Author/s:
Nawaz, S;Linden, T;Mitchell, M;Bhowmik, J

Title:
Examining effectual, ineffectual and problematic smartphone use: A qualitative exploration of dependence and management behaviours

Date:
2026-06

Citation:
Nawaz, S., Linden, T., Mitchell, M. & Bhowmik, J. (2026). Examining effectual, ineffectual and problematic smartphone use: A qualitative exploration of dependence and management behaviours. Social Sciences and Humanities Open, 13, https://doi.org/10.1016/j.ssaho.2026.102569.

Persistent Link:
https://hdl.handle.net/11343/367300

Social Sciences & Humanities Open 13 (2026) 102569

Contents lists available at ScienceDirect

Social Sciences & Humanities Open

journal homepage: www.sciencedirect.com/journal/social-sciences-and-humanities-open

Regular Article

Examining effectual, ineffectual and problematic smartphone use: A qualitative exploration of dependence and management behaviours

Saqib Nawaz [a,*], Tanya Linden [b], Matthew Mitchell [a], Jahar Bhowmik [c]

[a] Department of Computing Technologies, School of Science, Computing and Emerging Technologies, Swinburne University of Technology, Melbourne, Australia
[b] School of Computing and IS, Faculty of Engineering and IT, The University of Melbourne, Melbourne, Australia
[c] Department of Biomedical, Health and Exercise Sciences, School of Health Sciences, Swinburne University of Technology, Melbourne, Victoria, Australia

ARTICLE INFO

Keywords:
Smartphone use
Behaviour
Addictive
Dependence
Psychological
Problematic smartphone use and dependence
Self-control
Recreation

ABSTRACT

This qualitative study examines the multifaceted influences that shape effectual, ineffectual, and problematic smartphone use, as well as the strategies individuals employ to manage their smartphone dependence. Guided by the Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), and Uses and Gratifications Theory (UGT), this research examined how cognitive, motivational, and behavioural factors interact in everyday smartphone engagement. Data were collected through semi-structured interviews with 18 adult participants, representing diverse occupational backgrounds including students, professionals, and caregivers. Participants were recruited through purposive and convenience sampling to capture variation in smartphone dependency experiences. Data saturation was reached after 16 interviews, with two additional interviews confirming thematic stability across demographic groups. Data were analysed using Braun and Clarke's reflexive thematic analysis, ensuring methodological rigour and depth through iterative coding and cross-case comparison. Findings from these studies revealed three overarching themes: (1) motivations and contexts driving smartphone use, (2) consequences of overuse across social, occupational, and wellbeing domains, and (3) management strategies reflecting varying degrees of self-regulation and awareness. Participants reported using different tactics, such as app deletion, screen-time monitoring, and physical separation, to mitigate dependence, reflecting constructs of perceived behavioural control (TPB), perceived ease of use (TAM), and goal-oriented gratification (UGT). The study provides empirical grounding for an integrative framework of smartphone behaviour, demonstrating how situational, motivational, contextual, and perceptual factors, alongside patterns of use frequency, interact to influence transitions from effectual to problematic smartphone use. These insights inform digital wellbeing interventions, behavioural models, and policy initiatives promoting balanced smartphone engagement.

1. Introduction

Smartphones have become integral to daily life, reshaping how people communicate, work, study, and socialise. For many, they are the first and last objects used each day, symbolising an intense psychological and functional attachment (Graben et al., 2020). Their use brings both benefits and risks. On one hand, smartphones enhance productivity, facilitate instant communication, support learning, and provide entertainment (Precht et al., 2024; Sánchez-Fernández & Borda-Mas, 2023). They can strengthen social connectedness, promote engagement, and reduce loneliness (Wang et al., 2023). Research has also linked daily smartphone use to positive health outcomes such as increased physical activity, improved self-perceived wellbeing, and greater mobility (Lepp et al., 2014). In education, smartphones enable interactive learning and immediate access to information, supporting autonomy and collaboration (Wang et al., 2023). However, the same accessibility and multifunctionality that make smartphones valuable also contribute to dependency and problematic use.

Problematic Smartphone Use and Dependence (PSUD) refers to excessive, uncontrolled, or compulsive use that disrupts daily functioning and wellbeing (Billieux, 2012; Elhai et al., 2017; Li et al., 2024; Nawaz et al., 2024). Individuals experiencing PSUD often report impaired concentration, reduced productivity, disturbed sleep, and increased anxiety or depression (Bauer et al., 2020; De-Sola et al., 2017; Kaviani et al., 2020). Problematic use can occur in inappropriate contexts, such as while driving, studying, or during social interactions,

* Corresponding author. Swinburne University of Technology, PO Box 218 -H23, John Street, Hawthorn, VIC, 3122, Australia.
E-mail address: saqibnawaz@swin.edu.au (S. Nawaz).

https://doi.org/10.1016/j.ssaho.2026.102569
Received 28 January 2026; Received in revised form 6 February 2026; Accepted 10 February 2026
Available online 18 February 2026

posing risks to safety, relationships, and mental health (Roehrick et al., 2023; Walsh et al., 2011). Financial consequences may also arise through impulsive in-app purchases, subscriptions, or data overuse (Ameen, 2022; Mason et al., 2022). The COVID-19 pandemic further accelerated these behaviours. During lockdowns and social restrictions, smartphones became essential tools for remote work, study, and social connection (Heyman & Kushlev, 2023; Hodes & Thomas, 2021). However, increased reliance often led to excessive screen time and psychological dependence, especially among younger adults (Nawaz, Linden, et al., 2025; Popescu et al., 2022). As professional, academic, and personal boundaries blurred, smartphones transitioned from tools of necessity to potential sources of distraction and stress (Akulwar-Tajane et al., 2020; Stoyanova et al., 2023). The pandemic context, therefore, highlights how situational pressures can amplify dependence and accelerate the shift from effectual to problematic use (Nawaz, Linden, et al., 2025).

Despite extensive research, understanding PSUD remains limited by conceptual and methodological inconsistencies. Many studies rely on cross-sectional surveys of student populations, limiting generalisability (Busch & McCarthy, 2021; Harris et al., 2020). Others equate high screen time with addiction, overlooking user motivation, situational context, and purpose (Elhai et al., 2018; Liu et al., 2018). This approach fails to capture the qualitative distinction between functional and dysfunctional use, as frequent engagement may be essential for one individual but excessive for another. As Harris et al. (2020) and Linden et al. (2021) argue that smartphone use should be classified not by duration but by intention, purpose, and outcome. To address this gap, the present study employs the conceptual continuum of effectual, ineffectual, and problematic smartphone use (Nawaz, 2023, 2024). Effectual use refers to purposeful, goal-directed engagement that enhances productivity, wellbeing, or social connection. Ineffectual use describes non-productive or aimless behaviours that undermine focus or efficiency, while problematic use represents compulsive patterns that impair daily functioning. This multilateral classification provides a dynamic understanding of smartphone behaviour, recognising that individuals may transition along this spectrum depending on situational demands, motivational states, and self-regulatory capacity. This perspective is conceptually aligned with recent proposals such as the Theory of Situation and Context (TSC), which emphasise how situational and contextual conditions shape technology use and dependence (Nawaz, Bhowmik, et al., 2025). Although TSC remains a developing framework, the findings of the present study offer empirically grounded insights that may inform its future refinement and application, particularly in understanding how contextual shifts facilitate transitions between adaptive and problematic smartphone use.

This continuum also aligns with behavioural and psychological theories that explain technology use. The Technology Acceptance Model (TAM) highlights perceived usefulness and ease of use as drivers of intentional engagement (Davis, 1989). The Theory of Planned Behaviour (TPB) emphasises behavioural intention, perceived control, and social norms influencing smartphone habits (Ajzen, 1991). The Uses and Gratifications Theory (UGT) adds a motivational dimension, explaining how individuals seek psychological or emotional rewards, such as entertainment, social validation, or escapism, through media use (Katz et al., 1973). Together, these frameworks provide complementary insights into how smartphones satisfy both functional and emotional needs, while also illustrating how gratification-seeking can override behavioural control, leading to overuse. Building on these theoretical foundations, the present study explores how individuals experience, interpret, and regulate smartphone use across the continuum from effectual to problematic. Unlike prior studies that primarily quantify use by frequency or duration, this research focuses on why and how users engage with their devices, how they distinguish between productive and excessive use, and the strategies they employ to regain control. By situating PSUD within this multidimensional TSC framework, the study advances theoretical and practical understanding of smartphone dependence. It demonstrates that problematic use stems not only from the time spent but also from the interplay of context, motivation, and self-regulation. In doing so, it offers an empirically grounded model that bridges the gap between technology acceptance and behavioural regulation, contributing to the broader discourse on digital wellbeing.

2. Background

Smartphones are deeply integrated into modern life, shaping how people communicate, work, learn, and manage their daily routines. Their multifunctionality, encompassing communication, productivity, entertainment, and health applications, has rendered them indispensable tools in contemporary society. However, while smartphones enhance connectivity and efficiency, their widespread and continuous use has raised concerns about patterns of ineffectual and problematic use (Agnihotri, 2022; Linden et al., 2021; Wolfers et al., 2023). Research increasingly documents adverse psychosocial and physiological outcomes associated with excessive smartphone engagement, including disrupted relationships, social withdrawal, anxiety, stress, and sleep disturbances (Adamczewska-Chmiel et al., 2022; Jilisha et al., 2019; Spiratos & Ratanasiripong, 2023). PSUD refers to maladaptive, compulsive, or uncontrolled patterns of use that interfere with daily functioning and wellbeing (Billieux, 2012; Elhai et al., 2017; Nawaz et al., 2024). PSUD occurs along a behavioural continuum, from normative use for communication or productivity to excessive use driven by habit, emotional regulation, or compulsion. Individuals exhibiting PSUD often prioritise phone use over essential activities such as sleep, work, or social interaction, and experience distress when disconnected (Busch & McCarthy, 2021; Wacks & Weinstein, 2021). Physical consequences, such as eyestrain, headaches, and musculoskeletal discomfort, have also been linked to prolonged use (Derakhshanrad et al., 2021; Rozgonjuk et al., 2022). However, the reported prevalence and intensity of PSUD vary considerably across studies due to inconsistent conceptualisations, methodological limitations, and diverse demographic or cultural samples (Busch & McCarthy, 2021; Sohn et al., 2019).

The COVID-19 pandemic further magnified these dynamics by intensifying global reliance on digital communication. Lockdowns and social distancing measures compelled individuals to depend on smartphones for remote work, education, and social connectivity (Heyman & Kushlev, 2023; Hodes & Thomas, 2021). While smartphones provided essential continuity and emotional connection, research also highlights increases in screen time, compulsive checking, and digital fatigue during this period (Nawaz, Linden, et al., 2025; Popescu et al., 2022). The pandemic context thus serves as a unique environmental moderator, accelerating transitions from effectual (purposeful) to problematic (compulsive) use by heightening psychological stress, social isolation, and blurred work–life boundaries (Stoyanova et al., 2023). As societies move beyond the pandemic, these intensified habits continue to shape digital behaviour, underscoring the need to examine the lasting interplay between situational and contextual stressors, motivational processes, patterns of use frequency, and users' perceptions of control and necessity in shaping dependence.

2.1. Factors influencing PSUD

PSUD is shaped by a multifaceted interaction of psychological, social, environmental, and demographic factors. Psychologically, traits such as impulsivity, sensation-seeking, and low self-esteem increase vulnerability to compulsive use (Balogun & Olatunde, 2020; Fryman & Romine, 2021). Individuals often report using smartphones as coping mechanisms for negative affect or boredom, creating feedback loops that reinforce dependency. Socially, norms of constant connectivity and expectations of immediate responsiveness exacerbate overuse, particularly in peer or professional settings where availability is perceived as a signal of reliability and belonging (Narayanan et al., 2020; Sciandra et al.,

2019). Family patterns also play a role; parental modelling and monitoring of device use influence the formation of early smartphone habits (Serra et al., 2021). Environmental and structural conditions further sustain dependency. The ubiquity of internet access, app notifications, and algorithmically designed engagement loops encourages prolonged interaction (Rakib et al., 2022; Rosen, 2013).

Workplace and educational demands blur the boundaries between leisure and professional life, legitimising extended use in the name of productivity (Abbas et al., 2019; Kim et al., 2019). At a cultural level, societal expectations shape perceptions of acceptable use: collectivist cultures often view smartphone communication as essential to maintaining social cohesion, whereas individualist contexts may emphasise autonomy and self-regulation (Akbari et al., 2021; Moqbel et al., 2023). Despite identifying numerous determinants, prior studies frequently examine these factors in isolation, resulting in fragmented and sometimes ambiguous explanations of problematic smartphone use. For example, while impulsivity is often identified as a risk factor, it remains unclear whether it precedes dependence or emerges as a consequence of habitual engagement. Similarly, social and environmental influences are rarely examined alongside cognitive and motivational processes. This fragmentation highlights a persistent theoretical gap and reinforces the need for integrative approaches that explicitly consider how behavioural control, motivation, and gratification interact within situational and contextual conditions. The present study could address this gap by offering empirically grounded insights that can inform future context-sensitive frameworks, including the recently proposed TSC, by providing a qualitative baseline for systematically examining the situational and contextual mechanisms of smartphone use.

2.2. Demographic and contextual variations

Demographic variables, such as age, gender, occupation, and parental status, significantly influence smartphone usage patterns and the risk of dependence. Adolescents and young adults, for example, are particularly vulnerable due to their developmental tendencies toward peer conformity and identity formation through digital media (Abi-Jaoude et al., 2020; Ostic et al., 2021). Adults face distinct pressures related to professional demands, multitasking, and work-life integration, which can foster stress-related dependency (Yang et al., 2022). Older adults, though typically less at risk of PSUD, encounter challenges tied to digital literacy and accessibility (Anderson & Perrin, 2017). Gender differences remain inconclusive: some studies suggest that males engage in more compulsive gaming or browsing, while others report that females exhibit greater social media dependency and emotional attachment (Busch & McCarthy, 2021; Linden et al., 2021; Nawaz et al., 2025; Oviedo-Trespalacios et al., 2019).

Occupational contexts also matter; professions requiring constant availability, such as education, healthcare, or management, can normalise hyperconnectivity (Qazi et al., 2022; Whelan & Turel, 2023). Relationship status may similarly shape behaviour, as partnered individuals often use smartphones to sustain communication, while single users may rely more heavily on social networking or dating applications. These demographic distinctions reinforce the need for situational analysis rather than universal assumptions about "excessive" use. A qualitative exploration that captures diverse lived experiences can thus reveal how situational and contextual differences shape both adaptive and maladaptive engagement patterns.

2.3. Addressing PSUD: strategies and limitations

Efforts to mitigate smartphone dependence have produced a range of technological, educational, and policy interventions, yet their outcomes remain mixed. Digital wellbeing applications, for instance, offer screen-time tracking and notification management to encourage self-regulation, but their effectiveness is limited by users' motivation and reliance on the same devices they aim to control (Chaudhary et al., 2022; Sas & Sas, 2023). Educational programs promote digital literacy and responsible usage, yet they often lack long-term behavioural reinforcement (García et al., 2022). Policy initiatives such as device bans in schools or workplaces and digital detox campaigns show short-term promise but depend heavily on compliance and contextual support (Montag & Elhai, 2023; Sanders & Scanlon, 2021). While these approaches demonstrate a growing awareness of digital wellbeing, they often overlook underlying psychological mechanisms, such as how emotional gratification, social validation, and habitual reinforcement sustain use despite adverse outcomes. Consequently, most existing interventions treat the symptoms of overuse rather than its motivational roots. To promote sustainable behaviour change, strategies must integrate insights from behavioural psychology, cognitive control theory, and public health, tailoring interventions to users' individual motivations, triggers, and life contexts (Fineberg et al., 2022; Nawaz et al., 2024).

2.4. Conceptual gaps and theoretical integration

Despite the increasing recognition of PSUD as a behavioural concern, research remains dominated by quantitative, cross-sectional designs that focus on prevalence and risk factors, with limited attention to experiential and contextual dimensions (Arrivillaga et al., 2023; Casale et al., 2023). Few studies investigate how individuals understand and manage their own use, or how they distinguish between productive, effectual engagement and problematic dependence (Busch & McCarthy, 2021; Harris et al., 2020; Nawaz, 2023). As a result, there is no unified framework that captures both adaptive and maladaptive smartphone behaviours within a single continuum. To address this, recent research has proposed conceptual models that move beyond frequency-based measures to focus on motivation, purpose, and control (Busch & McCarthy, 2021; Linden et al., 2021).

The present study builds upon this progression by integrating three established behavioural theories, the TAM, the TPB, and the UGT, to examine how psychological intention, perceived control, and motivational gratifications jointly explain variations in smartphone use. TAM elucidates functional, goal-driven engagement through perceived usefulness and ease of use (Davis, 1989), corresponding to effectual use. TPB contributes understanding of behavioural intention and self-regulation, highlighting perceived behavioural control as critical in managing overuse (Ajzen, 1991). UGT provides the affective dimension, explaining how gratification-seeking for entertainment or social validation can escalate to dependency when unregulated (Katz et al., 1973). Together, these models provide a multidimensional perspective that integrates purposeful engagement, loss of control, and emotional motivation within a single interpretive continuum.

2.5. The present study

Given these conceptual and empirical gaps, the present study seeks to explore how individuals experience, interpret, and manage smartphone use across the continuum of effectual, ineffectual, and problematic behaviours. Drawing on qualitative interviews, the study focuses on how users perceive the benefits and drawbacks of their smartphone engagement, how contextual factors (e.g., work, family, leisure) influence behaviour, and how individuals attempt to regulate or reform their use patterns. Unlike survey-based approaches, this design provides deeper insight into users' motivations, awareness, and self-regulatory strategies, offering a more holistic understanding of PSUD. Building upon these objectives, the study is guided by the following research questions:

- RQ1: How do individuals conceptualise and distinguish between effectual, ineffectual, and problematic smartphone use in their daily lives?

- RQ2: What psychological, situational, and contextual factors influence the transition between effectual, ineffectual, and problematic modes of smartphone use?
- RQ3: What strategies and coping mechanisms do individuals employ to manage or reduce PSUD?
- RQ4: How can participants' lived experiences inform the development of an empirically grounded conceptual framework integrating the TAM, the TPB, and UGT to explain smartphone dependence and management behaviours?

These research questions address the identified theoretical and methodological gaps by exploring how individuals interpret and regulate smartphone behaviours across varying situational contexts, while also highlighting the need to examine problematic use through situational and contextual dimensions such as motivation, setting, demand, frequency and perception, as proposed in the TSC (Nawaz, Bhowmik, et al., 2025).

3. Conceptual framework

This study proposes an integrative conceptual framework (Fig. 1) that combines three foundational behavioural theories, the TAM, the TPB, and the UGT, to explore the complex behavioural, motivational, and contextual dimensions of smartphone use and dependence. Rather than testing hypotheses, the framework conceptually aligns these models to interpret participants' lived experiences, offering a multidimensional understanding of PSUD within contemporary digital life.

The framework is informed by the recognition that the COVID-19 pandemic significantly intensified reliance on smartphones for work, study, and social connection. During this period, the boundary between effectual and problematic use became increasingly blurred, as individuals adopted smartphones for essential tasks yet struggled to maintain behavioural control under conditions of stress and isolation (Heyman & Kushlev, 2023; Nawaz, Linden, et al., 2025). This situational context provides a real-world backdrop for interpreting how functional motivations (TAM), social and emotional gratifications (UGT), and behavioural regulation (TPB) intersect to shape smartphone engagement patterns.

3.1. Theoretical foundations

3.1.1. Technology Acceptance Model (TAM)

Developed by Davis (1989), TAM posits that perceived usefulness and ease of use influence an individual's acceptance and sustained use of technology. Within this study, TAM helps explain how participants evaluate smartphones as tools that enhance organisation, productivity, and communication in personal and professional contexts. Perceived usefulness from TAM reflects the instrumental value of smartphones in achieving specific goals. However, rather than focusing on technology adoption, this study extends TAM as a lens for understanding functional engagement, distinguishing purposeful, effectual use from habitual or ineffectual patterns. This conceptual distinction clarifies that while usefulness represents rational, goal-oriented evaluation, other emotional or psychological gratifications (captured by UGT) may drive continued use even in the absence of utility.

3.1.2. Theory of Planned Behaviour (TPB)

Ajzen's (1991) TPB proposes that attitudes, subjective norms, and perceived behavioural control shape human behaviour. In this framework, TPB elucidates how individuals' intentions to manage or moderate smartphone use are influenced by social expectations (e.g., constant availability during remote work or study) and their perceived ability to regulate behaviour. Many participants acknowledged excessive use but felt compelled to remain connected due to external pressures, highlighting a discrepancy between their intentions and actions. TPB thus complements TAM by emphasising regulatory mechanisms and

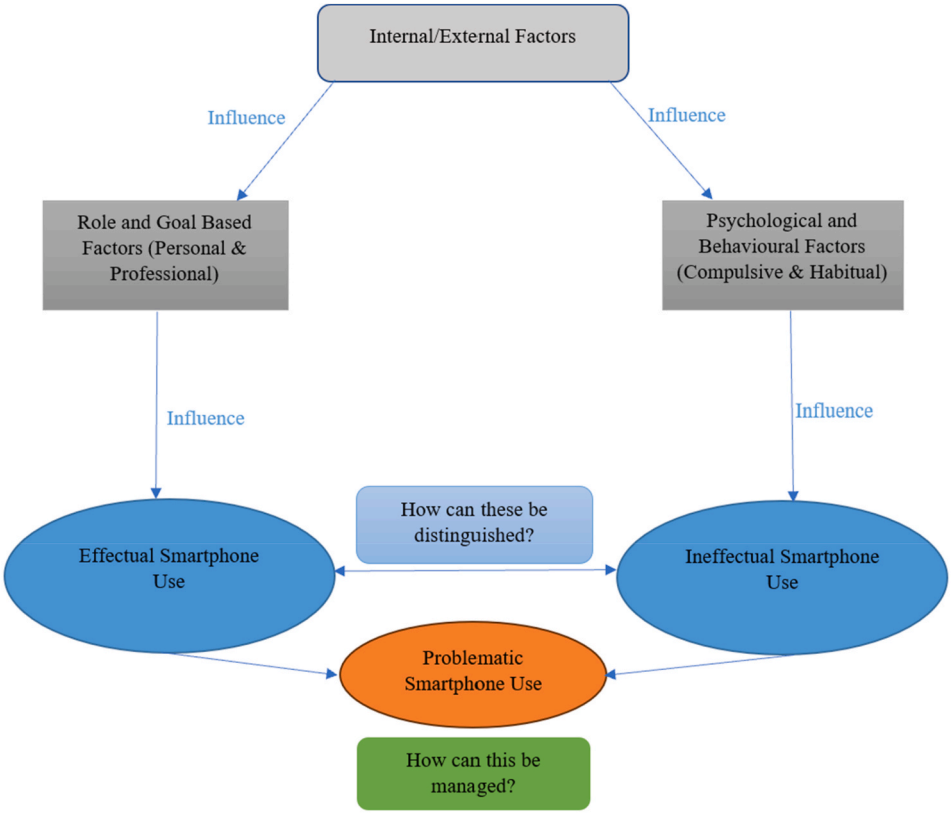

Fig. 1. Proposed conceptual framework for managing problematic smartphone use.

perceived control, illustrating how smartphone dependence persists even when users recognise its negative effects.

3.1.3. Uses and Gratifications Theory (UGT)

UGT, as explained by Katz et al. (1973), suggests why individuals actively use media to satisfy their cognitive, social, and emotional needs. Within this study, UGT helps interpret participants' motivations for seeking entertainment, social validation, or stress relief through smartphone use, patterns that were notably reinforced during the pandemic. These gratifications provide short-term satisfaction but can diminish perceived control, leading to compulsive checking and emotional dependency. UGT therefore introduces an affective dimension to the framework, capturing how psychological rewards interact with cognitive and behavioural factors in sustaining PSUD.

3.2. Integrative framework and conceptual distinctions

The integration of TAM, TPB, and UGT provides a comprehensive interpretive structure:

- TAM explains how smartphones are functionally adopted and valued.
- UGT explains why they are emotionally and socially gratifying.
- TPB explains when individuals succeed or fail in self-regulating their use.

By combining these models, the framework captures the full spectrum of smartphone engagement, from effectual to problematic, bridging functionality, gratification, and behavioural control. Supporting constructs such as habit formation, loss of control, and perceived addiction are incorporated as contextual extensions. Habit formation aligns with TPB's notion of reduced perceived control, while perceived addiction represents the maladaptive pursuit of gratification described by UGT. These elements refine the framework to better reflect the psychological realities of dependence without overextending its theoretical scope.

3.3. Empirical grounding and application

Empirical grounding for this conceptual framework is provided through qualitative interviews, which explore how participants' lived experiences align with or diverge from the assumptions of TAM, TPB, and UGT. This inductive approach allows the model to evolve from data rather than being imposed upon it. The framework guided both the development of interview questions and the thematic analysis, ensuring coherence between theory and evidence. Fig. 1 illustrates how effective use (goal-directed, controlled engagement) transitions into ineffectual or problematic use (habitual or compulsive behaviour) through shifts in motivation, control, and context. Demographic, situational, and cultural factors, amplified by the COVID-19 environment, further moderate these transitions. The resulting framework thus provides a theoretically grounded yet empirically flexible model for understanding and managing PSUD in contemporary digital life.

4. Materials and methods

4.1. Study design and participants

This study employed a qualitative, exploratory design to examine distinctions among effectual, ineffectual, and problematic smartphone use and to identify strategies for managing PSUD. Semi-structured interviews were chosen to capture the depth and diversity of participants' lived experiences, motivations, and behavioural patterns related to smartphone engagement. A purposive–convenience sampling strategy was employed to ensure the inclusion of participants representing diverse professional, gender, and demographic backgrounds, while maintaining accessibility and voluntary participation. Recruitment occurred through professional networks, academic mailing lists, and community social media platforms. Eligibility criteria required participants to be adults aged 18 years or older, residing in Australia, and regular smartphone users for at least one year. Individuals under 18 or with known medical or psychological conditions that could confound dependency patterns were excluded.

A total of 18 participants were recruited, achieving a balance of demographic representation and thematic depth. Participants ranged in age from 18 to 40 years (n = 13), with 5 aged 41 or older. The sample consisted of 10 females and 8 males, representing a range of occupational backgrounds: 12 were employed full-time, and 6 were students with part-time work. Regarding parental status, six participants were parents and twelve were non-parents. The relationship status included seven married individuals, six individuals in relationships, and five single participants. This sample diversity enabled cross-validation of themes across different situational contexts, while prioritising analytical depth over statistical generalizability (Guest et al., 2020). Data saturation was achieved after sixteen interviews, when no new codes or concepts emerged; two further interviews were conducted to confirm saturation and ensure representational completeness. This approach aligns with established qualitative research standards, where saturation is defined as the point at which additional data yield no significant new insights (Braun & Clarke, 2023; Guest et al., 2020; Naeem et al., 2024). Ethical approval was obtained prior to data collection, and all participants provided informed verbal consent.

4.2. Data collection

Interviews were conducted between mid-2023 and early 2024, either face-to-face or via Microsoft Teams, depending on participants' preferences and geographic accessibility. Each interview lasted approximately 30–45 min and was either audio- or video-recorded with the participant's consent. All interviews were conducted in English by the same researcher to ensure consistency and reliability of the data. A semi-structured interview protocol was designed based on prior literature and aligned with the study's four research questions (RQ1–RQ4). Interview questions were organised into three central domains:

1. Differentiating between effectual, ineffectual, and problematic smartphone use.
2. Identifying psychological, situational, and contextual influences shaping smartphone usage behaviour.
3. Exploring strategies for managing or mitigating smartphone dependence.

Participants were invited to describe their daily routines, including both professional and personal responsibilities, as well as the applications they used most frequently (e.g., social media, messaging, productivity, and entertainment). They were asked to reflect on the reasons for use, the contexts of overuse, the perceived consequences, and attempts to control use. Additional probes explored screen-time awareness, social and professional expectations, and perceived substitutes for smartphone use. Importantly, participants discussed how their smartphone use changed during and after the COVID-19 pandemic, highlighting the influence of lockdowns and remote work on their reliance on digital devices. Although objective usage metrics were not collected, participants' self-reported reflections on screen time provided rich qualitative insights into their perceived screen time intensity. The interviewer used time-based and contextual prompts (e.g., "How often do you check your phone during work or leisure?") to enhance credibility and consistency of recall. The detailed guidance and semi-structured interview questions used in this study are provided in the Supplementary materials (Appendix A).

4.3. Data analysis

Data were analysed using reflexive thematic analysis (Braun & Clarke, 2019, 2023), following a six-phase process: familiarisation, initial coding, theme generation, theme review, refinement, and interpretation. Interviews were transcribed verbatim by the corresponding author, who also conducted all interviews to maintain interpretive coherence. Repeated reading and listening facilitated immersion in the data and identification of recurring patterns relevant to the research aims. Initial codes captured the descriptive and conceptual features of smartphone use, including motivation, context, emotional regulation, and self-control. Codes were iteratively refined into themes that reflected the dynamic interplay between effectual, ineffectual, and problematic behaviours. Themes were continually reviewed against raw data to ensure internal consistency and distinctiveness.

Analysis was supported by NVivo and Microsoft Excel to manage data organisation and code comparison. Although the primary coding was undertaken by the lead researcher, as is standard practice in doctoral qualitative studies, the process was conducted under continuous academic supervision. Supervisors independently reviewed the evolving coding framework, theme structure, and interpretations to ensure transparency, consistency, and methodological rigour. Regular supervisory consultations served as reflexive validation checkpoints, enabling the comparison of analytic perspectives and the refinement of emerging interpretations. While formal intercoder reliability statistics were not applicable given the interpretivist orientation of reflexive thematic analysis, rigour was maintained through iterative dialogue, documentation of analytic decisions, and adherence to Braun and Clarke's principles of reflexivity and transparency.

Thematic interpretations were informed by existing theoretical frameworks (TAM, TPB, and UGT), providing coherence between empirical insights and conceptual underpinnings. To preserve anonymity, participants were assigned pseudonyms (e.g., P1–P18), with demographic details presented only in aggregated form. Although self-reported data inherently rely on subjective recall, methodological robustness was strengthened through triangulation of multiple perspectives, theoretical grounding, and iterative analytic reflection. The combination of methodological transparency, supervisory oversight, and theoretical integration ensured that findings were empirically grounded, contextually rich, and interpretively credible, consistent with established qualitative research standards (Braun & Clarke, 2023; Naeem et al., 2024).

5. Results

5.1. Smartphone usage in managing diverse responsibilities

This theme examines how participants use smartphones to manage responsibilities across family life, work, education, volunteering, and emergency preparedness. Smartphones were described as essential tools that support communication, organisation, and adaptability, particularly during the COVID-19 pandemic. Family responsibilities were a primary driver of use, with smartphones facilitating long-distance relationships, parenting coordination, and household organisation through scheduling and communication.

> ‘A daughter. With older parents, so I keep in touch with them, check in with them, support them from afar’ (P4).

> ‘There’s always communication happening. Family chat. Obviously, my wife and my kids, and then they extended well with mum’s’ (P5).

> ‘And then of course, you know, being a mother. So, looking after the two boys as well, they’re my main priorities, and then, you know, going to work again’ (P11).

> ‘Not yet, but because my husband and my son are not with me here. So as soon as they will be here, I will have a bundle of responsibilities for my son and towards my husband as well’ (P17).

Participants used smartphones for communication, monitoring, reporting, and organisation at work, while volunteers relied on them for event planning, task coordination, and networking, underscoring their organisational importance. Smartphones were also widely used for self-directed learning, particularly via platforms such as YouTube, enabling skill development and exploration beyond formal education.

> ‘Well, basically, some of my activities are mainly patrolling. Uh, surveillance through CCTV cameras. And, uh, report it to higher managers if I find any issues’ (P2).

> ‘And I am also on three boards, so I guess you know that’s not daily, but the phone does get used for part of the Football Board’ (P12).

> ‘I do use YouTube quite often these days, especially for learning as well, so I do a bit of learning online, not structured learning, but if I find, let’s say, for example, a subject that intrigues me, I’ll go on YouTube, and I’ll have a look at it’ (P18).

Smartphones were essential for emergency preparedness, enabling rapid access to real-time information, while COVID-19 lockdowns intensified reliance on them for connectivity, organisation, and adapting to new routines such as managing children's activities and maintaining remote relationships.

> ‘Actually, yeah, because, like, it happened the other day, and this is the problem. The phone I had my phone not on mute. But it was. It was low, and I missed it, and I missed it by maybe 30 to 40 minutes, so a lot could have happened during that time’ (P5).

> ‘I would say because of lockdown like it’s more frequent than I used to’ (P10).

Although all participants viewed smartphones as essential, clear distinctions emerged between effectual and ineffectual use. Effectual use was purposeful and goal-oriented, enhancing efficiency, learning, and communication, whereas ineffectual use resulted in distraction, overload, and emotional fatigue due to reduced focus and self-control. This distinction reinforces the framework, demonstrating how purpose, control, and context determine whether smartphone use remains adaptive or shifts toward dependence.

5.2. Inappropriate smartphone use and its impact on daily lifestyle activities

This theme examines how inappropriate smartphone use disrupts daily activities, including meetings, social interactions, study, and driving. Smartphone use often reduces attention and engagement, particularly in meetings and social settings. While some participants actively manage distractions, others reported habitual checking during dull or non-essential moments, leading to disengagement from face-to-face interactions, especially during meals and outings.

> ‘I have done this before. Like if I’m in a meeting and I’m finding that it’s boring or I find it hard to sit still for so long listening to someone talk, sometimes I’ll grab my phone and I’ll just be sort of browsing, like flicking, checking. I’m listening at the same time, so I’ve done that in meetings' (P11).

> ‘I’ve also experienced sometimes when you’re in a meeting … there’s general things which are not too important, and you just start seeing your phone, and even without any reason, you just start scrolling’ (P14).

> ‘Whenever I go out to meet some friends or we go out to eat, it’s just a habit. When we have ordered the food … we just start scrolling our phones instead of talking’ (P14).

'I'm pretty good at not doing that as much. If I'm out for dinner with friends, I don't put it on the table' (P10).

Smartphones are significant sources of distraction during study sessions. Notifications and the habit of checking devices hinder focus and lead to procrastination. Participants frequently noted challenges in staying productive due to smartphone interruptions.

'Probably in the evenings when I'm procrastinating studying … I'm probably conscious that I'm procrastinating too much' (P16).

'Especially when I'm studying and making some assessments, and any notification came and my phone blinks. I just leave my studies and start using my phone' (P17).

'My phone is often near me when I'm studying, and I'm very easily distracted by it. It's a big procrastination tool' (P4).

'If I'm sitting at uni and I'm in a really boring class, I'll just turn on my phone, and there goes 15–20 minutes' (P8).

Using smartphones while driving emerged as a critical concern due to its safety implications. Despite being aware of the risks, some participants admitted to occasionally using their phones while driving, while others avoided it entirely. This highlights a tension between habitual use and mindful restraint.

'I was driving home from work, and [my partner] had texted me something. It wasn't urgent, but I still looked at it' (P10).

'When I'm driving, my phone is on the holder, and when I get notifications, you feel so tempted to see those notifications, which is a bit of a distraction' (P14).'I drive and I do sometimes use my phone while driving. I know that's bad' (P6).

'I have like flicked to choose a different song while I'm on my phone, but only when I'm stationary at the lights' (P11).

'I've seen a lot of accidents happen due to phone use. I avoid using my phone unless it's absolutely urgent' (P18).

'I feel like it's unsafe, and I'm paranoid about getting caught and paying a fine. Accidents can happen in a blink of an eye' (P4).

These behaviours show how habitual checking overrides rational control, reflecting reduced behavioural control (TPB) and heightened gratification-seeking (UGT). Persisting despite known risks highlights cognitive dissonance between intention and action, marking a shift from effectual to problematic use, in which gratification outweighs situational awareness and self-regulation.

5.3. COVID-19: impact on smartphone use and digital dependency

This theme explores how the COVID-19 pandemic reshaped smartphone use, with increased reliance on digital tools for work, socialisation, and entertainment. Lockdowns and social distancing prompted heightened screen time, as participants reported greater use to maintain communication, connection, and distraction during isolation. Remote work further intensified this reliance by blurring boundaries between professional and personal life.

'I, I would say because of lockdown like it's more frequent than I used to. It increased it initially, but I think that's why I'm decreasing it now. I'm aware that it's not making me feel good' (P10).

'Because it's my only form of communication with people like sometimes [partner] says to me, you're always on your phone. And I say [partner] this is the only way I can speak to my friends and people that I can't see' (P11).

'During COVID, I would have used my phone a lot for social media just to stay connected because we couldn't see people. And I did probably spend too much time on social media' (P13).

'Before COVID, meetings would have been in person, and now you just sit, and I'm talking to screens all day. My whole life is just one Teams meeting after another at the moment' (P12).

'Yes, COVID really increases the cell phone use because people don't have much to do. They were captivated in their own houses. So, only thing we have to do to use cell phones' (P18).

Additionally, smartphones became an essential tool for entertainment, with participants turning to streaming services and social media to cope with the lack of in-person activities.

'During COVID, definitely you are sitting at home. You don't have much to do. So definitely you will use your mobile for your entertainment purposes' (P3).

'During pre-COVID, I was more socially active, but during COVID, obviously you were not allowed to go out and most of the time you were spending most of your time at home and my smartphone user did actually go up' (P14).

'If we didn't have technology, we would be in a far worse situation. No, but then we wouldn't even have the option of meeting people by Zoom or via using any of the social media apps' (P18).

'I was more aware of like how much time I am spending in front of the screens, and I also did a lot more like family stuff like going for a bike ride together or cooking together as a family' (P9).

While increased smartphone use was often seen as a practical response to the challenges of the pandemic, it also had negative consequences. Some participants acknowledged the detrimental effects of excessive screen time on their mental health and subsequently took steps to reduce their use, such as deleting social media apps or setting time limits.

'I spent like, I don't know, first 2 months of lockdown just scrolling Facebook and Instagram. And to some extent I do regret that and I deleted Facebook and Instagram altogether because I was wasting so much time' (P4).

'It's been a month now because I know that from past few months, because you know that it was all locked down and stuff. So obviously everyone needed something as a distraction, and everyone was looking at the phones and laptops and other things' (P15).

'I started putting time limits on my socials. And I'm actually quite proud to say that my average for the week on social media is only about 45 minutes' (P13).

Not all participants perceived increased smartphone use during COVID-19 negatively; for some, it strengthened connections and supported healthier routines. The pandemic underscored smartphones' dual role, enabling productivity and connection while also increasing overuse and mental strain. These shifts reflected sustained engagement driven by perceived usefulness and ease of use (TAM), reduced self-regulation (TPB), and gratification-seeking (UGT), accelerating the transition from adaptive to dependent use and highlighting key situational and motivational drivers of PSUD.

5.4. Participants' experiences of effectual, ineffectual, and problematic smartphone use

This theme examines participants' perceptions of smartphone use and its impact on productivity and wellbeing, revealing a continuum from purposeful engagement to loss of control. Effectual use supported organisation, communication, and task efficiency, whereas habitual or excessive use led to distraction, stress, and reduced wellbeing. This continuum is illustrated in Fig. 2, with representative participant quotes presented in the Supplementary materials (Appendix B – Supplementary Table 1) to ensure qualitative transparency.

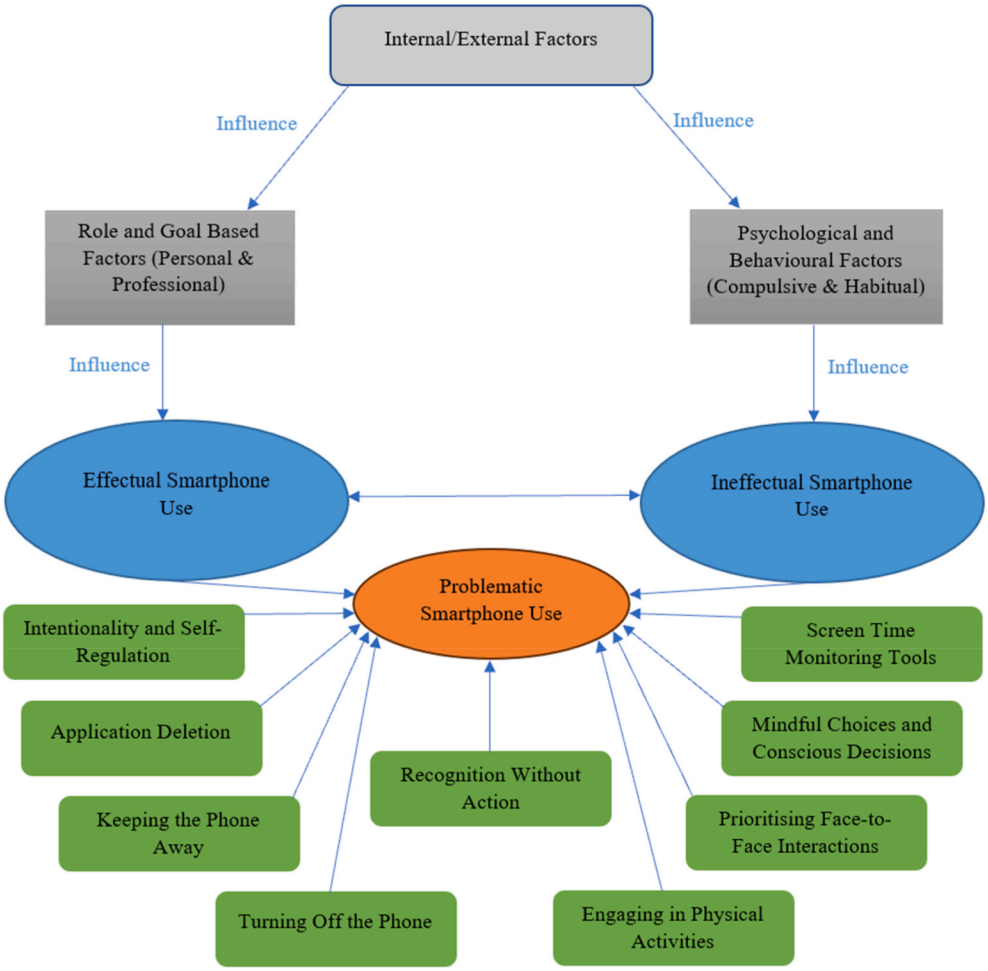

Fig. 2. An empirically grounded framework for managing problematic smartphone use.

5.4.1. *Effectual smartphone use*

Participants viewed smartphones as essential for coordinating activities, staying organised, and maintaining meaningful connections. They used productivity and communication apps to support daily routines, learning, and volunteering.

> 'I use my smartphone mainly for organising my activities in the writing group. It helps me stay on top of tasks and communicate efficiently with other members through WhatsApp and email' (P10).

> 'Being part of multiple boards and a football club, my phone helps me manage my responsibilities effectively. Calendar apps and email are crucial in keeping track of meetings and events' (P12).

> 'My studies require a lot of coordination, and my smartphone helps me keep everything organised. I use it for planning, setting reminders, and even for quick research during classes' (P6).

> 'Volunteering in a writing group, I rely heavily on my phone to manage communications and schedule meetings efficiently' (P10).

> 'In my various volunteering roles, my smartphone is essential for organising events and keeping track of responsibilities' (P12).

> 'I make sure my phone is always ready for emergencies. It's loaded with necessary contacts, and I use apps that can provide critical information quickly' (P11).

> 'Living far from my family, my phone is my lifeline. I use it for video calls, messaging, and staying connected despite the distance' (P1).

5.4.2. *Ineffectual smartphone use*

Many participants described moments when smartphone use became inefficient or distracting, often characterised by mindless scrolling, procrastination, and difficulty maintaining focus.

> 'Sometimes I find myself mindlessly scrolling through social media when I should be studying or working. It's not a productive use of my time' (P6).

> 'I use my phone strategically for study breaks, but sometimes those breaks extend longer than they should because I get caught up in apps like Instagram or Candy Crush' (P8).

> 'I set digital controls to limit my usage, but there are moments when I ignore them and end up wasting time on nonproductive activities' (P2).

> 'While at work, I try to avoid my phone, but sometimes notifications can be distracting, leading to a drop in productivity' (P14).

> 'During tutoring sessions, I sometimes get distracted by social media notifications, which takes my focus away from the students' (P4).

These examples illustrate how smartphones, though initially used for purposeful tasks, can shift toward time-wasting activities that undermine concentration and increase stress.

5.4.3. *Problematic smartphone use*

At the extreme end, participants described compulsive or disruptive behaviours, such as late-night use, constant checking during meals, or loss of control in professional settings.

'I often find myself checking my phone before bed, which disrupts my sleep patterns. It's hard to resist the urge to check notifications or scroll through social media' (P9).

'Using my phone during meals has become a habit. It's not only distracting but also affects my interactions with family and friends' (P8).

'I catch myself checking my phone during meetings, which is not only unprofessional but also means I'm not fully engaged in the discussion' (P7).

'There are times when I lack control over my phone use. I end up spending more time than planned, which affects my productivity and personal time' (P6).

'Especially when I'm studying and making assessments, and any notification came and my phone blinks. I just leave my studies and start using my phone' (P17).

These accounts reveal how overuse can compromise wellbeing, relationships, and performance, signalling a loss of self-regulation characteristic of problematic smartphone dependence.

These findings show that smartphone use operates along a behavioural continuum shaped by control, motivation, and purpose. Section 6.4 further interprets these distinctions through the integrated theoretical framework, explaining how cognitive and motivational factors drive transitions between effectual, ineffectual, and problematic use.

5.5. Balancing benefits and control: the need for smartphone management

This theme highlights participants' efforts to achieve balanced smartphone use, revealing both effective strategies and ongoing challenges. Nighttime use and leisure scrolling were commonly linked to procrastination and disrupted plans, reflecting how constant access and endless digital content complicate self-regulation during leisure time.

'I just pick up the phone and start scrolling. My phone starts seeing social media apps, and during nights, I reckon it's the most because sometimes, just for 5 minutes, I say, OK, let's check my social media, and it goes on for like 20 minutes, 25 minutes. You just lose track of the time' (P13).

'On weekends, I often spend hours in bed scrolling through Instagram, Facebook, and YouTube, delaying my plans for the day' (P3).

'I can't stop myself from using Facebook. Even when I've watched everything for the day, I find myself scrolling endlessly' (P7).

Most participants struggle with compulsive smartphone use, highlighting self-awareness about their inability to regulate usage effectively. The direct quotes below emphasise how smartphones dominate daily routines, often at the expense of productivity and self-control.

'I don't think I have control over it because I use it too much and really much addictively' (P17).

'I can't stop myself from using Facebook. Even when I've watched everything for the day, I find myself scrolling endlessly' (P7).

'I waste a couple of minutes. Then I realised that I'd have to get back to my study, and that is the most inappropriate time' (P15).

A few participants also explain how smartphone habits interrupt face-to-face interactions and social settings, challenging the quality of personal connections. The accounts below reflect the tension between digital and physical presence, with participants expressing frustration over how smartphones undermine meaningful interactions.

'Whenever I go out to meet some friends, or we go out to eat some food, it's just a habit. Like when we have ordered the food, not just me, but even other people start scrolling on our phones instead of talking and sitting next to your person, you should be talking and communicating with them' (P14).

'I don't set out any limits for myself, and I can get carried away, especially during boring classes at university. Checking my phone ends up consuming chunks of time that I could have used more productively' (P8).

Some participants described efforts to differentiate appropriate and inappropriate smartphone use across contexts such as work, study, and multitasking. The quotes illustrate how constant notifications and distractions undermine productivity, highlighting the need for clearer boundary-setting.

'I think before going to bed is not very inappropriate. But while on the job or studying, I think that's not a good thing. Especially when I'm studying and making some assessments and any notification came and my phone blinks, and I just leave my studies and everything and start using my phone' (P15).

'I'm not a massive fan of multitasking, but I find myself doing it frequently, especially when I'm on my computer or watching TV' (P1).

'I don't set out any limits for myself, and I can get carried away, especially during boring classes at university' (P8).

These perspectives underscore the complexity of managing smartphone use, as participants continually balance boundary-setting and digital distractions against the benefits of technology. Their experiences reflect an ongoing negotiation between maximising productivity and social engagement while minimising negative impacts, pointing to a broader shift toward more intentional digital use.

5.5.1. Practical strategies for managing smartphone use

This theme highlights practical strategies for managing smartphone use, grounded in participants' experiences, and offers actionable insights to promote a healthier digital lifestyle. It captures diverse approaches, including the influence of upbringing, self-imposed limits and accountability, techniques to improve focus and productivity, and the role of awareness and research in shaping behaviour. Management strategies were thematically grouped and summarised in Fig. 2 to illustrate the continuum from effectual to problematic use. Participants described responses ranging from recognition without action to intentional and mindful management, reflecting differing levels of self-regulation and behavioural control. Supporting quotations are provided in Supplementary materials (Appendix C – Supplementary Table 2), demonstrating how these categories emerged directly from participant narratives.

5.5.2. Recognising problems without action: participants' awareness and inaction towards PSUD

This theme captures participants' recognition of PSUD alongside limited efforts to address it. Although many acknowledged its negative impacts, they often lacked consistent strategies or motivation to enact change, with situational factors, ingrained habits, and personal barriers constraining action. Participants were aware of their problematic use but largely remained inactive, ranging from passive acknowledgment to explicit inaction.

'I never really look at [screen time], so I guess I could look at it and set a goal to like reduce it by a certain amount' (P10).

'Umm, actually I have not tried to be honest' (P14).

'No, I never tried it' (P17).

Participants described the habitual nature of their smartphone use as a significant obstacle. This included addictive tendencies, a lack of motivation, and personal barriers like laziness, which made it difficult to take control of their usage.

'A lot of time passes and it's like, oh, I have to go to sleep now and I've just been staring at my phone for an hour and a half' (P4).

'Apart from being lazy, yeah. Not really. I know I should do other stuff, but by the end of the day I would. Can't be bothered' (P9).

These accounts point to deeper psychological and structural barriers beyond individual motivation. References to "laziness" often reflected cognitive fatigue, depleted self-regulatory capacity, and entrenched habits reinforced by constant digital stimulation, rather than simple unwillingness. This aligns with TPB's weak perceived behavioural control and habit theory's emphasis on automaticity, suggesting behavioural inertia arises from emotional dependence, habitual reinforcement, and limited support for disconnection.

Some participants attempted to reduce smartphone use in specific contexts, such as social settings or during COVID-19 lockdowns, but these efforts were inconsistent and lacked a comprehensive strategy. A small number reported gradual improvements as awareness increased over time.

'If I'm out, then I do [control phone use], but at home, I don't' (P11).

'I avoid it during dinners with friends but use it reluctantly for tracking runs and walks for a boxing group' (P10).

'During the lockdown, I used my phone very less, but again, I'll be using the phone for taking pictures' (P18).

'I slowly kind of stopped using those social media platforms because I realised that you don't need to be in contact with everyone all the time' (P8).

These insights highlight the challenge of translating recognition into action in managing PSU, underscoring the importance of structured support and motivation to sustain digital habits. They represent one end of a behavioural continuum marked by awareness without meaningful change, constrained by low perceived control, weak motivation, or habitual reinforcement. This contrasts with Section 5.5.3, which reflects the more intentional and self-regulated end of the continuum, where users actively manage and reduce their smartphone use. Framing these behaviours as a continuum clarifies how users move between awareness, intention, and active regulation within PSUD dynamics.

5.5.3. Intentional management: using smartphones less or not at all in specific contexts

This theme explores participants' deliberate efforts to manage smartphone use by reducing or restricting it in specific contexts. Strategies included setting boundaries during social, professional, and wellbeing activities to support a healthier relationship with technology.

Participants also used time-limit apps and digital controls to monitor screen time, increasing awareness and supporting intentional regulation.

'Just recently I started putting my phone away and being really conscious of it, so I think [my screen time] has dropped a little bit' (P10).

'On Facebook and Instagram, I have a limit in terms of how much time per day that app can be opened … When I'm doing physical activity, I won't use it' (P13).

'I have put some digital controls on my phone. So, when I think I'm going over my limit, I put that mode on' (P2).

Some participants avoided using their phones during important social or professional interactions. These strategies reflected their commitment to being present and focused in these settings.

'If I'm out for dinner with friends, I don't put it on the table' (P10).

'I try to put it on the side during meetings and for my professional development, I've tried to put it upside down so even if there is any notification or something coming through, I just don't see it' (P14).

'During lectures, especially practical labs, they don't allow us to use phones' (P7).

Participants highlighted the importance of taking breaks from their smartphones to engage in outdoor activities, social gatherings, or personal development tasks. These breaks supported both physical and mental wellbeing. Some participants created structured schedules for smartphone use, integrating focused activities with controlled phone breaks to maintain productivity.

'You work more when you don't have your cell phone. You work for yourself, for your body as well … I go out, enjoy nature, walk, and all' (P16).

'Whenever I mean look when the lockdown was not there, I used to at least go on a trip or a hike at least twice a month. I'll use the phone very less, but again, I'll be using the phone for taking pictures' (P18).

'When I'm catching up with friends, no, I don't use my phone. Especially in the morning when I have to freak out, going somewhere like when I'm in a hurry or when I get panicked doing something, I just don't use my phone' (P16).

'I try and do maybe like an hour, hour and 20 minutes of really solid study and then I give myself 15 minutes to kind of switch off … I just leave my study desk and play a couple of games on my phone for 15 minutes' (P8).

'It's almost been a month that I'm trying to cut down my hours on the phone' (P15).

Participants' strategies highlight the importance of intentional smartphone management for supporting focus, productivity, and wellbeing. By identifying contexts where phone use is unnecessary, individuals establish boundaries that promote balance. These findings reflect the opposite end of the behavioural spectrum to passive awareness, with participants demonstrating strong intentionality and self-regulation. Framed as a continuum from low perceived control to deliberate, goal-directed action, this progression aligns with TPB and habit theory, clarifying how smartphone use evolves as self-awareness and control increase.

5.5.4. Purging for control: deleting apps to manage smartphone use and improve wellbeing

Participants reported managing their smartphone use by intentionally deleting apps that consumed excessive time or had adverse effects on their mental health, social connections, or finances. This strategy highlights a proactive approach to mitigating the negative consequences of smartphone use and prioritising wellbeing and productivity.

'I deleted Instagram, Snapchat, and other social media apps probably about three years ago. It was just a negative influence on my mental health, and I found that spending so much time on my screen was not helping me and was taking away from doing other activities. So, I decided, you know what, I'm gonna delete it' (P1).

'I deleted Facebook or stopped using Facebook about six years ago. I just felt like it was making me be quite passive in other people's lives. I would see things on their timeline and know they got married or had another baby, but if I saw that person in the street, I might not actually have a conversation with them. I just thought it was a really strange way to socialise, and I decided that I didn't want it in my life anymore' (P4).

'It motivated me to save. Saving the money motivated me' (P3).

By deleting apps, participants reduced distractions and created space for more meaningful activities, including hobbies, relationships, and

improved mental or financial wellbeing. Motivations for app deletion clustered around three typologies: psychological wellbeing, social disengagement from superficial interactions, and financial discipline. These reflect complementary forms of perceived behavioural control (TPB) and self-regulation, showing how participants tailored strategies to specific strains. App deletion also parallels physical separation strategies (Section 5.5.5), with both modifying digital or physical environments to reduce exposure to overuse triggers. Together, they form a dual-layered boundary-setting approach that supports intentional smartphone management and digital wellbeing.

5.5.5. Out of sight, out of mind: managing smartphone use through physical separation

Participants actively managed their smartphone use by physically distancing themselves from their devices during specific times or activities. This strategy of physical separation reflects a deliberate effort to minimise distractions, enhance focus, and establish healthier boundaries with technology.

> 'I started putting my phone away and being really conscious of it. I turned my phone off at night and only turn it back on just before I leave for work. I don't really touch it during work hours, and I turn it off at 9:30 PM every night' (P10).

> 'I try to avoid it as much as I can because if I see my phone, it's just distracting. I've tried to put it upside down during meetings and for my professional development, just so even if there is any notification, I don't see it' (P14).

> 'I probably will not when I'm exercising. Sometimes I play music or watch TV news while exercising, but I try not to look at my phone otherwise' (P18).

> 'I have to either physically put my phone in another room or in a drawer. If I can see it, then I want to look at it' (P4).

> 'I've really tried to push my phone away. Out of sight, out of mind while I am studying until I have those 15–20 minute breaks in between longer periods of study' (P8).

These accounts show that physical separation effectively reduced smartphone reliance by limiting visibility and access, helping participants minimise distractions and maintain focus during key activities such as work, study, or exercise. Simple boundary-setting tactics, such as placing phones in another room or creating phone-free periods, improved concentration, productivity, and overall balance, reinforcing mindful and intentional smartphone use.

5.5.6. Switching off for discipline: managing smartphone use through scheduled disconnects

Participants managed their smartphone use by intentionally switching off their devices at specific times to establish discipline, enhance focus, and maintain a healthier balance between technology and daily life. This proactive strategy demonstrated a commitment to minimising distractions and fostering purposeful use of time.

> 'I turn my phone off at night. I only turn it back on just before I leave for work, around 7:30 in the morning. I don't really touch it much during work hours. I'm mostly on it between 4 and 7 or 8:00 PM, and I turn it off at 9:30 PM every night' (P10).

> 'I think it's more about discipline and time management. The moment I realise that if I'm watching a video or something that is not going to add any value, either entertainment or educational or professional, I'll just switch it off' (P18).

> 'I will switch off my phone and go outside if the weather is good. But if it's raining outside and I can't do outdoor activities, then it becomes challenging. Indoor activities are often expensive, and not everyone can afford to do them daily' (P7).

Participants described deliberate efforts to disconnect from smartphones by prioritising meaningful activities and reducing distractions. By setting clear boundaries and scheduling breaks aligned with personal goals, they used planned periods of disconnection (e.g., evenings, weekends, work hours) as a temporal self-regulation strategy. Unlike spatial or technological controls, scheduled disconnects restore focus, improve sleep, and promote psychological balance, reflecting proactive behavioural planning and perceived control (TPB). This approach highlights the value of structured, time-based disengagement for sustainable digital self-management and wellbeing.

5.5.7. Staying active, staying present: managing smartphone use through physical activities

Participants managed their smartphone use by intentionally disconnecting from their devices during physical activities, thereby remaining present and fully engaged in their surroundings. This intentional separation from smartphones not only minimised distractions but also encouraged healthier lifestyles and deeper enjoyment of activities.

> 'When I'm doing physical activity, I won't use it. I generally won't take my phone out for a run or while playing basketball or doing active physical activities with the kids or coaching basketball' (P13).

> 'When the lockdown wasn't there, I used to go on trips or hikes at least twice a month. I'll use the phone very little, mostly for taking pictures. For activities like gardening or household repairs, I keep my phone inside' (P18).

> 'While I'm exercising, it's nice to not worry about what's coming through on my phone. I listen to music while running or at the gym, but it's more about prioritising and knowing when to switch on and when to relax' (P8).

> 'If I go out for groceries, for a walk, or to meet friends, I use my phone less. If I'm sitting at home doing nothing, I use my phone more' (P14).

> 'I love reading, sketching, and playing sports with my friends. These are habits I would like to bring back. I've started reading books again' (P15).

> 'Being on social media was quite addictive and didn't feel like a good use of time. I could have been learning or going for walks, breathing fresh air' (P1).

These quotes show that participants reduced smartphone use during physical activities by setting clear boundaries and prioritising immersive engagement. This not only decreased dependence but also enhanced wellbeing by promoting mindfulness and balance between digital and real-world experiences. Consistent with research in exercise psychology and digital wellbeing, physical activity helped restore cognitive resources, improve mood, and reduce attentional fatigue (Sonnentag, 2018; Sonnentag et al., 2018). These patterns align with digital detox literature, suggesting that embodied activities foster psychological resilience and emotional recovery (Syvertsen & Enli, 2020). Physical activity functioned as a self-regulatory mechanism, reinforcing autonomy and intrinsic motivation (TPB; UGT), enabling participants to replace screen-based behaviours with restorative, mindful engagement.

5.5.8. Present in person: managing smartphone use through engaging social interactions

Sections 5.5.8–5.5.10 examine participants' practical strategies for managing smartphone dependence, broadly categorised into social, cognitive, and technological strategies. Participants deliberately avoided phone use during social interactions to prioritise in-person connections, demonstrating a commitment to presence, meaningful relationships, and social wellbeing. Common strategies included keeping phones out of sight, silencing notifications, and consciously redirecting attention toward those around them.

'I leave it in my bag and I leave it on silent when I'm with people' (P10).

'When I'm meeting with friends, we don't go on phones. I don't use my phone when I'm having dinner with my family, at a restaurant, or when I'm socialising with friends' (P11).

'I generally won't look at my phone when going out with people and having drinks. It stays in my pocket, and if it buzzes, I'll check to see if it's a valid message from my wife or kids, but otherwise, I'll just put it back' (P13).

'When I'm with friends in person, I put my phone aside or leave it in my bag' (P4).

'I haven't lost the ability to socialise in person, and if I'm having a great time, I won't look at my phone. When I'm out for a work dinner, I won't sit on my phone at the restaurant. When I'm on the court, the watch is off, the phone's in the bag, and I don't even think about it' (P12).

'Not when I'm catching up with friends' (P16).

'I make it a point not to use my phone, especially when interacting with friends or family. Even if I see myself reaching out to the phone, I'll make a mental note not to do that' (P18).

'Earlier, my first priority was to go out with friends and socialise, but COVID changed that. I'm trying to change it back to normal' (P15).

'I should limit my time on social media and use my phone for productivity instead' (P14).

'During COVID, I found social media to be a negative influence. I don't multitask when it comes to my phone; I won't be talking to someone and texting' (P1).

'I probably always had the same amount of time on my phone, but social media became less important. I realised I don't need to text people all the time who aren't a big part of my life' (P8).

Participants' management of smartphone use during social interactions reflects a commitment to strengthening in-person connections and limiting digital distraction. Through intentional boundary-setting, they prioritised presence and engagement, demonstrating social mindfulness, the deliberate preference for real-world interaction over mediated communication. This aligns with wellbeing research showing that reduced smartphone presence enhances empathy, attention, and social cohesion (Kushlev et al., 2019; Przybylski & Weinstein, 2013). Whereas the following section focuses on individual self-regulation, this theme emphasises relational presence and the social dimensions of mindful technology use.

5.5.9. *Mindful choices: prioritising presence over phone use in daily life*

This theme examines participants' mindful approaches to smartphone use, reflecting intentional efforts to remain present, focused, and engaged. Prioritising real-world activities over digital distractions, participants drew on personal values, upbringing, and context-specific strategies to limit interruptions and enhance productivity. These accounts demonstrate how accountability, structured downtime, and intentional boundaries support purposeful goal pursuit over constant connectivity.

'At home, probably not. That's mindful because you have nothing else to do, really. I actually enjoy my phone here' (P11).

'I haven't lost the ability to socialise in person, and if I'm having a great time, I won't look at it. It's more about that distraction, or if you've got lots on, you think I just need to check this' (P12).

'When I'm on my tram home from work, I'll flick through my phone and answer messages. When I get home, I don't really spend a lot of time on my phone. I'm doing other things like working, doing jobs around the house, watching a movie, or random other activities' (P1).

'I try to do an hour or hour and 20 minutes of solid study and then give myself 15 minutes to switch off. I leave my study desk, sit on the couch, and play a few games on my phone to relax my mind before getting back to study. This approach helps me maintain productivity' (P8).

'I don't listen to podcasts or books when I'm working because that affects my concentration, but having music in the background is something I've always done. I would read more books if I didn't use my phone so much' (P4).

'My mum was very much just like you don't have your phone next to your bed. You know when you're asleep at night? You, you know, you put it away when you study' (P1).

In contrast to Section 5.5.8, this theme focuses on individual mindfulness and self-regulation in managing attention, productivity, and focus. Participants demonstrated behavioural awareness and self-control consistent with mindfulness-based approaches to digital wellbeing (Choi et al., 2025; Yang et al., 2024). These practices reflect internally driven habits shaped by personal values, upbringing, and lived experience, underscoring the role of intentional choice in reducing distraction, maintaining balance, and fostering healthier relationships with technology.

5.5.10. *Monitoring moderation: using screen-time features to manage smartphone use effectively*

This theme examines how participants used screen-time features to regulate smartphone use and balance digital engagement with other priorities. Participants described using structured monitoring, gradual reduction, and app-based controls to block distractions and maintain focus. These approaches fostered self-awareness, intentional use, and moderation, though maintaining consistency remained challenging for some. Screen-time features reflect a broader shift toward intentional digital behaviour that combines self-discipline with accessible technological support.

'I don't really look at my screen time on my phone. I could set a goal to reduce it, which could be helpful' (P10).

'I use these limits to step down from 8 hours to 6 hours, aiming to reduce phone use' (P7).

'I became busier and had better things to do. I use screen time to monitor myself and stay on top of things' (P8).

'It's easy to set app limits and review weekly usage. It helps me stay present and in control' (P10).

'People who've known me before and after noticed a difference. I'm more grounded and focused now' (P1).

'I use these controls to block unproductive apps like Instagram or Facebook when I exceed my limits' (P2).

Participants' experiences reflect the effectiveness of screen-time features as tools for self-regulation, blending technological aid with personal accountability. Their approaches underscore the importance of proactive management in fostering healthier relationships with smartphones.

Together, Sections 5.5.8–5.5.10 identify a tripartite typology of smartphone management strategies: social strategies prioritising interpersonal presence; cognitive strategies emphasising self-regulation and mindfulness; and technological strategies using tools such as screen-time features and app limits. This classification shows how relational, psychological, and technological mechanisms are combined to manage smartphone dependence across contexts, enhancing interpretive coherence and aligning adaptive practices with behavioural intention (TPB),

self-regulation (UGT), and perceived control (TAM).

6. An empirically grounded framework for managing PSUD

The theoretical model presented in Fig. 2 integrates qualitative evidence from participant interviews to capture the multifaceted influences on smartphone use. Organised into Influencing Factors, Identification, and Management Strategies, the framework illustrates how effectual and ineffectual use may progress to problematic use and how such behaviours are managed. Drawing on the TAM, TPB, and UGT, the model is empirically grounded in lived experience rather than statistical validation.

6.1. Influencing Factors

6.1.1. Role- and goal-based factors

Participants' smartphone use was strongly shaped by role- and goal-related demands, including family responsibilities, work obligations, education, volunteering, and social coordination. Across these contexts, smartphones were consistently perceived as essential tools for organising tasks, maintaining communication, and managing competing responsibilities. This aligns with perceived usefulness (TAM), as smartphones were adopted to enhance efficiency, alongside perceived behavioural control and subjective norms (TPB), where digital availability was seen as necessary to meet role expectations. For example, participants described relying on smartphones to coordinate family and household responsibilities: *"My phone is essential for coordinating my children's activities and school schedules"* (P13). Similar role-driven reliance was evident in professional and community contexts, where smartphones enabled ongoing coordination and responsiveness: *"WhatsApp groups are vital for planning community events and meetings"* (P4). Educational and learning-related goals also shaped effectual smartphone use. Participants described using their devices to access information, collaborate, and support academic tasks, reinforcing TAM's perceived usefulness: *"During my study sessions, I use my phone for research and collaboration with classmates"* (P2). These uses also reflect cognitive and social gratifications central to UGT, as smartphones supported both learning and connection.

Collectively, these role- and goal-based factors illustrate how smartphones become embedded in everyday functioning. While such integration often supports effectual use, it simultaneously normalises constant accessibility and multitasking. Within this framework, these influences represent foundational drivers that enable productivity and social participation but also create conditions in which self-regulatory demands increase, heightening vulnerability to ineffectual or problematic use over time.

6.1.2. Psychological and behavioural factors

Participants frequently described smartphone use as habitual and, in some cases, compulsive, shaped by automatic routines and emotional states rather than deliberate intention. Habitual checking and mindless engagement reflected perceived ease of use (TAM) and weakened perceived behavioural control (TPB), where use occurred with limited conscious awareness. As one participant noted, *"I tend to check my phone frequently, even without any notifications, just out of habit"* (P5). Emotional drivers further influenced smartphone engagement, particularly in response to stress, boredom, anxiety, or loneliness. These patterns align with UGT, where smartphones function as tools for affect regulation and reassurance. Participants described increased use during periods of emotional vulnerability, such as *"When I'm feeling lonely, I spend more time on social media to feel connected"* (P12) and *"If I'm anxious, I tend to check my phone more frequently for reassurance"* (P10).

Despite these tendencies, some participants demonstrated context-specific self-regulation, intentionally limiting smartphone use during work or structured activities. This reflects stronger perceived behavioural control (TPB) and conscious boundary-setting, as illustrated by one participant who stated, *"I have a disciplined approach to using my phone during work hours"* (P6). Psychological and behavioural factors operated along a continuum, ranging from automatic, emotion-driven use to intentional, regulated engagement. Within the proposed framework, these dynamics illustrate how habitual patterns and emotional triggers can erode control over time, while self-awareness and contextual discipline can moderate the progression toward problematic smartphone use.

6.2. Distinguishing smartphone use

Smartphone use in this study is best understood as a continuum comprising effectual, ineffectual, and problematic patterns, shaped by psychological, behavioural, and contextual influences. Rather than discrete categories, participants moved along this continuum depending on motivation, situational demands, and emotional state. This typology provides an analytically structured lens grounded in the TAM, TPB, and UGT. Effectual use reflects goal-directed, purposeful engagement, supported by perceived usefulness (TAM) and instrumental gratifications (UGT). Ineffectual use represents a transitional phase, characterised by habitual or emotionally driven engagement and weakened perceived behavioural control (TPB). Problematic use emerges when these patterns become entrenched, resulting in dependency, impaired self-regulation, and negative consequences for wellbeing. By synthesising these patterns, the framework explains why and how smartphone use shifts from adaptive to maladaptive, moving beyond purely descriptive accounts. Detailed thematic categories and illustrative quotes are provided in the Supplementary materials (Appendix B – Supplementary Table 1).

6.2.1. Effectual smartphone use

Effectual smartphone use was characterised by intentional, regulated engagement that supported work, study, communication, and well-being. Participants described using smartphones strategically to organise tasks, access information, and coordinate activities, while maintaining boundaries to prevent interference with other life domains. These behaviours align with TAM's perceived usefulness and UGT's goal-oriented gratifications and are underpinned by strong perceived behavioural control (TPB). As one participant noted, *"For studies, my phone is an invaluable resource for quick access to information and collaboration"* (P8), while another emphasised deliberate boundary-setting: *"I limit my phone use during meetings to ensure I'm fully present and engaged"* (P7). Analytically, an effectual use reflects high intentionality and self-regulation, with smartphone engagement remaining functional and outcome-oriented. However, participants also acknowledged that sustained reliance without boundaries could blur work–life boundaries, increasing the risk of a transition toward ineffectual use.

6.2.2. Ineffectual smartphone use

Ineffectual smartphone use represented a middle position on the continuum, behaviours that were not yet pathological but showed reduced control and growing emotional reliance. Participants described impulsive checking, prolonged scrolling, and use as a coping response to boredom, stress, or fatigue. These patterns reflected diminished perceived behavioural control (TPB) and gratification-seeking motives (UGT), rather than deliberate goal pursuit. For example, participants reported *"losing track of time scrolling late at night"* (P5) and struggling with concentration due to constant checking (P4). Importantly, ineffectual use differed from effectual use not by application type, but by intentionality and regulation. Thematic analysis identified recurring manifestations of ineffectual use, including passive browsing, temporal displacement, and social interference. Together, these patterns signalled a shift from functional engagement toward emotional coping, increasing vulnerability to problematic dependence. Supporting evidence is summarised in the Supplementary materials (Appendix B – Supplementary Table 1).

6.2.3. Problematic smartphone use

Problematic smartphone use emerged when ineffectual behaviours became habitual, intrusive, and emotionally dysregulated, leading to disruptions in productivity, relationships, sleep, and wellbeing. Participants described persistent distraction, interpersonal conflict, and emotional irritability associated with excessive use. Although smartphones continued to be perceived as "necessary," this rationalisation masked declining self-regulation and escalating dependency. As one participant reflected, *"My productivity at work has decreased because I'm constantly distracted by my phone"* (P11), while others linked overuse to relationship strain and sleep disruption (P13; P5). Analytically, problematic use was defined less by frequency than by loss of intentionality and functional value. It represents a convergence point at which initially effective motivations (e.g., productivity, connection) become maladaptive drivers of compulsion.

Synthesising across the continuum, the analysis demonstrates that:

- **Effectual use**: high intentionality, strong control, positive outcomes
- **Ineffectual use**: reduced control, emotional coping, emerging dysfunction
- **Problematic use**: loss of control, dependency, adverse outcomes

This typology clarifies how motivation, control, and purpose differentiate adaptive from maladaptive smartphone engagement, providing a coherent theoretical foundation for refining the proposed framework and guiding future empirical research.

6.3. PSUD management strategies

Participants described a range of strategies to manage PSUD. Rather than discrete techniques, these strategies clustered into four higher-order regulatory mechanisms reflecting varying levels of awareness, intentionality, and behavioural control. Mapping these mechanisms to the TAM, TPB, and UGT clarifies how recognition, self-regulation, and motivational realignment interact in managing smartphone dependence. Across participants, management strategies reflected a progression from awareness without action to intentional behavioural regulation, supported by technological affordances, social norms, and alternative gratifications. Illustrative quotations are provided in the Supplementary materials (Appendix C – Supplementary Table 2).

6.3.1. Recognition without action

Some participants acknowledged excessive smartphone use but struggled to act, reflecting low perceived behavioural control and self-efficacy despite awareness. As one participant noted, *"I know I use my phone too much, but I haven't done anything about it yet"* (P11), while another stated, *"I'm aware of my excessive use, but it's hard to change my habits"* (P8). This pattern reflects cognitive dissonance and the TPB "intention–action gap," where recognition of the problem does not translate into behavioural change due to limited perceived control.

6.3.2. Intentionality and self-regulation

Some participants deliberately limited smartphone use, reflecting strong self-regulation (TPB) supported by perceived ease of use (TAM). For example, *"We used to hand over our phones to our mum to ensure we completed our tasks first"* (P1), and *"I try to minimise phone use during work hours to stay focused"* (P14). These behaviours demonstrate intentional self-management driven by perceived control and utility, alongside UGT's goal-oriented gratifications, as participants prioritised productivity, social connection, and wellbeing through offline engagement.

6.3.3. Application deletion

Deleting apps functioned as a self-regulation strategy (TPB) and selective gratification management (UGT), reducing exposure to overuse triggers. As participants noted, *"I deleted social media apps that were consuming too much of my time"* (P7) and *"Removing gaming apps helped me reduce unnecessary screen time"* (P2). These actions reflect rational recalibration of app usefulness (TAM), redirecting engagement toward more meaningful forms of gratification.

6.3.4. Keeping the phone away

Physically distancing the phone functioned as a behavioural control strategy (TPB), reducing accessibility and supporting self-imposed limits through ease of use (TAM). As participants noted, *"I keep my phone in another room when I need to focus on work"* (P14) *and "During family meals, I leave my phone in a different room"* (P3). This reflects environmental structuring to enhance self-control (TPB) and the intentional prioritisation of offline gratifications such as presence and social connection (UGT).

6.3.5. Turning off the phone

Turning off the phone reflected active self-regulation (TPB) enabled by technological affordances (TAM). As participants noted, *"I turn off my phone during certain hours to limit distractions"* (P10) and *"Switching off my phone at night helps me sleep better"* (P12). These practices show intentional control over device accessibility, supporting health, rest, and mental balance through selective gratification (UGT).

6.3.6. Engaging in physical activities

Replacing smartphone use with physical or social activities reflects a shift from digital to intrinsic gratifications (UGT), supported by behavioural intention and control (TPB). As one participant noted, *"I engage in outdoor activities to reduce my screen time"* (P14), while another stated, *"I joined a gym to spend less time on my phone and focus on fitness"* (P8). This substitution-based regulation highlights a shift in motivation from passive consumption to active, fulfilling alternatives.

6.3.7. Prioritising face-to-face interactions

Participants prioritised face-to-face interaction, reflecting social norms (TPB) and social gratifications (UGT). As one noted, *"I prioritise face-to-face interactions over phone use during gatherings"* (P3), while another explained, *"Spending quality time with family reduces my need to be on my phone"* (P6). These strategies show how normative expectations and intrinsic rewards, such as connection and belonging, reduce reliance on smartphones for emotional fulfilment.

6.3.8. Mindful choices and conscious decisions

Mindful smartphone use was associated with heightened behavioural control (TPB) and intentional gratification management (UGT). As participants noted, *"I make conscious decisions to limit my phone use to maintain focus"* (P2) and *"Mindful use of my phone helps me avoid unnecessary distractions"* (P5). These practices align with TAM, showing how awareness is translated into self-regulatory routines that sustain balanced smartphone engagement.

6.3.9. Screen time monitoring tools

Monitoring tools reinforced behavioural control through ease of use (TAM) and feedback (TPB). As participants noted, *"I use screen time monitoring to stay aware of my usage habits"* (P16) and *"Screen time reports help me understand and reduce my excessive use"* (P9). These tools operationalised self-awareness, enabling users to align their behaviour with desired gratifications (UGT) and to strengthen their perceived control.

6.3.10. Summary of theoretical integration

Across all strategies, the findings show that effective PSUD management occurs at the intersection of TAM, TPB, and UGT:

- TAM explains the adoption and usability of digital tools for self-regulation.
- TPB elucidates behavioural intention, self-efficacy, and social norms guiding mindful use.

- UGT accounts for the underlying gratifications and motivational shifts that sustain balance.

Together, these models provide a coherent theoretical explanation of how individuals recognise, regulate, and reconfigure smartphone use behaviours to prevent dependence.

6.4. Empirical grounding of the model

The empirical data from participants' interviews provide grounded, exploratory support for the proposed integrative conceptual framework (Fig. 2), demonstrating its relevance and applicability to real-world experiences. The qualitative findings illustrate how commitment-based, circumstantial, psychological, and behavioural factors shape transitions along a continuum from effectual to problematic use, consistent with TAM, TPB, and UGT. Participants also described management strategies, such as app deletion, physical activity, screen-time limits, and intentional disconnection that align with perceived control, ease of use, and goal-oriented gratifications. Together, these qualitative insights provide preliminary, empirically grounded support for the framework's coherence and applicability, offering a foundation for future quantitative validation.

7. Discussion

This qualitative study examines how smartphones are embedded in daily life, highlighting their functional value and potential for dependence. Thematic analysis identified interrelated instrumental, social, and affective dimensions of use. Interpreted through TAM, TPB, and UGT, the findings illuminate the psychological, behavioural, and motivational processes underlying both effectual and problematic smartphone use.

7.1. Reasons for overall smartphone use

Participants described smartphone use as driven by daily responsibilities and personal needs, with devices viewed as essential for managing household tasks, parenting, and maintaining family connections. These patterns align with the distinction between instrumental and ritualistic uses of technology (Hiniker et al., 2016). Instrumental use reflects perceived usefulness (TAM), while ritualistic use corresponds to gratification-seeking motives that satisfy social and emotional needs (UGT). Smartphones were also central to professional, educational, volunteering, and community activities, supporting coordination, learning, and collaboration. These goal-oriented uses exemplify effectual smartphone behaviour reinforced by perceived usefulness, behavioural intentions, and subjective norms (TPB), consistent with prior research highlighting smartphones' role in skill development and professional advancement (Middelweerd et al., 2015; Tanil & Yong, 2020). Lockdown conditions further intensified reliance on smartphones for communication and organisation, reinforcing their dual role as functional tools and emotional anchors shaped by perceived utility, social expectations, and affective gratification. These findings demonstrate that smartphone engagement extends beyond habitual behaviour, representing intentional actions shaped by perceived utility, social expectations, and emotional gratification. Thus, smartphones fulfil intertwined cognitive, affective, and social roles that structure modern daily life.

7.2. Consequences of problematic smartphone use

Participants reported adverse consequences of excessive or contextually inappropriate smartphone use across personal, social, educational, and occupational domains. Interpreted through TAM, TPB, and UGT, these outcomes reflect imbalances between perceived usefulness, behavioural control, and gratification-seeking. Smartphone use during meetings emerged as a key distraction, with compulsive checking driven by boredom or curiosity indicating reduced perceived control (TPB), consistent with findings that attention shifts are often triggered by anticipation rather than notifications themselves (Heitmayer, 2020). In social contexts, smartphones were viewed as both enabling and disruptive. While some participants avoided phone use during meals or gatherings to preserve social presence, others reported habitual use that diminished conversational quality, reflecting tension between subjective norms of attentiveness (TPB) and social gratifications from constant connectivity (UGT), consistent with mobile etiquette research (Moser et al., 2016).

Within educational settings, smartphones functioned as double-edged tools, supporting note-taking and research while also facilitating off-task browsing. This duality reflects TAM's paradox: perceived usefulness drives adoption, but ease of use enables distraction, and weakened perceived control (TPB) undermines focus. Prior research similarly shows that restricted access can hinder learning (Ifeanyi & Chukwuere, 2018), whereas frequent phone use during study negatively affects academic performance (Wang et al., 2023). Safety-related behaviours, particularly smartphone use while driving, further highlighted this tension. Some participants acknowledged occasional checking despite known risks, while others adopted precautionary strategies, reflecting variation in behavioural intention and control (TPB). Supporting this, Okati-Aliabad et al. (2024) report widespread mobile phone use among drivers.

Synthesising these findings, problematic smartphone use was conceptualised across four domains: cognitive and productivity disruptions; social and interpersonal disruptions; behavioural and safety disruptions; and physiological and wellbeing disruptions. This typology underscores that problematic use is shaped less by time spent than by diminished behavioural control, motivational intent, and emotional gratification. Through TAM, TPB, and UGT, smartphones emerge as both enablers and disruptors, underscoring the need for interventions that strengthen self-awareness, promote digital balance, and align intentions with mindful technology engagement.

7.3. COVID-19 pandemic influence

The COVID-19 pandemic reshaped smartphone use, intensifying reliance on social connections, work, and entertainment during lockdowns. Within the framework, the pandemic acted as a contextual moderator by amplifying perceived usefulness (TAM), altering behavioural intentions and control (TPB), and reshaping gratifications sought (UGT). Consistent with Heyman and Kushlev (2023), participants reported greater wellbeing when smartphones were used for complementary purposes, indicating a shift toward adaptive use. However, many initially increased use to mitigate isolation before recognising negative effects on mental wellbeing and attempting to reduce screen time, aligning with Pandya and Lodha (2021). The rapid digitalisation of work and increased use of streaming media further reflected UGT-driven diversional gratification, occasionally reinforcing maladaptive coping through habitual entertainment use.

Despite these risks, participants recognised technology's positive role in maintaining communication, continuity, and productivity during disruption. This duality reflects the coexistence of effectual and ineffectual smartphone use, with devices acting as both coping aids and sources of dependency. While some participants developed healthier post-lockdown habits, others reported lasting benefits from remote interaction and shared online activities. These patterns are supported by Gupta and Singharia (2021), Karl et al. (2022), Lal et al. (2021), and Nawaz et al. (2023), who show that COVID-19 reshaped smartphones' role in sustaining relationships and routines. Rather than directly causing PSUD, the pandemic amplified pre-existing behaviours and gratifications, underscoring the tension between digital resilience and fatigue and reinforcing COVID-19 as a situational moderator within TAM, TPB, and UGT.

7.4. Productivity and wellbeing

This theme highlights smartphones' dual impact on productivity and wellbeing, showing how effective management supports efficiency while excessive use undermines mental health. Interpreted through TAM, TPB, and UGT, the findings demonstrate that outcomes depend on behavioural control and motivational intent. Participants reported using smartphones for coordination, tutoring, and professional communication, reflecting perceived usefulness and cognitive gratification (TAM; UGT), consistent with prior research on collaboration and workflow optimisation (Haraty et al., 2016). These uses represent effectual engagement aligned with personal and professional goals. However, participants also described drifting into unproductive browsing and prolonged social media use during work or study, echoing findings from India and Finland (Chaudhary et al., 2022; Lonka et al., 2016). This shift from intentional to impulsive use reflects weakened perceived behavioural control (TPB), as immediate hedonic and social gratifications override task-oriented goals (UGT). Paradoxically, TAM's perceived ease of use further heightens vulnerability to distraction, enabling both efficiency and compulsion depending on context and motivation.

Problematic smartphone use extended into daily routines, with behaviours such as phone checking during meals, meetings, and before sleep disrupting attention, social engagement, and rest, thereby reducing overall wellbeing. This aligns with Moser et al. (2016), who show that social norms shape mobile etiquette and that phone use during interactions can erode relational quality. Within this framework, these behaviours reflect diminished behavioural control (TPB) and affective gratification-seeking (UGT), in which short-term reassurance outweighs sustained wellbeing. Despite this, participants reported growing awareness and attempts to restore balance through strategies such as limiting nighttime use, setting screen-time limits, practising mindfulness, and prioritising in-person interaction. These actions indicate regained self-regulation and a shift from ineffectual to effectual use, aligning technology use more closely with wellbeing goals and providing novel empirical insight into user-driven PSUD management strategies.

By linking regulation strategies such as digital distancing and mindfulness to TAM, TPB, and UGT, this study extends understanding of how smartphone use can both support and undermine wellbeing. The findings show that productivity and mental health depend less on time spent than on perceived control, intentions, and gratifications sought. Smartphones thus emerge as dual-use tools, supporting productivity and connection when used intentionally, but contributing to stress, fatigue, and social disconnection when mismanaged, highlighting the importance of reflective, self-regulated use in an increasingly digitised world.

7.5. Managing PSUD effectively

This study reveals how participants managed smartphone use across contexts through diverse strategies shaped by motivation and control. Interpreted through the integrated framework, these approaches show how perceived behavioural control (TPB), perceived ease of use (TAM), and goal-oriented gratifications (UGT) jointly influence digital self-regulation. Management ranged from passive awareness of overuse to deliberate regulation supported by personal discipline, environmental structuring, and technological tools. Many participants acknowledged excessive use but took limited action, illustrating an awareness–action gap linked to low perceived behavioural control (TPB). In contrast, others adopted proactive strategies such as avoiding phone use during social interactions or exercise, reflecting regained control and the pursuit of non-digital social and physical gratifications (UGT). App limits and digital wellbeing features were commonly used to establish boundaries, aligning with TAM's emphasis on ease of use and supporting self-regulatory behaviour, consistent with Goodin (2018) and Sutton (2020).

App deletion, physical separation, and scheduled disconnection further reduced compulsive use by restructuring digital and physical environments, exemplifying behavioural control (TPB) and gratification management (UGT). Time-based disconnection aligns with evidence from Eg et al. (2023), while engagement in physical and face-to-face activities shifted gratification toward embodied and social experiences, reinforcing wellbeing and relational presence (Mela, 2024). Most participants demonstrated mindful, balanced technology use supported by screen-time monitoring and intentional prioritisation of meaningful activities. Consistent with Pandya and Lodha (2021) and Wilmer et al. (2017), these tools enhanced awareness and self-efficacy by linking feedback to behavioural intention. Effective PSUD management thus depended not only on available tools but on alignment between motivation, perceived control, and meaningful gratification, illustrating a transition from reactive dependence to proactive digital wellbeing through the interplay of TAM, TPB, and UGT.

7.6. Demographic and cultural influences on smartphone use and management

Demographic and situational factors strongly shaped smartphone use and management, with age, gender, occupation, parental status, and relationship context influencing both dependence and regulation strategies. This supports prior work emphasising the contextual and cultural variability of technology engagement (Elhai et al., 2017; Kuss et al., 2018; Montag & Walla, 2016). Younger participants (18–40) reported higher dependency and difficulty managing distractions, consistent with evidence linking youth, social media use, and multitasking to problematic use (Horwood & Anglim, 2019; Lopez-Fernandez et al., 2017). In contrast, participants aged 41 and above demonstrated more selective, goal-oriented use and stronger self-regulation, aligning with findings on higher digital literacy and purposeful engagement among older adults (Kim et al., 2020). Gendered patterns were evident: female participants emphasised relational and emotional use consistent with UGT (Kuss et al., 2018; Roberts et al., 2014), while male participants more often cited productivity- and information-driven use aligned with TAM (Chen et al., 2020). However, both groups exhibited similar compulsive checking, supporting evidence that dependence mechanisms transcend gender once psychological triggers converge (Elhai et al., 2021).

Occupational and family roles further moderated behaviour. Full-time employees reported blurred work–life boundaries and adopted boundary-setting strategies, consistent with research on technostress and digital presenteeism (Ninaus et al., 2015; Ohly & Latour, 2014). Students and part-time workers were more susceptible to distraction, a finding that echoes prior research on academic impairment linked to excessive smartphone use (Chaudhary et al., 2022; Wang et al., 2023). Parents viewed smartphones as indispensable yet experienced guilt when use interfered with family interaction, reflecting parental technoference (McDaniel & Radesky, 2018; Radesky et al., 2018). Participants without dependents reported more discretionary, entertainment-focused use, consistent with links between singlehood and higher recreational screen time (Ding et al., 2024). These patterns underscore that smartphone use is shaped by social roles, life stages, and context. Integrating TAM, TPB, and UGT provides a unified explanation of this demographic variability, highlighting that effective self-regulation and digital wellbeing depend on both personal agency and contextual moderators rather than one-size-fits-all approaches (Elhai et al., 2017; Kuss et al., 2018; Montag & Walla, 2016).

7.7. Theoretical implications

This study advances theoretical understanding of smartphone use and dependence by proposing an integrative framework that explains how behavioural patterns and management strategies unfold along a continuum from effectual to problematic use. Drawing on the TAM, TPB, and UGT, the framework demonstrates how technology acceptance, behavioural regulation, and gratification-seeking dynamically interact

in everyday smartphone engagement. TAM elucidates how perceived usefulness and ease of use support productivity while simultaneously enabling overreliance; TPB highlights the influence of behavioural intentions, social norms, and perceived control in shaping regulation efforts; and UGT captures how cognitive, emotional, and social gratifications can transition from adaptive to compulsive forms. Together, these perspectives provide a coherent explanation of how cognition, motivation, and volition jointly shape digital behaviour. Beyond integrating established theories, this study provides important groundwork for future theoretical development by empirically foregrounding the role of situational and contextual factors in smartphone use. Participants' accounts consistently showed that transitions between effectual, ineffectual, and problematic use were contingent on situational demands, environmental settings, role expectations, and temporal pressures. These findings align closely with the core premises of the TSC, which proposes that motivation, situation, context, frequency and perception jointly determine when smartphone use remains functional or becomes problematic. While TSC remains a developing framework, the present study provides qualitative evidence that substantiates its underlying assumptions and demonstrates its relevance as a future explanatory lens for PSUD.

Additionally, the identified management strategies, such as app restrictions, device-free spaces, intentional disengagement, and redirection of gratifications toward purposeful offline activities, highlight intentionality and mindfulness as key mediators of self-regulation across contexts. These strategies further reinforce the need for theoretical models that move beyond static measures of use and instead account for dynamic, context-sensitive behavioural regulation. By situating PSUD management within broader environmental and social conditions, including workplace expectations and family norms, the framework contributes a theoretically grounded foundation upon which TSC can be empirically refined, tested, and operationalised in future quantitative and mixed-methods research.

7.8. Practical implications

The study's practical implications span education, workplaces, public health, technology design, and family life. Translating TAM, TPB, and UGT into intervention design bridges theory and practice to promote balanced, mindful, and self-regulated smartphone use. In education, the framework supports embedding digital wellbeing into curricula through device-free zones, reflective practices, and screen-time tracking to strengthen awareness, norms, and attentional control. In organisational contexts, policies such as scheduled disconnection, no-phone meetings, and self-monitoring tools enhance productivity and wellbeing when supported by perceived usefulness (TAM) and cultural norms (TPB). In public health, the framework shifts focus from risk to empowerment by framing smartphone management around behavioural intention and gratification awareness, supported through goal-setting, peer support, and time-limit tools. For technology design, mindful features such as adaptive reminders, usage dashboards, and personalised notifications operationalise TAM and TPB, positioning devices as partners in digital wellbeing. Within families, no-phone routines, device-free meals, and open discussions reinforce subjective norms (TPB) and social gratifications (UGT), fostering connectedness and self-regulation. Embedding these principles into policy and practice offers a coherent roadmap for promoting digital balance, wellbeing, and resilience in an always-connected world.

7.9. Limitations of the study

While this qualitative study offers rich insights into smartphone use and management, several limitations apply. As an exploratory design, the findings are interpretive rather than generalisable, providing empirical grounding rather than full validation. Reliance on self-reported data may have introduced social desirability bias, and the small, diverse sample, while appropriate for thematic saturation, limits external validity and increases contextual variability. Thematic analysis remains inherently interpretive, and the absence of objective usage metrics (e.g., screen-time or app data) restricts behavioural precision, consistent with the study's emphasis on meaning and context. Finally, the cross-sectional design captures a single time point and may not reflect evolving smartphone behaviours. Future mixed-method and longitudinal research could integrate digital-trace data to strengthen behavioural validity and examine changes in perceived usefulness, behavioural control, and gratification over time.

7.10. Future research suggestions

Future research should extend and empirically test the theoretical relationships proposed in this study. Quantitative and longitudinal approaches can complement the current qualitative grounding, enhancing the framework's robustness and predictive value. Surveys and modelling techniques (e.g., SEM, Path Analysis) could operationalise constructs from TAM, TPB, and UGT to quantify how perceived usefulness, behavioural intention, and gratification types contribute to effectual or problematic smartphone use. Experimental studies could manipulate variables such as notification frequency or screen-time limits to examine causal mechanisms underlying dependence and control. Longitudinal research is needed to trace behavioural and motivational changes over time, especially as emerging technologies and post-pandemic work patterns reshape digital habits. Mixed-methods approaches are strongly recommended to triangulate experiential and numerical evidence, using qualitative insights to inform instrument design and quantitative results to test theoretical coherence. Advancing this research through quantitative, experimental, and longitudinal validation will help transition the proposed TAM–TPB–UGT framework from exploratory grounding to empirical confirmation, bridging theoretical development and practical intervention in the study of PSUD. In addition, future research may build on these findings to empirically examine smartphone use through the lens of the TSC, which emphasises the dynamic role of motivation, situational demands, contextual constraints, engagement frequency and perception. The present study provides qualitative grounding for these constructs, offering a foundation for future quantitative validation and scale development aimed at capturing context-sensitive pathways to problematic smartphone use and dependence.

8. Conclusion

This study provides an empirically grounded and theoretically integrated understanding of the complex factors that shape smartphone use and dependence. Drawing on TAM, TPB, and UGT, it presents an integrative framework that captures how motivational, situational, and contextual influences interact to produce both effectual and problematic behaviours. Smartphones enhance productivity, connectivity, and daily organisation, but also pose a risk of compulsive engagement and diminished self-control. Through qualitative insights, the study elucidates how users negotiate this duality, balancing functionality with emotional gratification, and identifies strategies, such as app limits, screen-time tools, device-free routines, and mindful practices, that promote digital wellbeing. These behaviours reflect perceived behavioural control (TPB), perceived usefulness (TAM), and goal-directed gratification (UGT), underscoring the centrality of intentionality and self-awareness. Rather than asserting full validation, the research provides exploratory empirical support for a coherent theoretical model that captures real-world smartphone behaviour. It advances understanding of how internal motivations and external environments interact to drive transitions along the continuum from effectual to problematic use. Situated within established behavioural theories, the study enhances conceptual clarity in PSUD research and informs future quantitative, experimental, and mixed-method investigations. This study contributes to the broader discourse on digital wellbeing,

demonstrating that mindful, goal-aligned smartphone engagement, supported by self-regulation and contextual awareness, can foster healthier relationships with technology and improve quality of life in a hyperconnected world.

CRediT authorship contribution statement

Saqib Nawaz: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Tanya Linden:** Writing – review & editing, Validation, Supervision, Software, Resources, Methodology, Formal analysis, Conceptualization. **Matthew Mitchell:** Writing – review & editing, Validation, Supervision, Software, Resources, Project administration, Methodology, Formal analysis, Conceptualization. **Jahar Bhowmik:** Writing – review & editing, Validation, Supervision, Software, Resources, Project administration, Methodology, Conceptualization.

Data availability statement

The qualitative data generated during this study are not publicly available due to ethical considerations and participant confidentiality. However, anonymised data may be made available on reasonable request from the corresponding author, subject to ethical approval and data-sharing agreements.

Ethics statement

This study was reviewed and approved by the Swinburne University Human Research Ethics Committee (SUHREC) in accordance with the National Statement on Ethical Conduct in Human Research (Australia). Ethical approval was granted under approval number 20213022-6846 on June 24, 2021. All participants provided informed consent prior to participation, and all procedures were conducted in compliance with the approved protocol.

Declaration of AI use

Artificial intelligence (AI) tools were used in a limited, supportive capacity during manuscript preparation. Specifically, AI-assisted tools were used to support language refinement, clarity, and editorial polishing. All conceptual development, study design, data collection, data analysis, interpretation of findings, and theoretical contributions were conducted entirely by the authors. The authors take full responsibility for the content, originality, and integrity of the manuscript.

Funding statement

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssaho.2026.102569.

References

Abbas, J., Aman, J., Nurunnabi, M., & Bano, S. (2019). The impact of social media on learning behavior for sustainable education: Evidence of students from selected universities in Pakistan. *Sustainability, 11*(6), 1–23. https://doi.org/10.3390/su11061683

Abi-Jaoude, E., Naylor, K. T., & Pignatiello, A. (2020). Smartphones, social media use and youth mental health. *Canadian Medical Association Journal, 192*(6), E136–E141. https://doi.org/10.1503/cmaj.190434

Adamczewska-Chmiel, K., Dudzic, K., Chmiela, T., & Gorzkowska, A. (2022). Smartphones, the epidemic of the 21st century: A possible source of addictions and neuropsychiatric consequences. *International Journal of Environmental Research and Public Health, 19*(9). https://doi.org/10.3390/ijerph19095152

Agnihotri, A. (2022). *Mindful use of smartphones, without reducing screen time can boost productivity | health - Hindustan times*. HindustanTimes. https://www.hindustantimes.com/lifestyle/health/mindful-use-of-smartphones-without-reducing-screen-time-can-boost-productivity-101667054187416.html.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Akbari, M., Seydavi, M., Palmieri, S., Mansueto, G., Caselli, G., & Spada, M. M. (2021). Fear of missing out (FoMO) and internet use: A comprehensive systematic review and meta-analysis. *Journal of Behavioral Addictions, 10*(4), 879–900. https://doi.org/10.1556/2006.2021.00083

Akulwar-Tajane, I., Parmar, K. K., Naik, P. H., & Shah, A. V. (2020). Rethinking screen time during COVID-19: Impact on psychological well-being in physiotherapy students. *International Journal of Clinical and Experimental Medicine Research, 4*(4), 201–216. https://doi.org/10.26855/ijcemr.2020.10.014

Ameen, N. (2022). Gen Z smartphone addiction can boost compulsive buying – But businesses can help them kick the shopping habit. *The Conversation*. https://theconversation.com/gen-z-smartphone-addiction-can-boost-compulsive-buying-but-businesses-can-help-them-kick-the-shopping-habit-189346.

Anderson, M., & Perrin, A. (2017). *Tech adoption climbs among older adults*. Pew Research Center. May http://www.pewinternet.org/2017/05/17/technology-use-among-seniors/.

Arrivillaga, C., Hallauer, C. J., Montag, C., & Elhai, J. D. (2023). Addictive behaviors emotion dysregulation factors associated with problematic smartphone use severity : The mediating role of fear of missing out. *Addictive Behaviors, 143*(March), Article 107708. https://doi.org/10.1016/j.addbeh.2023.107708

Balogun, F. M., & Olatunde, O. E. (2020). Prevalence and predictors of problematic smart phone use among pre-varsity young people in ibadan, Nigeria. *Pan African Medical Journal, 36*(285), 1–13. https://doi.org/10.11604/pamj.2020.36.285.18858

Bauer, M., Glenn, T., Geddes, J., Gitlin, M., Grof, P., Kessing, L. V., Monteith, S., Faurholt-Jepsen, M., Severus, E., & Whybrow, P. C. (2020). Smartphones in mental health: A critical review of background issues, current status and future concerns. *International Journal of Bipolar Disorders, 8*(1), 1–19. https://doi.org/10.1186/s40345-019-0164-x

Billieux, J. (2012). Problematic use of the Mobile phone: A literature review and a pathways model. *Current Psychiatry Reviews, 8*(4), 299–307. https://doi.org/10.2174/157340012803520522

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health, 11*(4), 589–597. https://doi.org/10.1080/2159676X.2019.1628806

Braun, V., & Clarke, V. (2023). Toward good practice in thematic analysis: Avoiding common problems and be(com)ing a knowing researcher. *International Journal of Transgender Health, 24*(1), 1–6. https://doi.org/10.1080/26895269.2022.2129597

Busch, P. A., & McCarthy, S. (2021). Antecedents and consequences of problematic smartphone use: A systematic literature review of an emerging research area. *Computers in Human Behavior, 114*, Article 106414. https://doi.org/10.1016/j.chb.2020.106414. May 2020.

Casale, S., Boursier, V., Musicò, A., Ghinassi, S., Cigolini, G., Petrucci, E., & Gioia, F. (2023). Stigmatizing attitudes toward internet gaming disorder, Problematic smartphone use and Problematic social networking site use: An experimental vignette study. *Addictive Behaviors, 141*(November 2022). https://doi.org/10.1016/j.addbeh.2023.107665, 0–6.

Chaudhary, A., Saroha, J., Monteiro, K., Forbes, A. G., & Parnami, A. (2022). "Are you still watching?": Exploring unintended user behaviors and dark patterns on video streaming platforms. *Designing interactive systems conference*. https://doi.org/10.1145/3532106.3533562

Chen, I. H., Pakpour, A. H., Leung, H., Potenza, M. N., Su, J. A., Lin, C. Y., & Griffiths, M. D. (2020). Comparing generalized and specific problematic smartphone/internet use: Longitudinal relationships between smartphone applicationbased addiction and social media addiction and psychological distress. *Journal of Behavioral Addictions, 9*(2), 410–419. https://doi.org/10.1556/2006.2020.00023

Choi, E., Carleton, E., Walsh, M., & Hancock, A. (2025). Mindfulness buffers the negative effects of social media overuse on work effort through state self-control during crisis: A daily diary study. *Behaviour & Information Technology, 44*(13), 3115–3132. https://doi.org/10.1080/0144929X.2024.2433031

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 318.

De-Sola, J., Talledo, H., Rodríguez de Fonseca, F., & Rubio, G. (2017). Prevalence of problematic cell phone use in an adult population in Spain as assessed by the mobile Phone problem use scale (MPPUS). *PLoS One, 12*(8), 1–17. https://doi.org/10.1371/journal.pone.0181184

Derakhshanrad, N., Yekaninejad, M. S., Mehrdad, R., & Saberi, H. (2021). Neck pain associated with smartphone overuse: Cross-sectional report of a cohort study among office workers. *European Spine Journal, 30*(2), 461–467. https://doi.org/10.1007/s00586-020-06640-z

Ding, X., Ji, Y., Dong, Y., Li, Z., & Zhang, Y. (2024). The impact of family factors and communication on recreational sedentary screen time among primary school-aged

children: A cross-sectional study. *BMC Public Health, 24*(1), 1733. https://doi.org/10.1186/s12889-024-19128-y
Eg, R., Demirkol Tønnesen, Ö., & Tennfjord, M. K. (2023). A scoping review of personalized user experiences on social media: The interplay between algorithms and human factors. *Computers in Human Behavior Reports, 9*(July 2022), Article 100253. https://doi.org/10.1016/j.chbr.2022.100253
Elhai, J. D., Dvorak, R. D., Levine, J. C., & Hall, B. J. (2017). Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *Journal of Affective Disorders, 207*(August 2016), 251–259. https://doi.org/10.1016/j.jad.2016.08.030
Elhai, J. D., Levine, J. C., Alghraibeh, A. M., Alafnan, A. A., Aldraiweesh, A. A., & Hall, B. J. (2018). Fear of missing out: Testing relationships with negative affectivity, online social engagement, and problematic smartphone use. *Computers in Human Behavior, 89*(August), 289–298. https://doi.org/10.1016/j.chb.2018.08.020
Elhai, J. D., Yang, H., & Montag, C. (2021). Fear of missing out (FOMO): Overview, theoretical underpinnings, and literature review on relations with severity of negative affectivity and problematic technology use. *Brazilian Journal of Psychiatry, 43*(2), 203–209. https://doi.org/10.1590/1516-4446-2020-0870
Fineberg, N. A., Menchón, J. M., Hall, N., Dell'Osso, B., Brand, M., Potenza, M. N., Chamberlain, S. R., Cirnigliaro, G., Lochner, C., Billieux, J., Demetrovics, Z., Rumpf, H. J., Müller, A., Castro-Calvo, J., Hollander, E., Burkauskas, J., Grünblatt, E., Walitza, S., Corazza, O., … Zohar, J. (2022). Advances in problematic usage of the internet research – A narrative review by experts from the European network for problematic usage of the internet. *Comprehensive Psychiatry, 118*. https://doi.org/10.1016/j.comppsych.2022.152346. December 2021.
Fryman, S., & Romine, W. (2021). Measuring smartphone dependency and exploration of consequences and comorbidities. *Computers in Human Behavior Reports, 4*(June), Article 100108. https://doi.org/10.1016/j.chbr.2021.100108
García, C. L., Sánchez, M. C., & Repiso, A. G. V.-M. (2022). Internet addiction. *Journal of Information Technology Research, 15*(1), 1–12. https://doi.org/10.4018/JITR.297120
Goodin, T. (2018). *Stop staring at screens: A digital detox for the whole family*. Hachette UK.
Graben, K., Doering, B. K., Jeromin, F., & Barke, A. (2020). Problematic Mobile phone use: Validity and reliability of the problematic use of Mobile phone (PUMP) scale in a German sample. *Addictive Behaviors Reports, 12*(July), Article 100297. https://doi.org/10.1016/j.abrep.2020.100297
Guest, G., Namey, E., & Chen, M. (2020). A simple method to assess and report thematic saturation in qualitative research. *PLoS One, 15*(5), Article e0232076. https://doi.org/10.1371/journal.pone.0232076
Gupta, G., & Singharia, K. (2021). Consumption of OTT media streaming in COVID-19 lockdown: Insights from PLS analysis. *Vision, 25*(1), 36–46. https://doi.org/10.1177/0972262921989118
Haraty, M., McGrenere, J., & Tang, C. (2016). How personal task management differs across individuals. *International Journal of Human-Computer Studies, 88*, 13–37. https://doi.org/10.1016/j.ijhcs.2015.11.006
Harris, B., Regan, T., Schueler, J., & Fields, S. A. (2020). Problematic Mobile phone and smartphone use scales: A systematic review. *Frontiers in Psychology, 11*(May). https://doi.org/10.3389/fpsyg.2020.00672
Heitmayer, M. (2020). Smartphones at the workplace: An in situ mixed-method study on smartphone use during intellectual work. *The Asian conference on psychology & the behavioral sciences 2020 official conference proceedings*. https://doi.org/10.22492/issn.2187-4743.2020.4
Heyman, J. L., & Kushlev, K. (2023). Did smartphones enhance or diminish well-being during the COVID-19 pandemic? *Frontiers in Psychology, 14*(March). https://doi.org/10.3389/fpsyg.2023.1094196
Hiniker, A., Patel, S. N., Kohno, T., & Kientz, J. A. (2016). Why would you do that? Predicting the uses and gratifications behind smartphone-usage behaviors. *UbiComp 2016 - Proceedings of the 2016 ACM international joint conference on pervasive and ubiquitous Computing*. https://doi.org/10.1145/2971648.2971762
Hodes, L. N., & Thomas, K. G. F. (2021). Smartphone Screen time: Inaccuracy of self-reports and influence of psychological and contextual factors. *Computers in Human Behavior, 115*(October 2020), Article 106616. https://doi.org/10.1016/j.chb.2020.106616
Horwood, S., & Anglim, J. (2019). Problematic smartphone usage and subjective and psychological well-being. *Computers in Human Behavior, 97*(February), 44–50. https://doi.org/10.1016/j.chb.2019.02.028
Ifeanyi, I. P., & Chukwuere, J. E. (2018). The impact of using smartphones on the academic performance of undergraduate students. *Knowledge Management and E-Learning, 10*(3), 290–308. https://doi.org/10.34105/j.kmel.2018.10.017
Jilisha, G., Venkatachalam, J., Menon, V., & Olickal, J. J. (2019). Nomophobia: A mixed-methods study on prevalence, associated factors, and perception among college students in Puducherry, India. *Indian Journal of Psychological Medicine, 41*(6), 541–548. https://doi.org/10.4103/IJPSYM.IJPSYM_130_19
Karl, K. A., Peluchette, J. V., & Aghakhani, N. (2022). Virtual work meetings during the COVID-19 pandemic: The good, bad, and ugly. *Small Group Research, 53*(3), 343–365. https://doi.org/10.1177/10464964211015286
Katz, E., Blumler, J. G., & Gurevitch, M. (1973). Uses and gratifications research. *Public Opinion Quarterly, 37*(4), 509–523. https://doi.org/10.1086/268109
Kaviani, F., Robards, B., Young, K. L., & Koppel, S. (2020). Nomophobia: Is the fear of being without a smartphone associated with problematic use? *International Journal of Environmental Research and Public Health, 17*(17), 1–19. https://doi.org/10.3390/ijerph17176024
Kim, Y. J., Cho, J. H., & Park, Y. J. (2020). Leisure sports participants' engagement in preventive health behaviors and their experience of constraints on performing leisure activities during the COVID-19 pandemic. *Frontiers in Psychology, 11*(December), 1–9. https://doi.org/10.3389/fpsyg.2020.589708
Kim, Y. H., Choe, E. K., Lee, B., & Seo, J. (2019). Understanding personal productivity how knowledge workers define, evaluate, and reflect on their productivity. *Conference on Human Factors in Computing Systems - Proceedings*, 1–12. https://doi.org/10.1145/3290605.3300845
Kushlev, K., Hunter, J. F., Proulx, J., Pressman, S. D., & Dunn, E. (2019). Smartphones reduce smiles between strangers. *Computers in Human Behavior, 91*, 12–16. https://doi.org/10.1016/j.chb.2018.09.023. September 2018.
Kuss, D. J., Kanjo, E., Crook-Rumsey, M., Kibowski, F., Wang, G. Y., & Sumich, A. (2018). Problematic Mobile phone use and addiction across generations: The roles of psychopathological symptoms and smartphone use. *Journal of Technology in Behavioral Science, 3*(3), 141–149. https://doi.org/10.1007/s41347-017-0041-3
Lal, B., Dwivedi, Y. K., & Haag, M. (2021). Working from home during Covid-19: Doing and managing technology-enabled social interaction with colleagues at a distance. *Information Systems Frontiers*, 1333–1350. https://doi.org/10.1007/s10796-021-10182-0
Lepp, A., Barkley, J. E., & Karpinski, A. C. (2014). The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students. *Computers in Human Behavior, 31*(1), 343–350. https://doi.org/10.1016/j.chb.2013.10.049
Li, N., Fu, L., Yang, H., Zhao, W., Wang, X., Yan, Y., & Fu, Y. (2024). The relationship between Mobile phone dependence and academic burnout in Chinese college students: A moderated mediator model. *Frontiers in Psychiatry, 15*(May), 1–9. https://doi.org/10.3389/fpsyt.2024.1382264
Linden, T., Nawaz, S., & Mitchell, M. (2021). Adults ' perspectives on smartphone usage and dependency in Australia. *Computers in Human Behavior Reports, 3*(January), Article 100060. https://doi.org/10.1016/j.chbr.2021.100060
Liu, Q.-Q. Q., Zhang, D.-J. J., Yang, X.-J. J., Zhang, C.-Y. Y., Fan, C.-Y. Y., & Zhou, Z.-K. K. (2018). Perceived stress and mobile phone addiction in Chinese adolescents: A moderated mediation model. *Computers in Human Behavior, 87*(June), 247–253. https://doi.org/10.1016/j.chb.2018.06.006
Lonka, K., Upadyaya, K., Salmela-Aro, K., Alho, K., & Hakkarainen, K. (2016). The dark side of internet use: Two longitudinal studies of excessive internet use, depressive symptoms, school burnout and engagement among Finnish early and late adolescents. *Journal of Youth and Adolescence, 46*(2), 343–357. https://doi.org/10.1007/s10964-016-0494-2
Lopez-Fernandez, O., Kuss, D. J., Romo, L., Morvan, Y., Kern, L., Graziani, P., Rousseau, A., Rumpf, H. J., Bischof, A., Gässler, A. K., Schimmenti, A., Passanisi, A., Männikkö, N., Kääriänen, M., Demetrovics, Z., Király, O., Chóliz, M., Zacarés, J. J., Serra, E., … Billieux, J. (2017). Self-reported dependence on mobile phones in young adults: A European cross-cultural empirical survey. *Journal of Behavioral Addictions, 6*(2), 168–177. https://doi.org/10.1556/2006.6.2017.020
Mason, M. C., Zamparo, G., Marini, A., & Ameen, N. (2022). Glued to your phone? Generation Z's smartphone addiction and online compulsive buying. *Computers in Human Behavior, 136*(July), Article 107404. https://doi.org/10.1016/j.chb.2022.107404
McDaniel, B. T., & Radesky, J. S. (2018). Technoference: Parent distraction with technology and associations with child behavior problems. *Child Development, 89*(1), 100–109. https://doi.org/10.1111/cdev.12822
Mela, H. (2024). *Digital discipline: Choosing life in the digital age of excess*. Morgan James Publishing.
Middelweerd, A., van der Laan, D. M., van Stralen, M. M., Mollee, J. S., Stuij, M., te Velde, S. J., & Brug, J. (2015). What features do Dutch university students prefer in a smartphone application for promotion of physical activity? A qualitative approach. *International Journal of Behavioral Nutrition and Physical Activity, 12*(1), 1–11. https://doi.org/10.1186/s12966-015-0189-1
Montag, C., & Elhai, J. D. (2023). Do we need a digital school uniform? Arguments for and against a smartphone ban in schools. *Societal Impacts, 1*(1–2), Article 100002. https://doi.org/10.1016/j.socimp.2023.100002
Montag, C., & Walla, P. (2016). Carpe diem instead of losing your social mind: Beyond digital addiction and why we all suffer from digital overuse. *Cogent Psychology, 3*(1), 1–9. https://doi.org/10.1080/23311908.2016.1157281
Moqbel, M., Bertelt, V., Alam, M., Shaik, A. Y., Montoya, S., & Larson, M. (2023). Smartphone addiction and cultural dimensions. *Proceedings of the annual Hawaii international conference on system sciences, 2023-Janua*.
Moser, C., Schoenebeck, S. Y., & Reinecke, K. (2016). Technology at the table: Attitudes about Mobile phone use at mealtimes. *Conference on human factors in computing systems - Proceedings*. https://doi.org/10.1145/2858036.2858357
Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2024). Demystification and actualisation of data saturation in qualitative research through thematic analysis. *International Journal of Qualitative Methods, 23*. https://doi.org/10.1177/16094069241229777
Narayanan, A., Mathur, A., Chetty, M., & Kshirsagar, M. (2020). Dark patterns: Past, present, and future. *ACM Queue, 18*(2), 67–92. https://doi.org/10.1145/3400899.3400901
Nawaz, S. (2023). Rethinking classifications and metrics for problematic smartphone use and dependence: Addressing the call for reassessment. *Computers in Human Behavior Reports, 12*(August), Article 100327. https://doi.org/10.1016/j.chbr.2023.100327
Nawaz, S. (2024). Distinguishing between effectual, ineffectual, and problematic smartphone use: A comprehensive review and conceptual pathways model for future research. *Computers in Human Behavior Reports, 14*, Article 100424. https://doi.org/10.1016/j.chbr.2024.100424
Nawaz, S., Bhowmik, J., Linden, T., & Mitchell, M. (2024). Validation of a modified problematic use of mobile phones scale to examine problematic smartphone use and dependence. *Heliyon, 10*(2), Article e24832. https://doi.org/10.1016/j.heliyon.2024.e24832

Nawaz, S., Bhowmik, J., Linden, T., & Mitchell, M. (2025). Understanding smartphone usage behaviours: Developing and validating the brief problematic smartphone use and dependence scale. *Behaviour & Information Technology, 3001*, 1–20. https://doi.org/10.1080/0144929X.2025.2522203

Nawaz, S., Linden, T., Mitchell, M., & Bhowmik, J. (2023). Examining the effects of the COVID-19 pandemic on technology-enabled social interactions. *Proceedings of the 35th Australian computer-human interaction conference*. https://doi.org/10.1145/3638380.3638444

Nawaz, S., Linden, T., Mitchell, M., & Bhowmik, J. (2025). Examining screen time features for managing problematic smartphone use and dependence: An extension of technology acceptance model. *Human Behavior and Emerging Technologies, 2025*(1). https://doi.org/10.1155/hbe2/1799927

Ninaus, K., Diehl, S., Terlutter, R., Chan, K., Huang, A., & Erlandsson, S. (2015). Benefits and stressors - Perceived effects of ICT use on employee health and work stress: An exploratory study from Austria and Hong Kong. *International Journal of Qualitative Studies on Health and Well-Being, 10*, Article 28838. https://doi.org/10.3402/qhw.v10.28838

Ohly, S., & Latour, A. (2014). Work-related smartphone use and well-being in the evening: The role of autonomous and controlled motivation. *Journal of Personnel Psychology, 13*(4), 174–183. https://doi.org/10.1027/1866-5888/a000114. Hogrefe Publishing.

Okati-Aliabad, H., Habybabady, R. H., Sabouri, M., & Mohammadi, M. (2024). Different types of mobile phone use while driving and influencing factors on intention and behavior: Insights from an expanded theory of planned behavior. *PLoS One, 19*(3 March), 1–17. https://doi.org/10.1371/journal.pone.0300158

Ostic, D., Qalati, S. A., Barbosa, B., Shah, S. M. M., Galvan Vela, E., Herzallah, A. M., & Liu, F. (2021). Effects of social media use on psychological Well-being: A mediated model. *Frontiers in Psychology, 12*(June). https://doi.org/10.3389/fpsyg.2021.678766

Oviedo-Trespalacios, O., Nandavar, S., Newton, J. D. A., Demant, D., & Phillips, J. G. (2019). Problematic use of Mobile phones in australia…is it getting worse? *Frontiers in Psychiatry, 10*(March). https://doi.org/10.3389/fpsyt.2019.00105

Pandya, A., & Lodha, P. (2021). Social connectedness, excessive screen time during COVID-19 and mental health: A review of current evidence. *Frontiers in Human Dynamics, 3*(July), 1–9. https://doi.org/10.3389/fhumd.2021.684137

Popescu, A. M., Balica, R.Ș., Lazăr, E., Bușu, V. O., & Vașcu, J. E. (2022). Smartphone addiction risk, technology-related behaviors and attitudes, and psychological well-being during the COVID-19 pandemic. *Frontiers in Psychology, 13*(August), 1–9. https://doi.org/10.3389/fpsyg.2022.997253

Precht, L. M., Mertens, F., Brickau, D. S., Kramm, R. J., Margraf, J., Stirnberg, J., & Brailovskaia, J. (2024). Engaging in physical activity instead of (over)using the smartphone: An experimental investigation of lifestyle interventions to prevent problematic smartphone use and to promote mental health. *Journal of Public Health, 32*(4), 589–607. https://doi.org/10.1007/s10389-023-01832-5

Przybylski, A. K., & Weinstein, N. (2013). Can you connect with me now? How the presence of mobile communication technology influences face-to-face conversation quality. *Journal of Social and Personal Relationships, 30*(3), 237–246. https://doi.org/10.1177/0265407512453827

Qazi, A., Hasan, N., Abayomi-Alli, O., Hardaker, G., Scherer, R., Sarker, Y., Kumar Paul, S., & Maitama, J. Z. (2022). Gender differences in information and communication technology use & skills: A systematic review and meta-analysis. *Education and Information Technologies, 27*(Issue 3). https://doi.org/10.1007/s10639-021-10775-x

Radesky, J., Leung, C., Appugliese, D., Miller, A. L., Lumeng, J. C., & Rosenblum, K. L. (2018). Maternal mental representations of the child and Mobile phone use during parent-child mealtimes. *Journal of Developmental and Behavioral Pediatrics, 39*(4), 310–317. https://doi.org/10.1097/DBP.0000000000000556

Rakib, M. R. H. K., Pramanik, S. A. K., Amran, M. Al, Islam, M. N., & Sarker, M. O. F. (2022). Factors affecting young customers' smartphone purchase intention during Covid-19 pandemic. *Heliyon, 8*(9), Article e10599. https://doi.org/10.1016/j.heliyon.2022.e10599

Roberts, J. A., Yaya, L. H. P., & Manolis, C. (2014). The invisible addiction: Cell-phone activities and addiction among male and female college students. *Journal of Behavioral Addictions, 3*(4), 254–265. https://doi.org/10.1556/JBA.3.2014.015

Roehrick, K. C., Vaid, S. S., & Harari, G. M. (2023). Situating smartphones in daily life: Big five traits and contexts associated with young adults' smartphone use. *Journal of Personality and Social Psychology, 125*(5), 1096–1118. https://doi.org/10.1037/pspp0000478

Rosen, L. (2013). iDisorder. In *Die digitale Falle* (pp. 1–16). https://doi.org/10.1007/978-3-642-34875-4_1

Rozgonjuk, D., Montag, C., & Elhai, J. D. (2022). In H. M. Pontes (Ed.), *Smartphone addiction* (117, p. 97). Springer International Publishing. https://doi.org/10.1007/978-3-031-04772-5_4.

Sánchez-Fernández, M., & Borda-Mas, M. (2023). Problematic smartphone use and specific problematic internet uses among university students and associated predictive factors: A systematic review. *Education and Information Technologies, 28*(Issue 6). https://doi.org/10.1007/s10639-022-11437-2. Springer US.

Sanders, C. K., & Scanlon, E. (2021). The digital divide is a human rights issue: Advancing social inclusion through social work advocacy. *Journal of Human Rights and Social Work, 6*(2), 130–143. https://doi.org/10.1007/s41134-020-00147-9

Sas, C., & Sas, A. C. (2023). Patterns of meaningful and meaningless smartphone use: A diary Study. In *36th international BCS human-computer interaction conference. August 2023* https://www.researchgate.net/publication/377242089.

Sciandra, M. R., Inman, J. J., & Stephen, A. T. (2019). Smart phones, bad calls? The influence of consumer mobile phone use, distraction, and phone dependence on adherence to shopping plans. *Journal of the Academy of Marketing Science, 47*(4), 574–594. https://doi.org/10.1007/s11747-019-00647-9

Serra, G., Lo Scalzo, L., Giuffrè, M., Ferrara, P., & Corsello, G. (2021). Smartphone use and addiction during the coronavirus disease 2019 (COVID-19) pandemic: Cohort study on 184 Italian children and adolescents. *Italian Journal of Pediatrics, 47*(1), 1–10. https://doi.org/10.1186/s13052-021-01102-8

Sohn, S. Y., Rees, P., Wildridge, B., Kalk, N. J., & Carter, B. (2019). Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: A systematic review, meta-analysis and GRADE of the evidence. *BMC Psychiatry, 19*(1), 356. https://doi.org/10.1186/s12888-019-2350-x

Sonnentag, S. (2018). The recovery paradox: Portraying the complex interplay between job stressors, lack of recovery, and poor well-being. *Research in Organizational Behavior, 38*, 169–185. https://doi.org/10.1016/j.riob.2018.11.002

Sonnentag, S., Reinecke, L., Mata, J., & Vorderer, P. (2018). Feeling interrupted—Being responsive: How online messages relate to affect at work. *Journal of Organizational Behavior, 39*(3), 369–383. https://doi.org/10.1002/job.2239

Spiratos, K., & Ratanasiripong, P. (2023). Problematic smartphone use among high school students. *Journal of School Administration Research and Development, 8*(2), 76–86. https://doi.org/10.32674/JSARD.V8I2.4893

Stoyanova, S. Y., Drugas, M. I., Roncaglia, I., & Rothmann, S. (2023). Well-being and work motivation brought by technological changes, coping and adaptations during and post COVID-19 pandemic: Barriers and opportunities. *Frontiers Media SA, 16648714*.

Sutton, T. (2020). *Digital re-enchantment: Tribal belonging, new age science and the search for happiness in a digital detoxing community*. University of Oxford.

Syvertsen, T., & Enli, G. (2020). Digital detox: Media resistance and the promise of authenticity. *Convergence, 26*(5–6), 1269–1283. https://doi.org/10.1177/1354856519847325

Tanil, C. T., & Yong, M. H. (2020). Mobile phones: The effect of its presence on learning and memory. *PLoS One, 15*(8 August), 1–12. https://doi.org/10.1371/journal.pone.0219233

Wacks, Y., & Weinstein, A. M. (2021). Excessive smartphone use is associated with health problems in adolescents and young adults. *Frontiers in Psychiatry, 12*(February), 1–7. https://doi.org/10.3389/fpsyt.2021.669042

Walsh, S. P., White, K. M., Cox, S., & Young, R. M. D. (2011). Keeping in constant touch: The predictors of young Australians' mobile phone involvement. *Computers in Human Behavior, 27*(1), 333–342. https://doi.org/10.1016/j.chb.2010.08.011

Wang, J. C., Hsieh, C.-Y., & Kung, S.-H. (2023). The impact of smartphone use on learning effectiveness: A case study of primary school students. *Education and Information Technologies, 28*(6), 6287–6320. https://doi.org/10.1007/s10639-022-11430-9

Whelan, E., & Turel, O. (2023). Personal use of smartphones in the workplace and work–life conflict: A natural quasi-experiment. *Internet Research, 34*(7), 24–54. https://doi.org/10.1108/INTR-08-2022-0607

Wilmer, H. H., Sherman, L. E., & Chein, J. M. (2017). Smartphones and cognition: A review of research exploring the links between mobile technology habits and cognitive functioning. *Frontiers in Psychology, 8*(APR), 1–16. https://doi.org/10.3389/fpsyg.2017.00605

Wolfers, L. N., Wendt, R., Becker, D., & Utz, S. (2023). Do you love your phone more than your child? The consequences of norms and guilt around maternal smartphone use. *Human Communication Research, 49*(3), 285–295. https://doi.org/10.1093/HCR/HQAD001

Yang, G. H., Cao, X. X., Fu, Y. Y., Wang, N. D., & Lian, S. L. (2024). Mobile phone addiction and academic burnout: The mediating role of technology conflict and the protective role of mindfulness. *Frontiers in Psychiatry, 15*, Article 1365914. https://doi.org/10.3389/fpsyt.2024.1365914

Yang, C. C., Li, C. L., Yeh, T. F., & Chang, Y. C. (2022). Assessing older adults' intentions to use a smartphone: Using the meta–unified theory of the acceptance and use of technology. *International Journal of Environmental Research and Public Health, 19*(9). https://doi.org/10.3390/ijerph19095403