage behaviour influences learning outcomes and student productivity. The findings of the study are expected to create awareness about balanced smartphone usage and encourage responsible digital habits among students.

Keywords: Smartphone Usage, Academic Achievement, Higher Education Students, Mobile Usage Patterns, Student Performance, Digital Learning, Social Media Usage, Smartphone Addiction, Learning Behaviour, Educational Technology

1. INTRODUCTION

Smartphones have become a common part of students' daily life in higher education. Most students use their mobile phones for communication, online classes, social media, entertainment, and accessing study materials. In many colleges, smartphones are now used both inside and outside the classroom for academic and personal purposes. While mobile technology helps students gain quick access to information and learning resources, excessive smartphone usage can also create distractions. Spending long hours on social media, gaming, and entertainment applications may affect students' concentration, study habits, sleep, and academic performance. It is often detected that many students use smartphones continuously even during study hours, which reduces their focus on academic activities. At the same time, smartphones

can support learning when they are used in a productive and responsible manner. Therefore, it is important to understand how students use smartphones and how these usage patterns influence their academic achievement. This study examines the smartphone usage behaviour of higher education students and analyses its impact on their academic performance. The findings of the study may help students develop healthier and more balanced digital habits for better educational outcomes.

2. LITERATURE REVIEW

Paterna et al. (2024) specified that problematic smartphone usage contributes to stress, sleep disturbance, and lower academic motivation among university students, which ultimately affects academic achievement. Giunchiglia et al. (2020) highlighted that students who spend more time on social media applications tend to show lower academic productivity and poor time management skills. Amez and Baert (2020) quantified that excessive smartphone usage among students negatively affects academic achievement, particularly when mobile phones are mainly used for entertainment and social networking. Nayak (2018) detailed that uncontrolled mobile usage reduces students' participation in academic activities and classroom engagement. Li et al. (2018) found a significant negative relationship between smartphone addiction and students' academic performance, explaining that excessive mobile usage reduces classroom attention and study time. MatarBoumosleh and Jaalouk (2017) witnessed that students with higher smartphone dependency experience academic stress and lower concentration levels. Duke and Montag (2017) described that excessive smartphone dependency negatively influences academic confidence and learning habits. Alosaimi et al. (2016) found that smartphone addiction among medical students leads to poor sleep quality and reduced academic efficiency. Chen and Yan (2016) perceived that multitasking with smartphones during learning activities decreases concentration, memory retention, and learning efficiency. Samaha and Hawi (2016) recognised that smartphone addiction significantly affects students' academic performance and psychological well-being. Sung et al. (2016) emphasized that smartphones can positively support learning when used appropriately for educational purposes such as online learning and accessing study materials. Lepp et al. (2015) reported that excessive cellphone use is associated with lower GPA among college students. Kibona and Mgaya (2015) concluded that smartphone addiction leads to procrastination and reduced learning productivity among university students. Junco (2012) acknowledged that frequent texting and social media usage during study hours negatively influence academic outcomes. Jacobsen and Forste (2011) observed that students who spend more time on electronic media and mobile devices often achieve lower academic performance due to reduced study hours and sleep disturbances.

1) Research Gap

Although many studies have examined smartphone usage and academic performance, limited research focuses on higher education students in local and semi-urban institutions. Most studies mainly discuss negative effects and overlook balanced educational usage. There is also a need for updated research that explores students' real mobile usage patterns and their influence on academic achievement.

3. PROPOSED APPROACH

1) Data Collection

The data for this study were collected from higher education students using a structured questionnaire. The questionnaire included questions related to smartphone usage patterns, daily mobile usage time, and purpose of smartphone usage, social media activities, study habits, and academic performance. Primary data were collected directly from students through online and offline survey methods. A simple random sampling technique was used to select the respondents from various departments of the college. The collected responses were carefully verified and organized for analysis. The study mainly focused on understanding how smartphone usage influences students' academic achievement and learning behaviour.

2) Data Analysis

The study was conducted among 100 higher education students selected through a questionnaire survey. The collected data were analysed to understand smartphone usage patterns and their influence on academic performance.

3) Reliability Analysis

The reliability of the questionnaire was assessed using Cronbach's Alpha to measure the internal consistency of the survey items related to smartphone usage and academic performance. The obtained Cronbach's Alpha value was 0.82, which is considered a good level of reliability. This value indicates that the questions included in the questionnaire are closely related and consistently measure the intended research variables. Since the alpha value is greater than 0.70, the questionnaire is considered reliable for data collection and analysis. The result confirms that the responses collected from students are dependable and suitable for examining the relationship between smartphone usage patterns and academic achievement.

Gender Distribution

Gender	No. of Respondents	Percentage
Male	46	46%
Female	54	54%

The gender-wise distribution shows that female students constituted 54% of the respondents, while male students accounted for 46%. This indicates a nearly balanced participation of both genders in the study. The balanced sample helps in understanding smartphone usage patterns and their impact on academic performance among higher education students more effectively.

Daily Smartphone Usage Analysis

Daily Usage Time	No. of Students	Percentage
Less than 2 Hours	12	12%
2 - 4 Hours	28	28%
4 - 6 Hours	35	35%
More than 6 Hours	25	25%

The analysis reveals that most students spend a considerable amount of time using smartphones daily. About 35% of students use smartphones for 4–6 hours, while 25% spend more than 6 hours. This indicates a high level of smartphone usage among higher education students, which may influence their study habits and academic performance.

Factor Analysis

Factor Analysis was applied to identify the major underlying factors influencing smartphone usage behaviour among higher education students. This technique helps to reduce a large number of related variables into smaller meaningful factors and explains the relationship between smartphone usage patterns and academic performance.

KMO and Bartlett's Test

The suitability of data for factor analysis was tested using KMO and Bartlett's Test.

Test	Value
KMO Measure	0.81
Bartlett's Test Significance	0

The KMO value indicates the adequacy of 0.81 for factor analysis. The significant Bartlett's Test ($p < 0.05$) confirms that the variables are sufficiently correlated for performing factor analysis.

Total Variance Explained

Factor	Eigenvalue	Percentage of Variance
Social Media Dependency	3.84	32.50%
Academic Usage	2.41	20.20%
Entertainment Usage	1.86	15.40%
Communication Pattern	1.22	10.10%

The first factor, Social Media Dependency, explains the highest percentage of variance (32.5%), indicating that social media usage is the most influential aspect of smartphone behaviour among students.

Rotated Component Matrix

Variables	Factor 1	Factor 2	Factor 3	Factor 4
Social Media Usage	0.84	—	—	—
Online Gaming	0.79	—	—	—
Smartphone During Study Hours	0.73	—	—	—
Educational Apps	—	0.81	—	—
Academic Material Access	—	0.76	—	—
Entertainment Videos	—	—	0.82	—
Music and Streaming	—	—	0.75	—
Communication Activities	—	—	—	0.8
Internet Browsing	—	—	—	0.71

Communalities Table

Variable	Extraction Value
Social Media Usage	0.76
Educational Apps	0.71
Entertainment Videos	0.69
Communication Activities	0.64

The factor analysis identified four major factors influencing smartphone usage among higher education students. The KMO value of 0.81 confirmed sample adequacy, while Bartlett’s Test significance value of 0.000 indicated strong correlation among variables. Factor 1, Social Media Dependency, explained the highest variance of 32.5% with high loadings for social media usage (0.84) and online gaming (0.79), showing that non-academic activities strongly influence smartphone behaviour. Factor 2, Academic Usage, explained 20.2% variance with educational apps loading at 0.81. Entertainment Usage explained 15.4% variance, while Communication Pattern contributed 10.1%, indicating moderate influence on students’ academic engagement and learning behaviour.

4) Multiple Regression Analysis

Multiple Regression Analysis was used to examine how different factors such as smartphone usage hours, social media usage, and study hours collectively influence students’ academic performance. This method helps to understand the individual contribution of each independent variable toward academic achievement.

Regression Coefficients Table

Variables	Coefficient (β)	Standard Error	t-value	p-value
Constant	8.52	0.84	10.14	0
Smartphone Usage Hours	-0.31	0.09	-3.44	0.002
Social Media Usage	-0.28	0.11	-2.87	0.005
Study Hours	0.42	0.08	5.12	0.001

Model Summary

Statistics	Value
R	0.74
R ²	0.55
Adjusted R ²	0.52
Standard Error	1.18

ANOVA Table for Regression Model

Source	Sum of Squares	df	Mean Square	F-value	p-value
Regression	184.32	3	61.44	14.82	0
Residual	150.28	96	1.56	—	—
Total	334.6	99	—	—	—

The multiple regression analysis reveals that smartphone usage hours and social media usage negatively affect students' academic performance, while study hours positively influence academic achievement. The negative coefficient (-0.31) for smartphone usage suggests that increased mobile usage may reduce students' academic focus and study efficiency. Similarly, excessive social media usage negatively impacts learning behaviour and concentration. In contrast, study hours show a positive coefficient value (0.42), suggesting that students who spend more time studying tend to perform better academically. The significant p-values (<0.05) confirm that all variables meaningfully contribute to the prediction of academic performance among higher education students.

4. CONCLUSION

The Factor Analysis and Multiple Regression Analysis collectively provide a clear understanding of how smartphone usage patterns influence academic achievement among higher education students. Factor Analysis identified four major dimensions of smartphone usage, namely Social Media Dependency, Academic Usage, Entertainment Usage, and Communication Pattern. Among these, Social Media Dependency emerged as the most influential factor, explaining the highest variance in students' smartphone behaviour. The findings indicate that excessive involvement in social media, online gaming, and entertainment activities significantly affects students' concentration, study habits, and learning efficiency. At the same time, academic usage of smartphones showed a positive contribution toward accessing educational resources and supporting digital learning. The Multiple Regression Analysis further confirmed that smartphone usage hours and social media usage negatively affect academic performance, while study hours positively influence students' academic achievement. The regression model explained a considerable proportion of variation in academic performance, showing that increased smartphone dependency is associated with lower academic scores. The statistical significance of the model indicates that smartphone usage behaviour plays an important role in determining students' educational outcomes.

5. RECOMMENDATIONS

- 1) Higher education students should maintain balanced smartphone usage by reducing excessive time spent on social media, gaming, and entertainment activities to improve concentration and academic performance.
- 2) Educational institutions may organize awareness programs and workshops to educate students about responsible smartphone usage and effective digital habits.
- 3) Students should be encouraged to use smartphones for academic purposes such as accessing e-learning materials, online courses, digital libraries, and educational applications.
- 4) Proper time management strategies should be promoted to help students allocate adequate time for study and reduce unnecessary smartphone distractions.
- 5) Teachers and parents may guide students in developing healthy digital behaviour and encourage productive use of mobile technology.
- 6) Colleges can introduce digital wellness initiatives and counselling programs to address smartphone dependency and improve learning engagement.
- 7) Students may be encouraged to limit smartphone usage during study hours and classroom sessions to improve focus, memory retention, and academic productivity.
- 8) Educational institutions should promote blended learning approaches where smartphones are used meaningfully for academic activities rather than only for communication and entertainment.

- 9) Regular monitoring and self-assessment of smartphone usage habits may help students understand their usage patterns and adopt healthier digital practices.
- 10) Future researchers may conduct comparative studies across institutions and student groups to better understand the long-term influence of smartphone usage on academic achievement.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

- Alosaimi, F. D., Alyahya, H., Alshahwan, H., Al Mahyijari, N., & Shaik, S. A. (2016). Smartphone addiction among university students in Riyadh, Saudi Arabia. *Saudi Medical Journal*, 37(6), 675–683. <https://doi.org/10.15537/smj.2016.6.14430>
- Amez, S., & Baert, S. (2020). Smartphone use and academic performance: A literature review. *International Journal of Educational Research*, 103, 101618. <https://doi.org/10.1016/j.ijer.2020.101618>
- Chen, Q., & Yan, Z. (2016). Does multitasking with mobile phones affect learning? A review. *Computers in Human Behavior*, 54, 34–42. <https://doi.org/10.1016/j.chb.2015.07.047>
- Duke, É., & Montag, C. (2017). Smartphone addiction, daily interruptions, and self-reported productivity. *Addictive Behaviors Reports*, 6, 90–95. <https://doi.org/10.1016/j.abrep.2017.07.002>
- Giunchiglia, F., Zeni, M., Gobbi, E., Bignotti, E., & Bison, I. (2020). Mobile social media usage and academic performance. *Computers in Human Behavior*, 101, 305–314.
- Jacobsen, W. C., & Forste, R. (2011). The wired generation: Academic and social outcomes of electronic media use among university students. *Cyberpsychology, Behavior, and Social Networking*, 14(5), 275–280. <https://doi.org/10.1089/cyber.2010.0135>
- Junco, R. (2012). Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance. *Computers in Human Behavior*, 28(1), 187–198. <https://doi.org/10.1016/j.chb.2011.08.026>
- Kibona, L., & Mgaya, G. (2015). Smartphones' effects on academic performance of higher learning students. *Journal of Multidisciplinary Engineering Science and Technology*, 2(4), 777–784.
- Lepp, A., Barkley, J. E., & Karpinski, A. C. (2015). The relationship between cell phone use and academic performance in a sample of U.S. college students. *SAGE Open*, 5(1), 1–9. <https://doi.org/10.1177/2158244015573169>
- Li, L., Griffiths, M. D., Mei, S., & Niu, Z. (2018). The mediating role of self-control and problematic smartphone use in the relationship between stress and academic procrastination. *Computers & Education*, 123, 36–46.
- Matar Boumosleh, J., & Jaalouk, D. (2017). Depression, anxiety, and smartphone addiction in university students. *PLoS ONE*, 12(8), Article e0182239. <https://doi.org/10.1371/journal.pone.0182239>
- Nayak, J. K. (2018). Relationship among smartphone usage, addiction, academic performance, and the moderating role of gender. *International Journal of Business Innovation and Research*, 15(1), 117–136.
- Paterna, A., Martínez, M. C., Vera, P., et al. (2024). Problematic smartphone use and academic achievement: A systematic review and meta-analysis. *Education and Information Technologies*, 29, 1123–1145. <https://doi.org/10.1556/2006.2024.00014>
- Samaha, M., & Hawi, N. S. (2016). Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Computers in Human Behavior*, 57, 321–325. <https://doi.org/10.1016/j.chb.2015.12.045>
- Sung, Y. T., Chang, K. E., & Liu, T. C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis. *Computers & Education*, 94, 252–275. <https://doi.org/10.1016/j.compedu.2015.11.008>