Analysis of Nomophobia as a Predictor of Cognitive Dysfunction and Academic Inefficiency

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Abstract

Nomophobia, defined as the anxiety or fear of being without a smartphone, is increasingly prevalent among students worldwide. Despite its widespread occurrence, the relationship between nomophobia, smartphone usage patterns, and academic performance remains insufficiently studied, particularly in developing countries such as India, where the proliferation of smartphone use among adolescents are notable.

This cross-sectional study, conducted with 950 University students across fifty-six institutions in India, provides critical insights into this phenomenon. The data reveals that 60.1 percent of participants have been using smartphones for over three years, with a significant average usage time of 5.73 hours daily. The prevalence of nomophobia among the cohort is remarkably high at 99.9 percent, with 23.7 percent of students experiencing severe levels of this condition. Additionally, demographic factors such as age and gender contribute significantly to nomophobia severity, with females and older students displaying heightened levels compared to their male and younger counterparts.

A notable finding of this study is the robust positive correlation between nomophobia and the frequency of daily phone-checking behaviors, underscoring the behavioral dimension of smartphone dependence. These findings highlight the urgent necessity for further exploration into the underlying psychological, social, and cognitive mechanisms driving nomophobia. Such research is essential to develop effective interventions that promote healthier smartphone habits among students, thereby mitigating potential adverse impacts on academic achievement.

This study not only brings attention to a critical issue affecting the academic landscape but also underscores the importance of incorporating technological dependency into educational and psychological frameworks. Future research efforts should focus on longitudinal studies to assess causative factors and intervention efficacy, alongside cross-cultural analyses to understand the global nuances of nomophobia. This could pave the way for evidence-based policies and programs designed to equip students with the tools to navigate their academic responsibilities in a smartphone-dominated world.

Keywords

Smartphones, Nomophobia, Technology, University, and Academic.

1. Introduction

The ubiquitous integration of smartphone technology into daily life has revolutionized communication and interaction patterns, bringing profound changes across societal, educational, and psychological dimensions. The COVID-19 pandemic catalyzed a substantial reliance on digital devices, including smartphones, as remote learning emerged as the predominant mode of education during lockdowns (Singh, 2021). Smartphones have evolved beyond mere communication tools, offering a diverse suite of applications such as social media platforms, GPS navigation, entertainment, psychological interventions, and access to online educational resources (Yilmaz et al., 2023). While these functionalities contribute to convenience and productivity, the excessive use of smartphones has sparked global concerns regarding their psychological impact.

Studies report alarming statistics that highlight smartphone dependency; for instance, over half of Americans experience anxiety if their phone battery depletes below 20 percent, and nearly half admit a compulsive reliance on their devices, perceiving them as indispensable (Lee & Kim, 2022; Wheelwright, 2021). This growing dependence has given rise to a specific psychological condition termed "Nomophobia"—an abbreviation for "NO MO(bile) PHO(ne) (pho)BIA"—which describes the irrational fear of being disconnected from one's smartphone (Bhattacharya, 2019; Yilmaz et al., 2023). Nomophobia manifests through various symptoms, including compulsive smartphone usage, possession of multiple devices, carrying chargers routinely, and heightened anxiety when phone access is disrupted (Bragazzi & Del Puente, 2014; Qutishat et al., 2020).

Educational environments present unique contexts for smartphone utilization. On one hand, smartphones support academic pursuits by facilitating access to learning materials, peer collaboration, and remote task completion (Turkle, 2011). Conversely, excessive smartphone engagement introduces disruptions such as diminished focus, procrastination, and the onset of problematic behaviors, adversely impacting students' academic performance (Rosen et al., 2014). The psychological effects of overuse extend beyond academic challenges, encompassing phenomena like technostress, phantom vibration syndrome, sleep disturbances, and depression, with nomophobia emerging as a significant concern (Demirci et al., 2015; Singh, 2021).

Nomophobia's prevalence among student populations varies widely, ranging from 18.5 percent to 73 percent across studies, with critical determinants identified as age, gender, self-esteem, and personality traits (Abraham et al., 2014; Dixit et al., 2010; Qutishat et al., 2020). Research further indicates that increased smartphone usage frequency correlates strongly with heightened nomophobia risk (Buctot et al., 2020). This excessive dependence demands scrutiny, particularly in regions such as India, where smartphone penetration among adolescents is rapidly increasing (Nguyen et al. 2024) Indian youth reportedly spend 169 minutes daily on their devices, with behaviors linked to negative outcomes like obesity, unsafe practices, and mental health issues (Ali & Matarneh, 2024).

While smartphones are multi-functional tools integral to students' lives, their overuse poses significant challenges, particularly concerning academic performance. Nomophobia is implicated in reduced attention spans, poor time management, and declining motivation, all of which adversely affect educational outcomes (Berdida, 2023). Medical student studies in Saudi Arabia further corroborate these impacts, associating nomophobia with academic underachievement; (Alkalash et al., 2023). In India, however, research exploring the intersection of smartphone usage, nomophobia, and academic achievement remains sparse.

2. Research Gap

This study endeavors to address this research gap by analyzing smartphone usage patterns, nomophobia prevalence, and their correlations with sociodemographic variables and academic performance among India's high school students. The findings will contribute to developing interventions aimed at fostering responsible smartphone practices and mitigating their detrimental effects on academic pursuits, thereby informing educational policies and psychological frameworks.

3. Objectives of the Study

This study aims to address critical research questions by focusing on the unique context of Indian university students, a demographic characterized by rapid technological adoption and evolving educational practices. The research questions are as follows:

3.1 What is the frequency of smartphone usage among Indian university students, and how does it vary based on sociodemographic characteristics such as age, gender, academic discipline, and socioeconomic background?
This question seeks to quantify and analyze the intensity and patterns of

smartphone usage among Indian students, acknowledging the diverse sociodemographic factors that influence technology adoption. Given India's heterogeneous population and regional disparities, understanding these variations are crucial for contextualizing the data.

3.2 What is the prevalence of nomophobia among Indian university students, and how does it manifest across different demographic and academic subgroups?

This question explores the extent to which nomophobia affects Indian students, emphasizing its psychological, behavioral, and social dimensions. Considering India's growing dependence on smartphones for communication, education, and leisure, this investigation will highlight the extent of digital anxiety among students.

3.3 Are there significant associations between smartphone usage patterns, nomophobia, and academic performance among Indian university students?

This question delves into the intricate relationships between smartphone usage behaviors, the psychological impacts of nomophobia, and academic achievements. It aims to uncover whether excessive or problematic smartphone use correlates with reduced academic outcomes, while also factoring in variables like motivation, attention span, and time management skills.

4. Research Methods

This study adopts a correlational design targeting Indian university students to explore the research questions.

4.1. Participants

A diverse sample of 950 students were selected from 56 universities across India. The participants, aged between 18 and 25 years (M = 20.47; SD = 2.13), included a nearly equal representation of male and female students (54 percent female). Initially, 1,140 students were invited to participate, with all returning completed questionnaires. However, after accounting for incomplete responses and significant missing data in the core measurements, 190 responses were excluded, yielding 950 valid responses for analysis (response rate: 83.3 percent). The sampling framework ensured inclusivity, with participants drawn from various academic disciplines, including engineering, arts, commerce, and sciences, to provide a comprehensive understanding of the variables across different educational contexts.

4.2. Measures

Data collection utilized an anonymous self-report questionnaire encompassing core measurements and demographic details such as age, gender, academic stream, family income, and Grade Point Average (GPA). The following describes the core measurement used:

4.2.1. Nomophobia

Nomophobia was assessed using the Nomophobia Questionnaire (NMP-Q), developed by Yildirim and Correia (2015) in the U.S. The NMP-Q measures the fear or phobia associated with being without a smartphone and examines four dimensions:

- Not being able to access information (6 items)
- Losing connectedness (5 items)
- Not being able to communicate (4 items)
- Giving up convenience (5 items)

The NMP-Q comprises 20 items rated on a 7-point Likert scale, ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Total scores range from 20 to 140, with interpretations as follows:

- 20: No nomophobia
- 21–59: Mild nomophobia
- 60–99:Moderate nomophobia
- 100–140: Severe nomophobia

The questionnaire has been translated, validated, and extensively utilized across diverse populations globally, including Spain (Gutiérrez-Puertas et al., 2019), Italy (Adawi et al., 2018), Pakistan (Nawaz et al., 2017), and China (Ma & Liu, 2021). To adapt the NMP-Q for use among Indian students, the questionnaire was translated into Hindi and regionally relevant dialects. A forward-backward translation procedure was employed to ensure semantic compatibility. The psychometric properties of the adapted NMP-Q were evaluated, with Confirmatory Factor Analysis (CFA) indicating that the four-factor structure demonstrated excellent model fit (e.g., $\chi^2/df = 2.41$; RMSEA = 0.05). Reliability analysis yielded Cronbach's alpha coefficients ranging from 0.73 to 0.91 across dimensions, signifying high internal consistency.

4.2.2. Smartphone Use

A comprehensive questionnaire was developed to investigate smartphone usage among Indian university students. This questionnaire was formed by an extensive review of literature and

previous studies related to smartphone use, particularly those focusing on student populations in India. It includes 14 questions covering multiple dimensions:

4.2.2.1. Duration of smartphone ownership

- How long have you been using a smartphone?

4.2.2.2. Internet accessibility

- Is internet access available on your smartphone?

4.2.2.3. Daily usage time

- How many hours do you spend on your smartphone each day?

4.2.2.4. Frequency of smartphone interaction

- How often do you check your smartphone each day?
- How many times do you check your smartphone each day?

4.2.2.5. Communication activities

- How many calls do you make each day using your smartphone?
- How many calls do you receive each day via your smartphone?
- How many messages do you send from your smartphone each day?
- How many messages do you receive on your smartphone each day?
- How many emails do you send using your smartphone each day?
- How many emails do you receive using your smartphone each day?
- How many apps are currently installed on your smartphone?

4.2.2.6. Purpose of smartphone use

- What activities do you primarily use your smartphone for?

4.2.2.7. Usage context

- In which situations do you typically use your smartphone each day?

4.2.3. Academic Performance

Academic performance was evaluated using a single-item self-assessment question: "What was your academic achievement during

the last semester?" Responses were categorized into five performance levels: "Excellent," "Very Good," "Good," "Average," and "Below Average." This approach provides a straight forward yet effective method for measuring academic achievement, reflecting a wide spectrum of educational outcomes among Indian university students. Including GPA data or other objective measures could further validate academic outcomes.

4.3. Procedure

Participants were recruited using a stratified random sampling method to ensure adequate representation of gender, academic disciplines, and socio-economic groups. Data collection was conducted through in-person surveys administered in academic institutions during regular hours to maximize participation rates. Ethical approval for the study was obtained from the university's research ethics committee, and informed consent was secured from all participants. Measures were implemented to ensure anonymity and confidentiality throughout the study.

4.4. Data Analysis

Statistical analysis was performed using SPSS 25.0 software (Pallant, 2013). Descriptive statistics, including means, standard deviations (SDs), frequencies, and percentages, were calculated to summarize the data. Correlational analysis was conducted using Pearson's correlation coefficients to explore relationships between smartphone use, nomophobia, and academic achievement. Spearman's correlation was employed for non-parametric data to assess associations between smartphone use and academic performance.

4.4.1 Independent t-tests were used to examine differences in smartphone usage and nomophobia across demographic groups (e.g., age, gender).

4.4.2 Multiple linear regression was applied to investigate the unique contributions of smartphone use and nomophobia to academic achievement, controlling for demographic factors such as gender, age, and socioeconomic status.

5. Results

5.1. Smartphone Use among Indian University Students

5.1.1. Time, Duration, and Frequency of Smartphone Use

Survey results indicate that 68.4 percent of Indian university students have been using smartphones for more than three years, reflecting widespread early adoption of mobile technology.

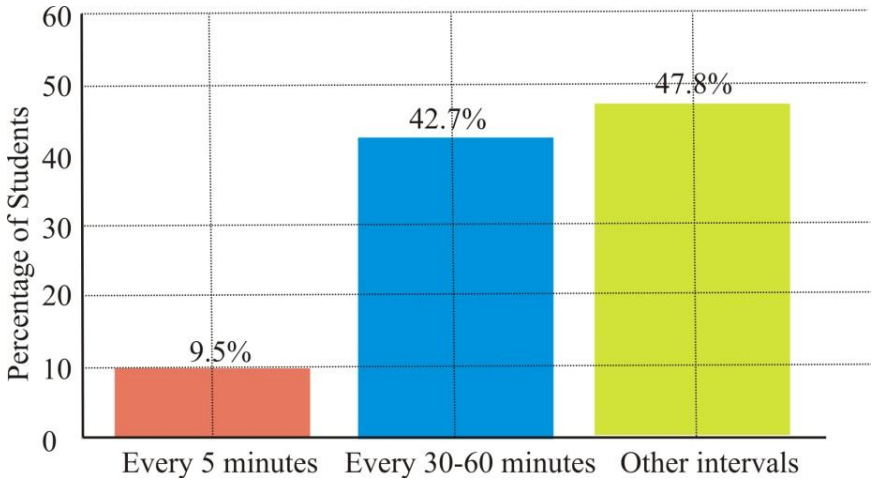
Additionally, 98.1 percent of students reported the ability to access the Internet on their smartphones, showcasing high digital connectivity in this demographic (Table 1). The average time spent daily on smartphones for academic purposes was 6.12 hours, demonstrating a substantial reliance on these devices for educational activities.

Table 1:- Smartphone Usage and Internet Access among Indian University Students

Parameter	Survey Result
Students using smartphones for more than 3 years	68.4%
Students with Internet access on smartphones	98.1%
Average daily use of smartphones for academics	6.12 hours

Source:- Author's compilation

Analysis of smartphone-checking habits revealed varied patterns. A significant proportion of students, 42.7 percent, check their smartphones every 30–60 minutes, while 9.5 percent report checking their phones as frequently as every 5 minutes (Fig. 1). This high frequency of interaction with mobile devices underscores their pervasive role in students' academic and social lives.



Source:- Author's compilation

Figure 1:- Frequency of Smartphone-checking among Students

Key Findings on Smartphone Use among Indian University Students:

Indian university students exhibit significant smartphone adoption and usage:

- **Duration of Use:** A large majority (68.4 percent) have been using smartphones for over three years, indicating early and widespread adoption.
- **Internet Access:** Near-universal internet access via smartphones (98.1 percent) highlights strong digital connectivity.
- **Academic Use:** Students spend a considerable average of 6.12 hours daily on their smartphones for academic activities, demonstrating their importance in education.
- **Checking Frequency:** A substantial portion (42.7 percent) check their phones every 30–60 minutes, with a notable 9.5 percent checking as often as every 5 minutes, suggesting high engagement levels.
- **Multifunctional Use:** Smartphones serve diverse purposes, including academic information seeking (84.5 percent), entertainment (78.4 percent), social media engagement (73.9 percent), communication (69.8 percent), gaming (62.4 percent), and news consumption (55.1 percent).
- **Contextual Use:** Smartphone use is prevalent across various contexts, including waiting times (68.3 percent), feelings of boredom or loneliness (72.9 percent), during transit (35.7 percent), meals (28.1 percent), and even during class (21.6 percent).

Table 2:- Smartphone Usage Characteristics (Summary)

Smartphone Usage Findings	Percentage (%)
Students using smartphones for over three years	68.4%
Students with internet access on smartphones	98.1%
Average daily smartphone uses for academic purposes	6.12 hours
Students checking smartphones every 30–60 minutes	42.7%
Students checking smartphones every 5 minutes	9.5%
Smartphone use for academic information	84.5%
Smartphone use for entertainment	78.4%
Smartphone use for social media	73.9%

Smartphone Usage Findings	Percentage (%)
Smartphone use for communication	69.8%
Smartphone use for gaming	62.4%
Smartphone use for news consumption	55.1%
Smartphone use when bored or lonely	72.9%
Smartphone use while waiting	68.3%
Smartphone use during transit	35.7%
Smartphone use during meals	28.1%
Smartphone use during class	21.6%

Source:- Author's compilation

Table 3:- Smartphone Usage among Students

Characteristic	n	Percentage (%)
Smartphone Usage Duration		
Less than 1 year	105	11.1
1–2 years	132	13.9
2–3 years	151	15.9
3–4 years	183	19.3
4–5 years	142	14.9
More than 5 years	237	24.9
Cannot remember	10	1.1
Total	950	100.0
Internet Access		
No	18	1.9
Yes	932	98.1
Prefer not to say	10	1.0

Source:- Author's compilation

5.1.2. Activities on Smartphones

Students reported engaging in diverse activities on their smartphones, highlighting both academic and non-academic usage patterns:

- 84.5 percent of students use smartphones to search for academic information, such as journal articles and assignments.

- 78.4 percent rely on their devices for entertainment (e.g., watching movies, listening to music).
- 73.9 percent frequently check social media notifications, while 69.8 percent use messaging apps to communicate with family and friends.
- 62.4 percent reported using smartphones to play games, a popular form of recreation.
- 55.1 percent utilize smartphones for reading news or gathering information.

5.1.3. Context of Smartphone Use

Students' smartphone usage contexts further illustrate their embeddedness in various aspects of life:

- 68.3 percent reported using smartphones while waiting for someone or something.
- 72.9 percent used them when feeling bored or lonely.
- 35.7 percent utilized smartphones during transit (e.g., buses, trains).
- 28.1 percent reported using smartphones during meals, while 21.6 percent admitted to checking phones during class.

6. Discussion

This study revealed that smartphone usage is highly prevalent among Indian university students. With 68.4 percent of students having used smartphones for over three years and 98.1 percent having internet access on their devices, it is clear that mobile technology is deeply integrated into students' academic routines. The average of 6.12 hours of daily academic smartphone use, along with frequent checking behavior (42.7 percent every 30–60 minutes and 9.5 percent every 5 minutes), demonstrates a high level of engagement. By this way, first question was answered, showing both the frequency of smartphone usage and its general consistency across the student population.

Although a specific nomophobia scale was not used, several behavioral indicators point toward its likely presence. The use of smartphones in response to boredom or loneliness (72.9 percent), while waiting (68.3 percent), during meals (28.1 percent), and even in class (21.6 percent) suggests psychological dependency on mobile devices. These findings reflect core symptoms of nomophobia such as anxiety and compulsive checking, particularly among frequent users. This addresses question number two, indicating a probable high

prevalence of nomophobia among students, although subgroup analysis is recommended for future studies.

The study also explored the connection between smartphone usage and academic outcomes. While smartphones support learning, especially through academic information access (84.5 percent), excessive or poorly managed use—such as checking during class or meals — may interfere with concentration and academic performance. The frequent non-academic use patterns raise concerns about distraction and overdependence. This addressed question three, suggesting that while smartphones can aid learning, their misuse may have adverse academic effects.

7. Conclusion

This study provides valuable insights into smartphone usage patterns among Indian university students, revealing high levels of ownership, internet access, and daily academic use. The findings demonstrate that smartphones are not only essential academic tools but also deeply embedded in students' daily lives through frequent and context-driven use.

Behavioral indicators suggest a strong likelihood of nomophobia, particularly among students who frequently check their phones or use them in emotionally driven situations such as boredom or loneliness. While smartphones enhance access to educational content, their excessive or compulsive use may interfere with academic focus and performance.

Overall, the research highlights both the benefits and challenges of smartphone reliance in higher education. It underscores the need for balanced usage, digital literacy, and awareness programs to support students in managing their smartphone habits effectively.

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