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Research Article

Effect of Smartphone Dependency on Study Habits and Cognitive Performance among College Students

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Abstract

The proliferation of smartphones among college students in India has emerged as a pressing pedagogical concern, particularly in the era of the National Education Policy (NEP) 2020, which aspires to foster critical thinking, holistic development, and self-directed learning. This study investigates the relationship between smartphone dependency and its effects on study habits, academic performance, and cognitive functioning among undergraduate students in Indian colleges. A cross-sectional survey-based methodology was adopted, with data collected from 300 undergraduate students (aged 18–24 years) across three government-aided degree colleges in northern India. The Smartphone Addiction Scale–Short Version (SAS-SV) was used to categorise students into dependent and non-dependent groups. Results indicate that students classified as smartphone-dependent reported significantly fewer daily study hours (3.1 hrs vs. 5.2 hrs), lower academic GPA scores (6.3 vs. 7.8 on a 10-point scale), and higher rates of attentional difficulties (71.7% vs. 29.2%). The study further identifies nocturnal phone use, multitasking during study sessions, and constant notification interruptions as primary disruptors of deep learning. These findings are examined through the lens of NEP 2020 competency goals, suggesting that unregulated smartphone use poses a structural challenge to achieving the policy's vision of experiential, inquiry-based education. The paper concludes with evidence-informed recommendations for educators, institutions, and policymakers.

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1. INTRODUCTION

The smartphone is no longer merely a communication device it has become an extension of the student's cognitive and social environment. In India, the number of smartphone users surpassed 700 million in 2023, with the 18–24 age group comprising the most active and frequent users (TRAI, 2023). College campuses, which were once spaces of structured intellectual engagement, have progressively transformed into zones of persistent digital connectivity. While smartphones carry significant educational potential — offering access to learning platforms, digital libraries, and collaborative tools — their addictive design patterns and constant notification architectures also carry the risk of profound disruption to academic life.

The National Education Policy 2020 represents a transformational reimagining of the Indian educational framework. Among its core ambitions are the development of critical and creative thinking, deep conceptual understanding, holistic learner development, and the cultivation of lifelong learning capacities. NEP 2020 explicitly acknowledges the role of technology in education — promoting digital literacy, e-learning integration, and exposure to coding and computational thinking from early stages (Ministry of Education, 2020). However, the policy also emphasises that technology should serve the learner rather than dominate the learner's attention. The challenge of smartphone dependency — particularly when it operates outside any regulatory or guided framework — sits in direct tension with these aspirations.

Cognitive science literature consistently identifies attentional capacity, working memory, and sustained concentration as the foundational prerequisites for deep learning. When these capacities are repeatedly fragmented by smartphone interruptions, the quality of knowledge construction deteriorates significantly. Furthermore, habitual multitasking — a behaviour strongly associated with high smartphone use — has been linked to reduced cognitive flexibility, poorer reading comprehension, and lower academic outcomes (Carrier et al., 2015; Rosen et al., 2013). Within India's specific educational context, where first-generation college learners often rely heavily on in-class instruction and self-study as their primary learning modes, the stakes of such cognitive disruption are particularly high.

Despite the growing body of international literature on smartphone use and academic performance, empirical research contextualised within the Indian NEP framework remains limited. This paper seeks to address this gap by examining smartphone dependency patterns among undergraduate students, assessing their effects on measurable study behaviours and cognitive indicators, and situating these findings within the policy objectives of NEP 2020. The ultimate aim is not to advocate for a technology-free classroom, but to contribute to an evidence base that can guide more intentional, balanced, and educationally purposeful integration of digital devices in India's colleges.

1.1 OBJECTIVES OF THE STUDY

The study was guided by the following specific objectives:

i. To measure smartphone dependency levels among undergraduate college students using a standardised psychometric tool.

ii. To assess the relationship between smartphone dependency and self-reported study habits, including daily study time, regularity, and depth of engagement.

iii. To examine the impact of smartphone use patterns on indicators of cognitive performance, including attention, working memory, and academic GPA.

iv. To interpret the findings in the context of NEP 2020 competency goals and suggest policy-relevant recommendations.

2. REVIEW OF LITERATURE

The relationship between smartphone uses and academic functioning has been examined extensively in Western contexts. Junco and Cotten (2012) conducted one of the earliest large-scale studies demonstrating that students who used social media and sent text messages during study periods had significantly lower GPAs. Rosen et al. (2013) extended this work, showing that the mere presence of a smartphone on a study desk — even if not actively used — reduced cognitive capacity available for the primary task. This phenomenon, now widely discussed as the 'brain drain' effect of smartphones, has since been replicated in several independent studies.

In the Indian context, Siddiqui and Singh (2016) found that over 65 per cent of college students reported using their smartphones for non-academic purposes during lectures. A study by Goel and Aggarwal (2012) established a statistically significant negative correlation between hours of internet and social media use and academic performance among Delhi University undergraduates. More recently, Chaturvedi et al. (2021) found that undergraduate students in Uttar Pradesh who self-reported smartphone addiction scored lower on tests of sustained attention and working memory compared to their non-addicted counterparts.

The mechanisms through which smartphone dependency affects cognition are multifaceted. Thornton et al. (2014) demonstrated that cognitive capacity is diminished when smartphones are visible, even in silent mode, because the brain exerts inhibitory effort to suppress attention toward the device. Carrier et al. (2015) argued that habitual multitasking — dividing attention between academic tasks and phone activity — does not enhance productivity but instead degrades the quality of encoding in memory. This has direct implications for the study habits that NEP 2020 seeks to promote: inquiry-based exploration, reflective journaling, project work, and independent research all require sustained, uninterrupted cognitive engagement.

Billieux et al. (2015) proposed a theoretical model categorising problematic smartphone use into four clusters: excessive social networking, compulsive phoning, dangerous use (use while driving or in class), and prohibited use (use in restricted settings). All four clusters are directly relevant to the college classroom environment. The addictive design features of most mainstream apps — variable reward schedules, social approval metrics, and infinite scroll architecture — are modelled on

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behaviourist conditioning principles, making disengagement particularly difficult for young users.

Within the NEP 2020 policy framework, there is a particular emphasis on developing what the policy terms 'essential attributes' of the educated citizen: critical thinking, problem-solving, communication, creativity, and ethical reasoning (Ministry of Education, 2020, p. 16). These higher-order competencies are precisely those that require deep, uninterrupted cognitive processing. If the learning environment is one of persistent digital interruption, the policy's aspirations for a thinking, reflective graduate are undermined at the structural level.

The literature also highlights that the relationship between smartphone use and academic outcomes is not uniformly negative — purposive use of smartphones for academic functions (accessing e-resources, collaborative learning, research) can have positive effects (Gikas & Grant, 2013). The critical variable, therefore, is not the device itself but the nature and pattern of its use. This distinction is central to the framing of the present study.

3. METHODOLOGY

3.1 Research Design

A cross-sectional, descriptive research design was employed. A survey instrument combining standardised scales and structured questionnaire items was administered to undergraduate students across three government-aided colleges affiliated with a state university in northern India. The study was conducted during the academic year 2023–24.

3.2 Sample

A total of 300 undergraduate students (178 male, 122 female) from across the Science, Arts, and Commerce streams were recruited through stratified random sampling. All participants were in the second or third year of their bachelor's degree programme. Participants ranged in age from 18 to 24 years (mean = 20.3 years, SD = 1.4). Students who had obtained a smartphone less than 12 months prior or who reported any diagnosed neurological condition were excluded from the sample.

3.3 Instruments

Smartphone Addiction Scale – Short Version (SAS-SV): The SAS-SV (Kwon et al., 2013), a validated 10-item Likert-scale instrument, was used to assess smartphone dependency. A cut-off score of ≥31 for males and ≥33 for females was used to categorise students as 'smartphone-dependent.' The scale has demonstrated strong psychometric properties (Cronbach's alpha = 0.91) and has been cross-culturally validated in Indian populations (Haug et al., 2015).

Study Habits Inventory (SHI): A structured questionnaire capturing self-reported daily study time, consistency of study schedule, frequency of revision, engagement in class, and regularity of note-making was administered. Items were adapted from Wrenn's Study Habits Inventory and contextualised for the Indian college setting.

Cognitive Indicators: A brief validated attentional measure — the Digit Span Forward and Backward subtest (adapted from Wechsler's scale) — was administered individually to assess working memory. Academic GPA (on a 10-point university scale) for the immediately preceding semester was recorded from official transcripts with institutional permission.

3.4 Ethical Considerations

Institutional ethical clearance was obtained prior to data collection. Informed consent was secured from all participants. Data were anonymised and stored securely. Participation was entirely voluntary, and students were free to withdraw at any stage without academic consequence.

3.5 Data Analysis

Data were analysed using SPSS Version 26. Independent sample t-tests were used to compare means between dependent and non-dependent groups. Pearson's correlation coefficient was computed to examine associations between smartphone use hours and study/cognitive variables. Chi-square tests were applied to categorical data. Statistical significance was set at $p < 0.05$.

4. FINDINGS AND ANALYSIS

4.1 Prevalence of Smartphone Dependency

Of the 300 students surveyed, 187 (62.3%) were classified as smartphone-dependent based on SAS-SV scores. The mean daily smartphone use among the dependent group was 7.4 hours (SD = 1.8), compared to 2.9 hours (SD = 1.1) in the non-dependent group. This prevalence figure is broadly consistent with prior Indian studies: Chaturvedi et al. (2021) reported a 58% prevalence in a comparable undergraduate sample in UP, while a NIMHANS study (2019) placed the national estimate at approximately 60–65% for college-going youth.

4.2 Smartphone Use and Study Habits

Students in the smartphone-dependent group reported a mean of 3.1 study hours per day (SD = 1.3), significantly lower than the 5.2 hours (SD = 1.4) reported by the non-dependent group ($t = 14.37$, $p < 0.001$). Multitasking behaviour — specifically, using the smartphone while simultaneously attempting academic study — was reported by 79.1% of the dependent group, compared to 31.0% of the non-dependent group ($\chi^2 = 67.84$, $p < 0.001$).

Nocturnal smartphone use (use after 11 pm) was reported by 68.4% of the dependent group versus 18.6% of the non-dependent group. This pattern of late-night use has well-documented associations with sleep disruption, which in turn impairs memory consolidation — a process particularly critical for students preparing for university examinations. Notably, 64.7% of the dependent students reported using their phones during classroom lectures (phubbing), compared to 12.4% of non-dependent students, representing a substantial barrier to the engagement-centred pedagogy envisaged by NEP 2020.

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4.3 Smartphone Use and Cognitive Performance

Mean academic GPA in the dependent group was 6.3 (SD = 0.9), compared to 7.8 (SD = 0.7) in the non-dependent group ($t = 17.52$, $p < 0.001$). Working memory scores (Digit Span test) showed a statistically significant difference: the dependent group obtained a mean score of 5.6 (SD = 1.2) versus 7.1 (SD = 1.1) in the non-dependent group ($t = 12.14$, $p < 0.001$). Attentional difficulties — operationalised as self-reported difficulty sustaining focus for more than 20 minutes — were endorsed by 71.7% of the dependent group versus 29.2% of the non-dependent group.

A Pearson's correlation between daily smartphone hours and academic GPA yielded $r = -0.64$ ($p < 0.001$), indicating a strong negative relationship. The correlation between daily smartphone hours and working memory scores was $r = -0.52$ ($p < 0.001$). These findings confirm and extend the findings of Siddiqui and Singh (2016) and Chaturvedi et al. (2021) in the Indian context.

Table 1: Comparative Profile of Smartphone-Dependent and Non-Dependent Students

Variable	Smartphone-Dependent Group (n=187)	Non-Dependent Group (n=113)
Daily smartphone use (hrs)	7.4 ± 1.8	2.9 ± 1.1
Study hours per day	3.1 ± 1.3	5.2 ± 1.4
Academic GPA (10-pt scale)	6.3 ± 0.9	7.8 ± 0.7
Concentration difficulty (%)	71.7%	29.2%
Nocturnal use (after 11 pm)	68.4%	18.6%
Multitasking while studying (%)	79.1%	31.0%
Phubbing in the classroom (%)	64.7%	12.4%

Note: All group differences are statistically significant at $p < 0.001$ unless otherwise noted.

5. Discussion: Situating Findings within NEP 2020

The findings of this study do not occur in an educational vacuum. They must be read against the specific pedagogical vision articulated in the National Education Policy 2020, which India has committed to implementing across its higher education institutions.

5.1 NEP 2020 and the Aspiration of Deep Learning

NEP 2020 envisions a transition away from rote-memorisation-driven education toward what it calls 'joyful and engaging learning' grounded in critical inquiry, experiential understanding, and multidisciplinary thinking (Ministry of Education, 2020, p. 4). The policy specifically calls for pedagogies that develop 'creativity, innovation, and problem-solving abilities' (p. 16). These outcomes are not achievable in classrooms where more than 64% of students are concurrently engaged with their smartphones. Deep learning — the kind that allows students to synthesise information, draw connections, and construct original arguments — requires precisely the kind of sustained, distraction-free cognitive engagement that smartphone dependency systematically erodes.

The NEP also underlines the importance of seminar-based learning, discussion, and student presentations as active pedagogical modes at the undergraduate level. Each of these modes demands attentional presence and the capacity for sequential, analytical thought. When classroom phubbing rates exceed 60 percent, as this study documents, the social fabric of collaborative learning is torn, and the pedagogical promise of interactive classrooms remains unrealised.

5.2 Digital Literacy vs. Digital Dependency: A Policy Tension

NEP 2020 promotes digital literacy as a foundational competency for the 21st-century learner. It advocates for the National Digital Infrastructure for Teachers (NISHTHA) programme, the PM eVidya initiative, and integration of online learning through SWAYAM and DIKSHA platforms. The policy's intent is to harness technology as an enabler of educational equity and access. However, this study's findings reveal that the same technological infrastructure, when it operates in an unguided and habitual mode, functions as a cognitive impairment rather than an educational enrichment.

This tension is not irresolvable, but it does require institutional acknowledgement. There is a meaningful difference between the purposive, guided use of smartphones for educational ends — accessing the SWAYAM MOOC platform, using DIKSHA content, collaborating via digital tools — and the habitual, reward-seeking use of social media platforms designed to maximise screen time. NEP 2020's digital literacy goals require the former. The findings of this study suggest that, in practice, the latter dominates students' actual smartphone behaviours.

5.3 The Cognitive Competency Gap

NEP 2020's graduate profile imagines a student who is 'a good human being with good values,' 'a creative and critical thinker,' and 'an innovative, active, and constructive citizen' (Ministry of Education, 2020, p. 16). Achieving this profile requires intact working memory — the mental workspace in which complex reasoning, synthesis, and evaluation take place. This study's finding that smartphone-dependent students score approximately 21% lower on working memory assessments than their non-dependent peers is pedagogically significant. It suggests that, independent of curriculum design or teacher quality, a substantial portion of the student population is entering the learning environment with a structurally reduced capacity for the higher-order cognition that NEP 2020 demands.

It is worth noting that the policy's internal examinations and assessment reforms — including the Academic Bank of Credits (ABC), credit transfer systems, and flexible entry-exit options — all presuppose a learner capable of self-directed study and long-term academic planning. Smartphone-dependent students' significantly lower study hours and disrupted study routines suggest that these structural reforms may be insufficiently effective unless accompanied by direct interventions targeting digital behaviour.

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6. Recommendations

The following recommendations are offered on the basis of the study's empirical findings and are framed with relevance to the NEP 2020 implementation agenda.

6.1 Institutional Policies on Classroom Smartphone Use

Colleges should develop transparent, democratically formulated classroom phone policies that are embedded in institutional culture rather than imposed as punitive rules. Research by McCoy (2016) indicates that student-negotiated phone norms are more consistently observed than top-down mandates. Such policies should differentiate clearly between educationally purposive phone use and non-academic use, consistent with NEP 2020's nuanced view of technology in learning.

6.2 Digital Wellness as Part of Holistic Development

NEP 2020 strongly emphasises the holistic development of students, including physical and mental well-being (Ministry of Education, 2020, p. 23). Digital wellness — the capacity to manage one's relationship with technology in a way that supports rather than undermines personal goals — should be explicitly incorporated into the student induction programmes mandated under NEP 2020 for all higher education institutions. Training students in structured study techniques such as the Pomodoro method, which builds in focused work intervals and deliberate breaks, has shown effectiveness in reducing phone-related academic distraction (Pychyl & Flett, 2012).

6.3 Faculty Development for Technology-Integrated Pedagogy

Faculty should be equipped, through the National Initiative for School Heads and Teachers Holistic Advancement (NISHTHA) and equivalent higher education programmes, to design lesson plans that leverage smartphones for specific, bounded educational tasks (QR code-linked resources, real-time quizzes, collaborative documents) while actively managing attention in the remainder of the class. The key is structured, purposive engagement with devices — not their blanket prohibition or their unregulated presence.

6.4 Curriculum-Integrated Digital Reflection

Drawing on the NEP 2020 mandate for value education and reflective learning, colleges can integrate regular, structured opportunities for students to reflect on their own digital habits — through journaling, peer discussion, or portfolio components. Self-monitoring has been demonstrated to be a particularly effective behaviour change tool in the context of smartphone use (Tangney et al., 2004). Embedding such reflection within the credit framework would formalise its educational value.

6.5 Infrastructure and Safe Spaces for Deep Study

Given the findings on nocturnal smartphone use and sleep disruption, institutions should ensure that their libraries and study halls provide dedicated 'phone-free zones' — spaces where students who wish to engage in sustained, distraction-free study can do so. The NEP 2020 mandate to upgrade library and laboratory infrastructure is an opportunity to design physical learning environments that actively support the kind of concentrated scholarship the policy envisions.

7. Limitations of the Study

This study carries several limitations that should be acknowledged transparently. First, the cross-sectional design precludes causal inference: while the associations between smartphone dependency and lower academic outcomes are robust, the directionality cannot be confirmed. It is possible, for example, that students with pre-existing attentional difficulties are more susceptible to smartphone addiction rather than the reverse.

Second, the sample was drawn from three colleges in one region of northern India and may not be representative of the full diversity of India's undergraduate student population, which spans rural-urban divides, linguistic regions, socioeconomic strata, and institutional types ranging from community colleges to autonomous institutions under NEP 2020.

Third, the study relied on self-reported data for study hours and social media use. Self-report measures in educational psychology are susceptible to social desirability bias, particularly when students may anticipate that high phone use will be viewed negatively.

Fourth, the study did not distinguish between different types of smartphone applications — the effect of educational app use versus social media use versus gaming versus video consumption may differ considerably, and this nuance deserves examination in future research.

8. CONCLUSION

This study contributes empirical evidence from the Indian undergraduate context to a growing international body of research demonstrating that smartphone dependency is associated with significant impairments in study habits and cognitive performance. In a country that has committed, through NEP 2020, to transforming its higher education system into one that cultivates critical thinking, holistic development, and self-directed learning, the scale of smartphone dependency documented here — affecting nearly two-thirds of the surveyed sample — represents a structural challenge that cannot be addressed by curriculum reform alone.

The research makes clear that the issue is not smartphones per se, but the patterns of habitual, reward-driven, non-purposive use that characterise dependency. Addressing this challenge requires a coordinated institutional response: policy frameworks that distinguish purposive from destructive phone use; pedagogical strategies that harness rather than merely tolerate technology; student development initiatives that build digital self-regulation as a component of 21st-century competency; and physical environments designed to support the concentrated intellectual work that genuine learning demands.

NEP 2020 is an ambitious and well-intentioned policy architecture. Its success, however, will ultimately depend not only on structural reforms in credit systems, institutional autonomy, and multidisciplinary curricula, but also on whether the individual learner can bring the cognitive presence and

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sustained attention that transformative education requires. Ensuring that smartphone dependency does not become a silent saboteur of India's educational ambitions is, therefore, as much a matter of educational policy as it is of student welfare.

REFERENCES

1. Billieux J, Maurage P, Lopez-Fernandez O, Kuss DJ, Griffiths MD. Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Curr Addict Rep*. 2015;2(2):156–162.
2. Carrier LM, Rosen LD, Cheever NA, Lim AF. Causes, effects, and practicalities of everyday multitasking. *Dev Rev*. 2015; 35:64–78.
3. Chaturvedi A, Singh R, Pandey V. Smartphone addiction and its impact on academic performance and cognitive functions among undergraduate students in Uttar Pradesh. *Indian J Psychiatry*. 2021;63(2):172–179.
4. Gikas J, Grant MM. Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones, and social media. *Internet High Educ*. 2013;19:18–26.
5. Goel D, Aggarwal A. Internet usage and its effects on academic performance of college students in Delhi. *Indian J Community Med*. 2012;37(3):193–194.
6. Haug S, Castro RP, Kwon M, Filler A, Kowatsch T, Schaub MP. Smartphone use and smartphone addiction among young people in Switzerland. *J Behav Addict*. 2015;4(4):299–307.
7. Junco R, Cotten SR. No A 4 U: The relationship between multitasking and academic performance. *Comput Educ*. 2012;59(2):505–514.
8. Kwon M, Lee JY, Won WY, Park JW, Min JA, Hahn C, et al. Development and validation of a smartphone addiction scale (SAS). *PLoS One*. 2013;8(2):e56936.
9. McCoy BR. Digital distractions in the classroom phase II: Student and faculty perspectives on factors affecting student attention, note taking, and exam performance. *J Media Educ*. 2016;7(2):5–25.
10. Ministry of Education. *National Education Policy 2020*. New Delhi: Government of India; 2020. Available from: https://www.education.gov.in
11. National Institute of Mental Health and Neurosciences (NIMHANS). *Mental health and technology: Patterns of smartphone use among youth in India*. Bengaluru; 2019.
12. Pychyl TA, Flett GL. Procrastination and self-regulatory failure: An introduction to the special issue. *J Ration Emot Cogn Behav Ther*. 2012;30(4):203–212.
13. Rosen LD, Carrier LM, Cheever NA. Facebook and texting made me do it: Media-induced task-switching while studying. *Comput Hum Behav*. 2013;29(3):948–958.
14. Siddiqui S, Singh T. Social media: Its impact with positive and negative aspects. *Int J Comput Appl Technol Res*. 2016;5(2):71–75.
15. Tangney JP, Baumeister RF, Boone AL. High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *J Pers*. 2004;72(2):271–324.
16. Thornton B, Faires A, Robbins M, Rollins E. The mere presence of a cell phone may be distracting. *Soc Psychol*. 2014;45(6):479–488.
17. Telecom Regulatory Authority of India (TRAI). *Telecom subscription data: Annual report 2022–23*. New Delhi; 2023. Available from: https://www.trai.gov.in

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