
SCROLLING THROUGH LIFE: A STUDY OF SMARTPHONE ADDICTION IN POSTGRADUATE STUDENTS

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Article Received: 18 June 2026

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Article Revised: 08 July 2026

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Published on: 28 July 2026

DOI: <https://doi-doi.org/101555/ijrpa.7528>

ABSTRACT

Background: Problematic smartphone use is increasingly linked to stress, anxiety, depression, and disrupted sleep among university students. However, postgraduate students who face sustained evaluative pressure, isolation, and blurred work rest boundaries remain markedly under represented in a literature dominated by undergraduate and adolescent samples, and gender differences in use remain unresolved.

Objectives: (1) To assess smartphone addiction related behaviours among postgraduate students; and (2) to compare male and female students across the behavioural domains captured by the Smartphone Addiction Scale Short Version (SAS-SV).

Methods: A quantitative, cross-sectional survey was conducted among 40 postgraduate students, stratified equally by gender (20 female, 20 male), recruited by purposive sampling at a single institution. Smartphone addiction was measured using the validated 10-item SAS-SV (Kwon et al., 2013), rated on a six-point Likert scale. Data were analysed in SPSS v27 using descriptive statistics, an independent-samples *t*-test, the Mann–Whitney U test, and Cohen's *d*, with significance set at $p < .05$.

Results: Female participants scored higher ($M = 36.10$, $SD = 4.70$) than males ($M = 32.40$, $SD = 7.08$), with both group means at or above SAS-SV gender-specific screening thresholds. The gender difference approached but did not reach significance, $t(38) = 1.95$, $p = .059$, with a moderate effect size, $d = 0.62$ (Mann–Whitney $U = 136.00$, $z = -1.73$, $p = .083$).

Conclusion: Problematic smartphone use was pronounced cohort wide, with a moderate, non-significant trend toward higher use in women most plausibly obscured by limited statistical power. Findings support cohort wide digital wellbeing interventions embedded in postgraduate support structures.

KEYWORDS: Smartphone Addiction; Problematic Smartphone Use; Postgraduate Students; Gender Differences; Sas-Sv; Digital Wellbeing.

1. INTRODUCTION

The smartphone has become the most intimate technology of contemporary life, a device that mediates how a generation studies, socialises, works, and rests. What began as a tool for communication has evolved into an ever-present portal through which vast swathes of daily experience are now routed, so seamlessly that the boundary between using a device and inhabiting it has grown difficult to locate. For young adults in particular, the phone is not merely owned but worn, carried into lectures, laboratories, libraries, beds, and moments of solitude that earlier generations experienced unmediated. This ubiquity carries an obvious paradox. The same connectivity that enables instantaneous access to information, relationships, and opportunity also invites a form of compulsive engagement that is increasingly described in the clinical and psychological literature as problematic smartphone use or smartphone addiction. The issue that this study addresses is therefore neither purely technological nor purely individual; it sits at the intersection of design, cognition, affect, and social context, and it demands to be understood as a behavioural phenomenon with measurable psychological consequences rather than as a moral failing or a passing cultural anxiety. Framing the problem in this way matters, because the way a phenomenon is conceptualised determines the kinds of questions researchers are permitted to ask and the kinds of interventions that become thinkable.

Postgraduate students occupy a revealing and under-examined position within this landscape. They are old enough to have integrated smartphones fully into their intellectual and professional lives, yet they operate under distinctive pressures, including sustained cognitive demand, high stakes evaluation, financial precarity, delayed milestones, and comparatively isolated modes of study, that plausibly alter both the motivation for, and the consequences of, heavy smartphone engagement. Much of the existing evidence base treats students as an undifferentiated category dominated by undergraduate samples, thereby obscuring the specific conditions under which postgraduate scholars turn to their devices. Understanding

smartphone addiction in this population is not simply an act of demographic bookkeeping; it is a way of testing whether prevailing theoretical accounts of behavioural addiction hold under a particular configuration of stress, autonomy, and self regulation that postgraduate life imposes.

2. The Problem This Study Addresses

In an ideal scenario, the smartphone would function as an instrument fully subordinated to the goals of the person using it. A postgraduate student would deploy the device deliberately, to retrieve a source, coordinate with collaborators, or decompress for a bounded interval, and would then set it aside without cognitive residue, sleep disruption, or intrusive urges to return. Attention would remain a governable resource, technology would support wellbeing and academic productivity rather than compete with them, and the relationship between person and device would be characterised by control rather than compulsion. This is the situation that institutions implicitly assume when they integrate digital tools into higher education, and it is the situation that individuals themselves report wishing to inhabit.

The reality diverges sharply from this ideal. A growing body of evidence indicates that a substantial proportion of university students exhibit patterns of use that meet thresholds for problematic engagement, accompanied by elevated stress, anxiety, and depressive symptomatology, degraded sleep quality, and diminished face to face social connection (Elhai et al., 2019; Sohn et al., 2019). Rather than serving as a controllable instrument, the device increasingly captures attention involuntarily, fragments sustained concentration, and colonises the very periods of rest and recovery on which cognitive performance depends. The problem this study confronts is the gap between the regulated, purposeful use that higher education presupposes and the compulsive, self perpetuating use that a meaningful share of students actually report, and, more precisely, the question of what drives this gap, and with what consequences, specifically among postgraduate students whose circumstances differ from the undergraduate populations that dominate existing research.

3. What Prior Work Has Attempted, and Why It Falls Short

Efforts to understand and address problematic smartphone use have advanced along several fronts, each valuable but each limited in ways that leave the present problem incompletely solved. A first and voluminous stream has established robust cross sectional associations between smartphone addiction and adverse mental health outcomes. Studies across diverse national contexts have repeatedly linked problematic use to depression and anxiety (Matar

Boumosleh & Jaalouk, 2017), to stress and burnout, and to impaired sleep and reduced physical wellbeing. These findings have been indispensable in establishing that the phenomenon is real and consequential. Yet their predominantly cross sectional and correlational design leaves the direction of causality unresolved, whether distress drives compulsive use, use amplifies distress, or the two reinforce one another reciprocally, and their reliance on self reported usage introduces measurement imprecision that constrains inferential confidence, a limitation acknowledged even within recent work in the field.

A second stream has concentrated on measurement, producing and validating instruments such as the Smartphone Addiction Scale and its short forms. This psychometric labour has brought welcome standardisation, but it has also entrenched conceptual ambiguity: by operationalising addiction through symptom count thresholds borrowed from substance use paradigms, much of this work risks pathologising ordinary high frequency use and treating a heterogeneous set of behaviours as a single unitary construct. A third and more theoretically ambitious stream has sought to explain, rather than merely describe, problematic use, most notably through the compensatory internet use theory (Kardefelt-Winther, 2014), which reframes excessive engagement as a coping response to unmet needs and negative affect rather than as an intrinsic property of the technology, and through the Interaction of Person Affect Cognition-Execution (I-PACE) model (Brand et al., 2016; Brand et al., 2019), which integrates predisposing traits, affective and cognitive responses, and executive control into a process account of how addictive behaviours develop and are maintained. These frameworks represent genuine explanatory progress. However, they have been elaborated and tested largely on general internet use, gaming, and undergraduate or adolescent samples, and they have rarely been examined against the specific stressor profile and self regulatory demands of postgraduate study. The collective shortfall, then, is not an absence of evidence but a misalignment of it: strong on association and increasingly sophisticated in theory, yet thin on population specific, theoretically grounded explanation of why postgraduate students in particular are drawn into compulsive use and what it costs them.

4. Direct and Indirect Consequences of the Problem

The consequences of unresolved problematic smartphone use radiate outward in both direct and indirect forms. Directly, heavy and compulsive engagement is associated with heightened anxiety and depressive symptoms, elevated stress, and a documented deterioration in sleep quality, with anxiety appearing in longitudinal work to mediate the pathway from problematic use to disrupted sleep (Zhang et al., 2024). These are not trivial outcomes for a

population whose academic output depends on precisely the cognitive faculties, sustained attention, working memory, and emotional regulation, that poor sleep and chronic anxiety most reliably erode. Directly, too, the fragmentation of attention undermines the deep, uninterrupted engagement that postgraduate research and writing require.

The indirect consequences are subtler but no less serious. As devices displace face to face interaction, students may experience an erosion of social skills and a deepening of loneliness, which can in turn feed back into the affective distress that motivates further compensatory use, a self reinforcing loop rather than a linear chain (Zeng et al., 2022). Reduced physical activity, disrupted circadian rhythms, and the quiet normalisation of divided attention compound over time, shaping not only immediate wellbeing but longer term trajectories of academic persistence, professional development, and mental health. Notably, recent evidence suggests that smartphone addiction may impair psychological wellbeing without always producing a detectable direct effect on academic grades, implying that its damage is frequently mediated through mental health and behavioural pathways rather than expressed as a simple, visible decline in performance. This makes the harm easy to underestimate precisely because it is indirect, and it strengthens the case for research that models these mediating mechanisms rather than testing for crude direct associations alone.

5. The Knowledge Gap and the Contribution of the Present Study

Taken together, the literature has convincingly demonstrated that problematic smartphone use is prevalent and harmful, has produced increasingly refined tools for measuring it, and has advanced credible theoretical models for explaining it. What remains under addressed is the convergence of these strands upon a specific, high stakes, and comparatively neglected population. Postgraduate students have rarely been studied as a distinct group; the dominant reliance on undergraduate and adolescent samples means that the interaction between the particular stressors of advanced study and the mechanisms proposed by compensatory and process based models remains largely untested. This study is designed to fill that gap. It moves beyond documenting yet another correlation by asking why postgraduate students engage in problematic use and through what psychological pathways that engagement translates into consequences, thereby extending the explanatory ambitions of the compensatory internet use theory and the I-PACE model to a population and a set of conditions in which their assumptions have not been adequately examined.

The present work builds directly on the associational literature that established the phenomenon's severity and on the measurement literature that made it quantifiable, while

departing from both by foregrounding mechanism and specificity rather than prevalence alone. It aligns with the theoretical turn represented by Kardefelt-Winther (2014) and Brand and colleagues (2016; 2019), adopting their insight that compulsive engagement is best understood as an affect-driven, self-regulatory process embedded in a person's circumstances, but it applies that lens to a group for whom the relevant circumstances, sustained evaluative pressure, isolation, and the constant availability of a device that promises immediate relief, are unusually acute. Guided by this integrated conceptual framing, the study treats smartphone addiction among postgraduate students not as a fixed trait to be counted but as a dynamic coping process to be explained, and in doing so it aims to contribute both a clearer empirical picture of an overlooked population and a more mechanistically grounded account that can inform genuinely targeted intervention. In clarifying what has been established, what has been assumed, and what has been left unexamined, this introduction sets out the rationale for a study whose focus and approach are not merely novel but necessary.

6. Objectives of the Study

From the argument developed so far, two concrete aims follow. The first is to assess smartphone addiction-related behaviours among postgraduate students, not as an abstract score, but as a set of lived tendencies that show up in ordinary moments: the message checked mid paragraph, the thumb that finds the phone before the mind has decided to reach for it, the restlessness that surfaces when the device is out of sight. The second is to compare male and female students across ten behavioural statements that together span academic interference, attention difficulties, physical discomfort, dependence, anxiety and restlessness, cognitive preoccupation, and compulsive use. Put plainly, the study asks two things: how pronounced these behaviours are in this population, and whether they play out differently for men and women.

Stated as testable propositions, the research examines whether postgraduate students report clinically meaningful levels of smartphone related behaviour across these seven domains, and whether the pattern and intensity of those behaviours differ significantly by gender. The gender comparison is not a token subgroup split. There is a genuine, unresolved tension in the literature worth probing: some studies find little or no difference in overall prevalence between men and women (Chen et al., 2017), while others report substantially higher problematic use among female students (Aljomaa et al., 2016), and still others suggest the divergence lies less in how much and more in how, with men gravitating toward gaming and video, women toward messaging and social connection (Roberts et al., 2014). If that is right,

then a single composite addiction score can mask more than it reveals, and a statement by statement comparison across the seven domains becomes the more honest instrument. That is the wager this study makes.

Why does any of this matter? Academically, it extends process oriented accounts of behavioural addiction, the compensatory internet use theory (Kardefelt-Winther, 2014) and the I-PACE framework (Brand et al., 2016), to a group these models have largely bypassed, and it does so with enough behavioural granularity to see whether gender operates as the kind of moderating variable those models predict. Practically, the payoff is sharper. A department that knows its postgraduate cohort struggles specifically with, say, night time dependence and academic interference can design something targeted, such as a workshop on attention hygiene during thesis writing season, rather than a vague, one size fits all appeal to use your phone less, which almost nobody heeds. And if the data show that men and women stumble at different points, then counselling services and digital wellbeing initiatives can stop treating students as a uniform block and start meeting them where they actually are.

The remainder of this paper is organised to follow that line of reasoning. It first establishes the territory, setting out why smartphone addiction among postgraduate students is a problem worth the attention of researchers and educators alike, and grounding that claim in the mounting evidence of psychological and academic harm. It then identifies the niche, drawing together what current research has and, more tellingly, has not settled: the neglect of postgraduate samples, the unresolved question of gender, and the tendency to count symptoms rather than explain them. Finally, it occupies that niche: the review of literature situates the study within existing theory, the methods section details the survey design and the ten statement instrument used to operationalise the seven behavioural domains, the results present the descriptive and comparative findings, and the discussion interprets them against the guiding frameworks before turning to implications, limitations, and the questions still left open for future work.

7. Review of Literature

Smartphone addiction, or more cautiously problematic smartphone use, has moved in little over a decade from a fringe curiosity to one of the most heavily researched behavioural phenomena in the psychology of everyday life. The reason is not hard to locate. The device now sits at the centre of how people learn, work, and relate, and its capacity to capture attention involuntarily has made how much is too much a genuinely consequential question for education and public health alike (Elhai et al., 2017). For postgraduate students in

particular, whose work depends on sustained concentration, disciplined self regulation, and adequate rest, the stakes of that question are unusually high. Yet the literature that ought to inform this population has developed unevenly, and reading it against the two aims of the present study exposes both its considerable strengths and its telling silences.

The first aim, assessing smartphone addiction related behaviours, rests on a substantial and methodologically consistent body of work. The foundational contribution is arguably Demirci et al. (2015), who surveyed 319 university students using the Smartphone Addiction Scale alongside validated measures of sleep quality, depression, and anxiety. Their cross sectional design established that higher use severity travelled reliably with poorer sleep and greater psychological distress, and the study's careful use of standardised instruments set a template the field still follows. Its limitations, however, are equally instructive: being cross sectional, it could not establish whether distress drove overuse or vice versa, and its reliance on self report left actual usage unverified. Aljomaa et al. (2016) extended the descriptive project in a different direction, developing a five dimensional questionnaire, covering overuse, psychological social, health, preoccupation, and technological dimensions, and administering it to 416 King Saud University students, of whom roughly 48% met their addiction threshold. The dimensional structure is a real advance over unitary scoring, because it acknowledges that addiction is not one behaviour but several; yet the study's institution specific sample and locally developed instrument limit comparability, and its conflation of ordinary heavy use with pathology remains a recurring conceptual weakness across this literature.

The most analytically valuable synthesis comes from Elhai and colleagues. Their systematic review (Elhai et al., 2017) screened 117 citations and examined 23 studies relating problematic use to psychopathology, concluding that depression and anxiety severity were consistently associated with problematic use, stress somewhat consistently, and self-esteem inconsistently. A later review (Elhai et al., 2019) sharpened the focus on anxiety and, crucially, foregrounded the mediating and moderating variables, such as boredom proneness, rumination, and fear of missing out, that simpler correlational work had ignored. The contribution here is conceptual as much as empirical: these reviews reframed problematic use as a symptom driven coping process rather than a property of the device, an argument that dovetails with the compensatory internet use theory (Kardefelt-Winther, 2014) and the Interaction of Person Affect Cognition Execution model (Brand et al., 2016). The limitation, which the authors themselves concede, is the field's near total dependence on cross-sectional, self-reported, undergraduate data, a constraint that quietly recurs in almost every primary study assembled under these reviews.

The second aim, comparing male and female students across specific behavioural domains, reveals a literature that is far more contradictory and, on closer reading, less settled than its volume suggests. Chen et al. (2017), in a cross-sectional study of medical college students, found no significant gender difference in overall prevalence (30.3% in men, 29.3% in women) but reported that the factors associated with addiction diverged by sex, an important nuance implying that similar scores can conceal different underlying pathways. Against this, several regional studies report markedly higher problematic use among women, with one recent cross sectional study finding problematic use significantly more common among female than male students, alongside higher scores on stress and depression [citation to be confirmed]. Roberts et al. (2014) add a qualitative texture that pure prevalence figures obscure, showing that men and women gravitate toward different activities, gaming and information seeking versus messaging and social networking, such that identical addiction scores may rest on quite different behavioural foundations. The contradiction is genuine and unresolved: some evidence points to parity in magnitude, other evidence to female predominance, and still other evidence to a qualitative divergence in kind rather than degree. Setting these two bodies of work side by side surfaces three patterns worth naming. The first is a robust and replicated association between problematic use and psychological harm, which lends confidence to the behavioural assessment aim of this study. The second is a persistent methodological monoculture: cross sectional designs, self report instruments, and, most tellingly, samples drawn overwhelmingly from undergraduate, medical, or adolescent populations. The third is the unresolved gender question, where the disagreement appears to stem less from measurement error than from the use of composite scores that flatten the domain specific and activity-specific differences Roberts et al. (2014) and Chen et al. (2017) each, in their own way, gesture toward. The knowledge gaps follow directly. Postgraduate students are almost never studied as a distinct group, despite facing a stressor profile, prolonged evaluative pressure, isolation, and blurred work rest boundaries, that compensatory and process based theories would predict to be especially conducive to problematic use. And gender is too often treated as a single prevalence figure rather than examined statement by statement across the domains where men and women plausibly diverge.

Assessed as a whole, then, the literature is strong where the present study can lean on it and weak precisely where the study intends to contribute. It offers validated instruments, a credible theoretical scaffolding, and consistent evidence of harm, all of which support the first aim of assessing behaviours in a postgraduate cohort. But it corresponds only partially to the second aim, because its gender comparisons are contradictory, frequently composite, and

rarely conducted at the level of specific behavioural statements. This study is designed to address that shortfall on two fronts. By focusing squarely on postgraduate students, it fills a demographic gap that the reliance on undergraduate samples has left open. And by comparing men and women across ten discrete statements spanning academic interference, attention difficulties, physical discomfort, dependence, anxiety and restlessness, cognitive preoccupation, and compulsive use, it replaces the blunt composite score with a domain sensitive comparison capable of detecting the qualitative divergences that prior work has hinted at but seldom tested directly. Interpreted through the lens of compensatory internet use theory (Kardefelt-Winther, 2014) and the I-PACE model (Brand et al., 2016), such a design promises not merely another prevalence estimate but a more mechanistically informative account of how, and for whom, the smartphone becomes something one scrolls through life with rather than simply uses.

8. Methods

8.1 Study Design

The study adopted a quantitative, cross-sectional survey design. This approach was selected because the research objectives were descriptive and comparative rather than causal: the first aim sought to characterise smartphone addiction related behaviours within a defined student population at a single point in time, and the second aim sought to compare those behaviours between male and female respondents. A cross sectional survey was well suited to both purposes, since it permitted the efficient collection of standardised, self-reported behavioural data from a group of respondents under uniform conditions, and it aligned with the dominant methodological tradition in this field, where problematic smartphone use has most often been assessed through validated self-report scales administered on a single occasion (Elhai et al., 2017). The design carried the familiar trade off that it could establish patterns and group differences but not temporal or causal ordering, and this limitation was accepted as appropriate given that the objectives concerned prevalence and comparison rather than mechanism. The research was conducted among postgraduate students enrolled at [institution / department], and data were gathered over a period of [start month, year] to [end month, year].

8.2 Ethics Statement

Ethical approval for the study was obtained from the [Institutional Ethics Committee / Institutional Review Board] of [institution] prior to any data collection. All procedures were carried out in accordance with the ethical principles for research involving human

participants set out in the Declaration of Helsinki (World Medical Association, 2013). Participation was entirely voluntary, and written informed consent was obtained from every respondent after the purpose of the study, the nature of the questionnaire, the anticipated time commitment, and the intended use of the data had been explained. Respondents were informed that they could withdraw at any stage without penalty, that their responses would remain confidential, and that all data would be stored securely and analysed only in aggregate, anonymised form so that no individual could be identified.

8.3 Participants

The study population comprised postgraduate students, a group deliberately chosen because their academic work depends heavily on sustained attention and self-regulation and because they remain markedly under represented in a literature dominated by undergraduate and adolescent samples. A total of 40 participants were recruited and, in keeping with the comparative objective, the sample was stratified by gender into two equal groups of 20 women and 20 men. This balanced allocation was a considered design decision rather than an incidental outcome, because equal group sizes maximise the statistical efficiency and robustness of between group comparisons and guard against the distortions that unequal cells can introduce into tests of mean differences. Participants were selected using purposive sampling, targeting enrolled postgraduate students who were willing to take part. Eligibility was restricted to individuals who were currently registered in a postgraduate programme, who owned and regularly used a personal smartphone, and who provided informed consent. Students who did not own a smartphone, who declined to consent, or who returned incomplete questionnaires were excluded so that every retained case contributed a full set of responses. The two groups were comparable in their postgraduate status and were drawn from the same academic setting, which helped to hold constant the broader institutional and situational factors that might otherwise have confounded a gender comparison.

8.4 Equipment and Materials

The principal instrument was the Smartphone Addiction Scale, Short Version (SAS-SV), a 10-item self-report questionnaire developed and validated by Kwon, Kim, Cho, and Yang (2013). Each item is rated on a six-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree), producing a composite score between 10 and 60, with higher totals indicating a greater degree of problematic smartphone use. The ten items collectively capture the behavioural domains central to this study, namely academic and daily life interference, attention and concentration difficulties, physical discomfort associated with use, dependence, anxiety and restlessness when separated from the device, cognitive preoccupation, and

compulsive checking. The SAS-SV was chosen in preference to longer instruments because it is brief, is quick to administer, and has demonstrated strong internal consistency and criterion validity across diverse student populations, which made it well matched to a concise survey of postgraduate respondents (Kwon et al., 2013). No physical devices, apparatus, or biochemical substances were required; the materials consisted solely of the SAS-SV questionnaire together with a short accompanying sheet used to record participant gender and to confirm eligibility and consent.

8.5 Study Procedures

Data collection proceeded in a fixed sequence. Eligible postgraduate students were first approached and briefed on the aims and scope of the study, after which written informed consent was obtained from those who agreed to participate. Each consenting participant then completed the SAS-SV under standardised conditions, responding to all ten statements on the six-point Likert scale without time pressure and without discussion with other respondents, so as to minimise social influence on the answers. To preserve confidentiality, questionnaires were anonymised at the point of collection and were identified only by a participant code and a gender marker. Once collection was complete, each participant's ten item ratings were summed according to the scoring convention specified by Kwon et al. (2013) to yield a single composite SAS-SV score, and these composite scores were entered into a spreadsheet under two separate gender based headings, one for the 20 female participants and one for the 20 male participants. The resulting dataset, comprising 40 composite scores arranged into these two groups, formed the empirical basis for all subsequent analysis. Data entries were checked against the original questionnaires to verify accuracy before analysis began, and no imputation was necessary because only complete responses had been retained.

8.6 Outcome Measures

The primary outcome measure was the composite SAS-SV score, treated as a continuous index of smartphone addiction related behaviour and used to address the first objective of assessing the extent of such behaviour among postgraduate students. This composite was the most appropriate primary measure because it is the validated summary indicator of the SAS-SV and because it integrates the seven behavioural domains that the objectives were framed around into a single, interpretable quantity. The secondary outcome was the difference in composite SAS-SV scores between the male and female groups, which directly served the second objective of comparing the two genders across the behavioural statements that make up the scale. Participant gender functioned as the grouping variable for this comparison. These outcomes were selected because, taken together, they mapped precisely onto the

study's two aims: the composite score quantified how pronounced the behaviours were, while the between group comparison established whether, and to what extent, they differed by gender.

8.7 Statistical Analysis

All analyses were conducted using IBM SPSS Statistics (Version 27.0; IBM Corp., 2020), and the significance threshold was set a priori at $p < .05$ for all tests. Descriptive statistics, comprising means, standard deviations, and the observed range, were first computed for the composite SAS-SV scores of each gender group in order to summarise the distribution of the data. Because the analysis rested on comparing two independent groups of equal size, the distributional assumptions underlying parametric testing were examined before the main comparison was performed. The normality of the score distributions within each group was assessed using the Shapiro-Wilk test, which is well suited to small samples, and the homogeneity of variances across the two groups was evaluated using Levene's test. The primary inferential procedure was an independent samples t test comparing the mean composite SAS-SV scores of the male and female groups, a test chosen because it is the standard and most statistically efficient method for detecting a difference between the means of two independent, normally distributed groups. Where Levene's test indicated unequal variances, the Welch correction was applied so that the comparison remained valid under heterogeneity of variance, and where the normality assumption was not met, the non parametric Mann-Whitney U test was designated as the corresponding alternative. To convey the magnitude and not merely the statistical significance of any observed difference, Cohen's d was calculated as a measure of effect size and interpreted according to conventional benchmarks (Cohen, 1988). To gauge the sensitivity of the design, a power analysis was carried out using G*Power (Version 3.1; Faul et al., 2007), which indicated that a total sample of 40 participants divided equally between two groups, tested at an alpha of .05 with power of .80, was adequate to detect a large effect in a two tailed independent samples t -test; this constraint on the detectable effect size was acknowledged as a limitation appropriate to an exploratory comparison. The chosen analytical strategy was justified overall by its direct correspondence to the study objectives, since descriptive statistics addressed the first aim of characterising the behaviours and the between group comparison, supported by an effect size estimate, addressed the second aim of establishing gender based differences.

9. RESULTS

The composite SAS-SV scores were approximately symmetrically distributed within both groups, and the Shapiro-Wilk test did not indicate a significant departure from normality in either the female or the male sample ($p > .05$), which justified the use of parametric procedures. Levene's test confirmed that the assumption of homogeneity of variance was tenable, $F(1, 38) = 2.47$, $p = .124$, so the pooled-variance independent samples t-test was retained as the primary comparison. Descriptively, female participants recorded higher composite scores ($M = 36.10$, $SD = 4.70$, range 27 to 44) than male participants ($M = 32.40$, $SD = 7.08$, range 20 to 46). Both group means fell at or above the gender specific screening thresholds proposed by Kwon et al. (2013), namely 33 for women and 31 for men, indicating that problematic smartphone use was pronounced across the cohort as a whole. The independent samples t-test showed that the difference between women and men approached but did not reach the conventional threshold of statistical significance, $t(38) = 1.95$, $p = .059$. Notwithstanding this non significant p value, the associated effect size was of moderate magnitude, $d = 0.62$, suggesting a difference of practical rather than negligible size. The non-parametric Mann-Whitney U test, computed as a robustness check, yielded a convergent result, $U = 136.00$, $z = -1.73$, $p = .083$. Taken together, the analyses indicated a consistent tendency for female postgraduate students to report higher levels of smartphone addiction related behaviour than their male counterparts, a difference that was moderate in size yet fell just short of statistical significance in this sample.

10. DISCUSSION

The present study set out to characterise smartphone addiction related behaviours among postgraduate students and to establish whether those behaviours differed by gender. Two findings stand out. The first is that the cohort as a whole reported elevated levels of problematic use, with both the female and the male group means sitting at or above the clinical screening thresholds of the SAS-SV (Kwon et al., 2013). The second is that women scored higher than men by a margin that was moderate in effect size yet not statistically significant at the conventional level. These two findings deserve to be read together rather than separately, because the more striking story here is arguably not the gender gap but the uniformly high level of problematic use in a population defined by its academic seriousness and comparative maturity.

The elevated cohort wide scores align closely with the accumulated evidence that problematic smartphone use is both prevalent and consequential among students. Demirci et al. (2015), in

their foundational cross sectional study, reported that heightened use severity travelled reliably with poorer sleep and greater psychological distress, and Elhai et al. (2017) confirmed in their systematic review that depression and anxiety severity were consistently associated with problematic use. That the present postgraduate sample, despite its greater age and academic investment, should exhibit average scores exceeding the SAS-SV thresholds is therefore consistent with prior work while extending it to a group that has rarely been examined in isolation. This pattern is readily interpretable through the two frameworks guiding the study. From the standpoint of the compensatory internet use theory (Kardefelt-Winther, 2014), the sustained evaluative pressure, isolation, and blurred work rest boundaries that characterise postgraduate life furnish precisely the kind of unmet psychological needs and negative affective states that motivate compensatory online engagement, such that heavy smartphone use functions less as a failure of willpower than as a coping strategy for a demanding environment. The Interaction of Person Affect Cognition Execution model (Brand et al., 2016, 2019) offers a complementary reading, since it frames the transition toward problematic use as an interaction between predisposing characteristics, affective and cognitive responses to internal and external triggers, and diminished executive control, all of which are plausibly taxed during the intense and self directed labour of postgraduate study. The gender comparison invites a more careful and critical interpretation. On the surface, the absence of a statistically significant difference echoes Chen et al. (2017), who likewise found no significant gender difference in the overall prevalence of smartphone addiction among medical students, even as the factors associated with addiction diverged by sex. Yet the moderate effect size observed here, together with the consistent direction of the difference across both the parametric and non parametric tests, cautions against a simple null interpretation. A difference of $d = 0.62$ is not trivial, and its failure to reach significance is at least as attributable to limited statistical power as to a genuine absence of effect. Read in this light, the finding is better described as a non significant trend toward higher problematic use among women than as evidence of equivalence. That trend coheres with a substantial body of research reporting higher problematic use among female students (Aljomaa et al., 2016; Mahato et al. 2025) and with large scale evidence that younger women are at particular risk. It also resonates with the more nuanced argument of Roberts et al. (2014), who contended that men and women may reach similar levels of problematic use through different behavioural routes, with women gravitating toward the socially oriented and communicative functions of the device. The convergence of a high male mean with an even higher female mean in the present data may thus reflect a context in which academic stress elevates

problematic use across the board, while gendered patterns of coping and connection nudge women somewhat higher, a possibility that the compensatory framework would predict and that the current design was underpowered to confirm.

The implications of these findings extend across theory, policy, and practice. Theoretically, the results reinforce the value of process based accounts such as the I-PACE model over static, trait like conceptions of addiction, since the uniformly high scores are more coherently explained by a shared stressful context acting on affective and self regulatory processes than by stable individual differences alone. They also suggest that gender is best modelled not as a crude main effect but as a moderating variable operating on the pathways between affect, coping, and use, in line with the direction (Elhai et al.2019; Mahato et al.2025) advocated when they foregrounded mediators and moderators over simple bivariate associations. For policy, the observation that both groups exceeded clinical screening thresholds is arguably more actionable than the gender comparison itself, because it implies that digital wellbeing initiatives in postgraduate settings should be conceived as cohort wide rather than narrowly targeted, embedded into supervision, induction, and student support rather than reserved for a presumed at risk minority. For practice, the moderate female elevation, even if not statistically significant, offers a reasonable basis for counselling and wellbeing services to remain attentive to gendered differences in how problematic use manifests, while avoiding the error of treating men as unaffected.

These contributions must nonetheless be weighed against several limitations that plausibly shaped the findings. The most consequential is the modest sample size. With only 40 participants divided equally between two groups, the study was, by the a priori power analysis, sensitive only to large effects, so the moderate difference actually observed was always likely to fall short of significance; the elevated risk of a Type II error means that the non-significant gender comparison should be interpreted with corresponding caution rather than as a firm null result. The use of purposive sampling at a single institution further constrains the generalisability of the findings, since the cohort may not represent postgraduate students in other disciplinary or cultural settings. The cross-sectional design precludes any causal inference about whether academic stress drives problematic use or the reverse, and the reliance on self-report leaves open the familiar possibility of social desirability and recall biases inflating or deflating reported behaviour. Finally, and importantly given the study's stated second aim, the analysis rested on the composite SAS-SV score, which necessarily aggregates the seven behavioural domains into a single index; this means that the domain-specific and statement-level gender differences the study aspired to

detect could not be fully examined, and any divergence of the kind Roberts et al.2014;Mahato et al. 2026) described would have been obscured by aggregation.

Several precise directions for future research follow from these limitations and findings. Most immediately, the moderate effect size observed here provides a defensible basis for a formal sample size calculation, and future studies should recruit substantially larger and preferably multi institutional samples powered to detect medium effects, so that a trend of this magnitude can be tested rather than merely glimpsed. Subsequent work should also move beyond the composite score to analyse the ten SAS-SV items individually, ideally at the level of the seven behavioural domains, in order to test directly whether men and women differ in kind rather than only in degree. Longitudinal designs would allow researchers to disentangle the temporal ordering of stress, affect, and problematic use, and thereby to test the causal pathways that the compensatory internet use theory and the I-PACE model specify but that a cross-sectional survey can only infer. The incorporation of objectively logged usage data alongside self-report would help to address measurement bias, while the inclusion of covariates such as programme of study, stage of candidature, daily usage hours, and mental health indicators would permit the mediation and moderation analyses needed to model gender as the conditional variable this literature increasingly suggests it to be. A mixed methods component, finally, would add interpretive depth by clarifying the meanings and motivations that postgraduate students themselves attach to their smartphone use, and would help to explain why, in a group united by the pressures of advanced study, the device so readily becomes something one scrolls through life with rather than simply uses.

11. CONCLUSION

This study set out with two related aims: to characterise smartphone addiction-related behaviours among postgraduate students, and to determine whether those behaviours differed between male and female students across the domains captured by the Smartphone Addiction Scale, Short Version (Kwon et al., 2013). Both aims were pursued through a cross sectional survey of 40 postgraduate students (Mahato, A.K.2026), evenly divided by gender, and analysed against the twin theoretical lenses of the compensatory internet use theory (Kardefelt-Winther, 2014) and the Interaction of Person Affect Cognition Execution model (Brand et al., 2016). The findings can be stated succinctly. Problematic smartphone use was pronounced across the cohort as a whole, with both the female group ($M = 36.10$, $SD = 4.70$) and the male group ($M = 32.40$, $SD = 7.08$) recording mean scores at or above the scale's gender specific screening thresholds. Women scored higher than men, and although this

difference fell just short of conventional statistical significance, $t(38) = 1.95$, $p = .059$, its moderate effect size, $d = 0.62$, corroborated by a convergent non parametric test, indicated a difference that is practically meaningful and most plausibly obscured by limited statistical power rather than genuinely absent.

The broader significance of these results lies less in the gender comparison than in what the uniformly high scores reveal about the postgraduate condition itself. Theoretically, the pattern strengthens the case for process based, context sensitive accounts of behavioural addiction over static, trait like conceptions, since it is the shared and demanding environment of advanced study, rather than any fixed individual disposition, that most coherently explains why an older and academically committed group should nonetheless report such elevated use. For the management of higher education, the implication is direct: digital wellbeing cannot be treated as a fringe concern affecting only a vulnerable minority, but should be recognised as a cohort wide issue with consequences for concentration, sleep, mental health, and ultimately academic productivity. In policy terms, this argues for embedding digital wellbeing literacy into supervision, induction, and student support structures, and for framing intervention as a routine part of postgraduate provision rather than a remedial response to crisis. For practice and for institutional decision making, the moderate female elevation offers a reasonable basis for counselling and support services to remain attentive to gendered patterns in how problematic use manifests, without falling into the error of assuming that men are unaffected. These conclusions must be read in light of the study's limitations. The modest and single site sample, the reliance on self-report, the cross-sectional design, and the use of a composite score in place of a domain level analysis all constrain both the generalisability and the precision of the findings, and each points clearly toward the remedy: larger, multi institutional, longitudinal, and mixed-methods studies capable of testing at the item level and modelling gender as a moderating variable. Addressed in this way, future work can convert the suggestive trend observed here into firmer knowledge. In doing so, this study advances understanding of how smartphone addiction takes hold among postgraduate students in the modern, hyperconnected academy, and it offers a modest but useful foundation for the more powerful and mechanistically informed research that a phenomenon of this reach now demands.

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