



Digital addiction in the digital era: A conceptual analysis

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Abstract

Purpose: This paper clarifies the contested and often loosely used concept of “digital addiction,” differentiates it from adjacent constructs (problematic use, excessive use, pathological use), synthesises the dominant theoretical accounts of its development and maintenance, and proposes an integrative conceptual framework with testable propositions. It deliberately adds a Library and Information Science (LIS) and information-behaviour lens to a literature dominated by psychology and public health.

Design/methodology/approach: The paper is a conceptual analysis. It adopts a purposive, integrative concept-analysis strategy informed by Walker and Avant’s eight-step method and Rodgers’ evolutionary concept analysis. Seminal works and recent (2020–2026) peer-reviewed, predominantly Scopus- and Web of Science-indexed sources were purposively selected and interpreted. No primary data were collected; all quantitative estimates are drawn from cited empirical studies and meta-analyses.

Findings: Digital addiction is best understood not as a single validated clinical entity but as an umbrella construct spanning generalised problematic internet use and several application-specific behaviours (gaming, social media, smartphone, pornography). Its recurring defining attributes are impaired control, salience or preoccupation, mood modification, tolerance, withdrawal-like distress, conflict, relapse, continued use despite harm, and functional impairment. Antecedents are person-level, social and design-structural; consequences span mental health, sleep, academic and occupational functioning and wellbeing, though causal direction and effect sizes remain contested. Only gaming disorder has achieved formal diagnostic status in ICD-11.

Research limitations/implications: As a conceptual paper without primary data, the proposed framework and its propositions are analytic rather than empirically confirmed and require testing with longitudinal and culturally validated designs.

Practical implications: The paper maps a multi-level intervention architecture spanning individual, family, educational, platform-design and policy levels, and argues that academic libraries and information professionals are an under-recognised delivery point for digital wellbeing literacy embedded within existing information-literacy mandates.

Social implications: The analysis foregrounds the attention economy and persuasive platform design as structural antecedents, reframing digital addiction partly as a consequence of engineered environments rather than solely individual pathology, with implications for regulation.

Originality/value: The paper integrates an LIS and information-literacy perspective with the core psychology and public-health literature, offers a consolidated attributes–antecedents–consequences matrix, and supplies a synthesising Antecedents–Mechanisms–Moderators–Outcomes–Interventions (AMMOI) framework with propositions tailored to the Indian and South Asian context.

Keywords: Digital addiction, problematic internet use, gaming disorder, concept analysis, digital wellbeing literacy, academic libraries

Introduction

Digital technologies now mediate work, education, commerce, social relationships and leisure. This saturation has been especially rapid in India, where the Digital India programme, smartphone-first access and inexpensive mobile data have compressed into a single decade an adoption curve that took considerably longer elsewhere. Industry estimates place the number of Indian internet users at roughly 751.5 million at the start of 2024, corresponding to an internet penetration of about 52.4 per cent (Kemp, 2024)^[17]. Alongside undisputed benefits, this expansion has intensified a long-running concern: that for a minority of users, engagement with digital media becomes dysregulated, compulsive and harmful — a cluster of phenomena popularly labelled “digital addiction.”

The scholarly foundations of this concern predate ubiquitous smartphones. Young (1998)^[31] first framed internet addiction as an impulse-control disorder modelled on pathological gambling. Davis (2001)^[9] reconceptualised the phenomenon cognitively as pathological internet use. Griffiths (2005)^[10] advanced the more general claim that behaviours, and not only substances, can be addictive, and that all addictions share a common set of components. Since then the field has proliferated to encompass smartphone addiction, social media addiction, internet gaming disorder and problematic pornography use, among others. Yet this proliferation has generated conceptual disorder. Terms are used inconsistently and interchangeably, measurement is heterogeneous, prevalence estimates vary by an order of magnitude, and there is genuine scientific disagreement

about whether much of what is labelled addiction is instead ordinary, if heavy, use of rewarding technologies (Billieux *et al.*, 2015; Kardefelt-Winther, 2014) ^[4, 15].

For a discipline such as LIS — professionally concerned with how people seek, use, evaluate and are affected by information and information technologies — this ambiguity is not merely an academic irritant. Information professionals in universities increasingly encounter students whose relationship with devices affects their study, wellbeing and information behaviour. If digital addiction is to inform library services, digital-literacy curricula and institutional policy, the concept must first be clarified.

This paper therefore pursues four objectives:

1. To disentangle digital addiction from adjacent constructs and specify its defining attributes;
2. To synthesise the principal theoretical accounts of its aetiology and maintenance;
3. To map its antecedents, consequences, classification debates and prevalence, with particular attention to India and South Asia; and
4. To propose an integrative conceptual framework and research agenda, and to articulate a distinctive role for academic libraries in prevention through digital wellbeing literacy.

The paper is explicitly a conceptual analysis. It presents no new empirical data and fabricates none; every quantitative claim is attributed to a cited source.

Conceptual and definitional foundations

1. A crowded and inconsistent lexicon

The literature deploys a family of overlapping labels. Internet addiction (Young, 1998) ^[31] frames the behaviour as a discrete clinical condition. Pathological internet use (Davis, 2001) ^[9] emphasises maladaptive cognition. Problematic internet use is now often preferred as a more neutral, dimensional term that avoids prejudging the addiction question. Excessive use typically denotes high volume or frequency without necessarily implying harm or loss of control, while compulsive use imports an obsessive-compulsive framing. Digital addiction is the broadest of these terms, functioning as an umbrella for the whole family.

A crucial conceptual distinction runs through this vocabulary: quantity versus dysregulation. Excessive use refers to time or frequency; addiction, or problematic use, implies a symptom-based pattern of impaired control and harm. Conflating the two, and treating heavy use as automatically pathological, is a principal source both of inflated prevalence estimates and of the overpathologising critique discussed in Section 6.

2. Griffiths' components model as a unifying spine

The most influential attempt to give the umbrella coherence is Griffiths' (2005) ^[10] components model of addiction within a biopsychosocial framework. It holds that all addictions, whether substance-based or behavioural, share

six components: salience, in which the activity dominates thinking and behaviour; mood modification, using the activity to alter affect; tolerance, needing increasing amounts to achieve the same effect; withdrawal, producing unpleasant states when use is prevented; conflict, both interpersonal and intrapsychic; and relapse, reversion after attempts at abstinence. Griffiths argues that all six should be present for a behaviour to qualify as a genuine addiction — a deliberately conservative threshold that itself guards against overpathologising. The model has become the de facto backbone of the field's measurement instruments, including the Bergen scales for Facebook and social media use (Andreassen *et al.*, 2016) ^[3].

3. The sub-constructs

Several application-specific constructs sit under the umbrella. Internet addiction and problematic internet use denote generalised dysregulated internet use (Young, 1998; Davis, 2001) ^[9, 31]. Smartphone addiction, often accompanied by nomophobia, or fear of being without one's phone, frequently overlaps with or acts as a delivery vehicle for other behaviours (Sohn *et al.*, 2019) ^[26]. Social media or social networking site addiction has been reviewed comprehensively by Andreassen (2015), while Kuss and Griffiths (2011, 2017) ^[2, 19, 20] map its emergence and set out ten lessons learned, including the observation that social networking and social media use are not identical and that fear of missing out may be a facet of the construct. Gaming disorder is the only member of the family with formal diagnostic recognition, as discussed in Section 6.

Davis (2001) ^[9] supplied an early and still useful structural distinction between generalised problematic internet use, a diffuse multidimensional overuse tied to the social affordances of being online, and specific problematic internet use, the pathological use of one function such as online gambling or sexual content that might exist independently of the internet. This maps neatly onto the modern separation between broad internet addiction and narrow, application-specific disorders.

4. The dissenting frame: compensatory use

A significant strand disputes the addiction framing altogether. Kardefelt-Winther (2014) ^[15] argued that internet-addiction research suffered from conceptual and methodological shortcomings and proposed a compensatory internet use model: some individuals go online to escape real-life difficulties or to relieve dysphoric mood, and negative outcomes arise when this coping motivation is preceded by psychosocial problems. On this account the locus of the problem is the person's negative life situation, merely facilitated by an internet application, rather than an addictive property of the technology as such. This reframing is central to the concept's contested identity and is engaged directly in the framework proposed in Section 10. A subsequent multi-author paper asked how behavioural addiction might be conceptualised without pathologising common behaviours (Kardefelt-Winther *et al.*, 2017) ^[16].

Table 1: Comparison of core constructs and definitions

Construct	Key source(s)	Core meaning	Implied clinical status
Internet addiction	Young (1998) ^[31]	Impulse-control disorder of dysregulated internet use, modelled on pathological gambling	Proposed disorder; not formally recognised
Pathological internet use (generalised vs specific)	Davis (2001) ^[9]	Maladaptive-cognition-driven overuse; generalised (diffuse) versus specific (single function)	Analogous to an impulse-control disorder
Problematic internet use	Widely used	Dimensional, harm-linked use that avoids the addiction label	Sub-clinical to clinical continuum

Excessive use	Widely used	High volume or time without necessary loss of control or harm	Not inherently pathological
Smartphone addiction / nomophobia	Sohn <i>et al.</i> (2019); Davey & Davey (2014) [8, 26]	Dysregulated phone use; fear of being without one's phone	Not formally recognised
Social media / SNS addiction	Andreassen (2015); Kuss & Griffiths (2011, 2017) [2, 19, 20]	Component-based dysregulated social networking use	Not formally recognised
Gaming disorder	World Health Organization (2019); Stevens <i>et al.</i> (2021) [27, 30]	Impaired control, prioritisation over other activities, continuation despite harm, normally over 12 months	Formally recognised in ICD-11
Internet gaming disorder	American Psychiatric Association (2013) [1]	Provisional nine-criterion condition	DSM-5 Section III: condition for further study
Compensatory internet use	Kardefelt-Winther (2014) [15]	Coping and escapism response to life problems rather than an addictive property of technology	Reframes and critiques the addiction model

Source: Author's synthesis of the literature reviewed

Methodological approach to the conceptual analysis

This paper is a purposive, integrative concept analysis, and is described as such honestly: it is not a systematic review, and no PRISMA search protocol, exhaustive database enumeration or formal quality appraisal was undertaken. Instead it follows the logic of established concept-analysis traditions in order to bring order to a fragmented construct. Two methodological reference points inform the approach. The first is Walker and Avant's (2019) [29] widely used eight-step method: select a concept, determine the aims of analysis, identify uses of the concept, determine defining attributes, construct a model case together with borderline, related and contrary cases, identify antecedents and consequences, and define empirical referents. The second is Rodgers' (1989) [24] evolutionary concept analysis, which treats concepts as dynamic, context-dependent and continuously refined through use rather than as fixed essences — a stance particularly apt for a construct evolving as fast as its underlying technologies. Gunawan *et al.* (2023) [11] note that these two remain the classical methods, though several alternatives now exist.

Consistent with these traditions, the analysis surveys how the concept is used across psychology, psychiatry, public health, human–computer interaction and LIS; abstracts recurring defining attributes; specifies antecedents and consequences; illustrates the concept with a model case and a contrary case; and considers empirical referents, that is, the instruments by which the concept is measured. Sources were purposively selected to include seminal works (Young, 1998; Davis, 2001; Griffiths, 2005; Kardefelt-Winther, 2014; Billieux *et al.*, 2015; Brand *et al.*, 2016) [4, 6, 9, 10, 15, 31] together with recent meta-analytic and India-specific evidence published between 2014 and 2026. The limitations of this purposive strategy are stated frankly in Section 12.

Model case (constructed for illustration): A first-year undergraduate reports that gaming is the first thing he thinks of on waking, indicating salience. He plays to escape academic stress, indicating mood modification. Sessions have lengthened from one to six hours to achieve the same satisfaction, indicating tolerance. He is irritable and restless when unable to play, indicating withdrawal. Play has triggered conflict with family and precipitated failed courses, and repeated resolutions to cut down collapse within days, indicating relapse, with clear functional impairment. All defining attributes co-occur.

Contrary case: A postgraduate spends long hours online for research and streams films nightly to relax. Use is voluntary and controllable, stops without distress, and produces no functional impairment or conflict. Volume is

high, but the defining attributes of addiction are absent. The contrast operationalises the quantity-versus-dysregulation distinction and cautions against inferring addiction from screen time alone.

Theoretical perspectives

No single theory commands the field; several complementary accounts illuminate different facets, as compared in Table 2.

1. The components (biopsychosocial) model

Griffiths (2005) [10] provides the descriptive and definitional backbone described in Section 2.2, locating addiction in the interaction of biological, psychological and social processes and specifying the six shared components.

2. The cognitive-behavioural model

Davis (2001) [9] argued that pre-existing psychopathology such as depression or social anxiety is a distal necessary cause which, in the presence of the internet, gives rise to maladaptive cognitions — for example, the belief that one is only worthwhile online — that proximally generate and maintain pathological use. The model foregrounds cognition, yields direct targets for cognitive-behavioural therapy, and distinguishes generalised from specific problematic use.

3. The I-PACE model

Brand *et al.*'s (2016) [6] Interaction of Person-Affect-Cognition-Execution model is currently the most widely adopted integrative framework for specific internet-use disorders. It is a process model in which disorders result from interactions among predisposing person factors such as personality, psychopathology, biopsychological constitution and early experiences; affective and cognitive responses to triggers, including cue-reactivity, craving, internet-related cognitive biases and coping style; and reduced executive control, expressed as inhibitory failure, with conditioning strengthening these associations over time. The 2019 [5] update generalised the model beyond internet-use disorders to addictive behaviours more broadly and specified distinct early-stage and later-stage mechanisms (Brand *et al.*, 2019) [5]. I-PACE explicitly integrates neurobiological processes of reward and executive control with psychological ones, and it structures the framework proposed in Section 10.

4. Compensatory internet use

Kardefelt-Winther (2014) [15] supplies the principal motivational and critical counterweight described in Section 2.4, emphasising escapism and coping as mediators and psychosocial problems as the true origin of harm.

5. Uses and gratifications

This communication-theory tradition frames media engagement as active and goal-directed: users select platforms to satisfy needs for information, social connection, entertainment and self-presentation. It helps explain why particular applications become salient for particular users and cautions against a purely deficit-based reading of heavy use.

6. Dual-systems and reward accounts

Neurocognitive work frames technology addiction in terms of an imbalance between a fast, reward-driven impulsive system and a slower, reflective inhibitory system. A functional magnetic resonance imaging study of Facebook “addiction” reported hyperactive reward-system responses to social-media cues alongside relatively intact but insufficiently engaged inhibitory circuitry (Turel *et al.*,

2014) ^[28], and a companion structural study reported associated grey-matter differences (He *et al.*, 2017). These accounts align with the execution component of I-PACE.

7. Persuasive design and the attention economy

A rapidly growing, structurally oriented perspective locates part of the causal story outside the individual. Montag and Elhai (2023) ^[23] argue that social-media companies deliberately engineer immersive environments — the like button, infinite scroll, variable-ratio notifications, pull-to-refresh — in order to maximise time on app for advertising revenue, in what is described as the attention economy or surveillance capitalism. On this view, addictive-like behaviour is partly a designed outcome, which shifts some responsibility from the user to the platform and grounds regulatory and design-level interventions.

Table 2: Comparison of theoretical models

Model	Primary source	Central mechanism	Main intervention target	Strength / limitation
Components (biopsychosocial)	Griffiths (2005) ^[10]	Six shared components; all six required	Definition and screening	Unifying but descriptive rather than processual
Cognitive-behavioural	Davis (2001) ^[9]	Distal psychopathology gives rise to maladaptive cognitions, which drive use	Cognitions (CBT)	Strong therapeutic map; limited on neurobiology
I-PACE	Brand <i>et al.</i> (2016, 2019) ^[5, 6]	Person x affect x cognition x reduced execution, reinforced by conditioning	Executive control, cue-reactivity, coping	Comprehensive and integrative; complex to test as a whole
Compensatory internet use	Kardefelt-Winther (2014) ^[15]	Escapism and coping mediate psychosocial problems and overuse	Underlying life problems	Corrective and motivational; under-specifies chronic cases
Uses and gratifications	Communication tradition	Active need-satisfaction drives media selection	Meeting needs offline	Explains why and what; not a pathology model
Dual-systems / reward	Turel <i>et al.</i> (2014); He <i>et al.</i> (2017) ^[12, 28]	Imbalance between impulsive reward system and inhibitory control	Inhibitory control	Neurobiological grounding; small samples
Persuasive design / attention economy	Montag&Elhai (2023) ^[23]	Engineered engagement through variable rewards and infinite scroll	Design change and regulation	Adds structural cause; less on individual variation

Source: Author’s synthesis of the literature reviewed

Attributes, antecedents and consequences

Synthesising across theories and instruments yields the following consolidated concept-analysis output, summarised in Table 3.

Defining Attributes: the features whose co-occurrence marks the concept, are: impaired control over the onset, frequency, intensity, duration and termination of use; salience or preoccupation, such that the behaviour dominates cognition and priorities; mood modification, or use to escape or regulate affect; tolerance, or escalating engagement to achieve the prior effect; withdrawal-like distress on cessation or prevention; conflict, whether interpersonal, occupational, academic or intrapsychic; relapse after attempts to reduce or stop; and continuation despite harm with demonstrable functional impairment across life domains. The first, second, seventh and eighth of these map closely onto the ICD-11 gaming-disorder criteria, while the full set reflects Griffiths’ components model. Functional impairment is the pivotal differentiator from heavy but benign use.

Antecedents: The conditions preceding the concept, fall into three groups. Person-level antecedents include depression, anxiety, low self-esteem, high impulsivity and low inhibitory control, loneliness, social anxiety, sensation-seeking, and personality profiles marked by low conscientiousness or high neuroticism, together with adverse childhood experiences and stress-reactivity as

specified in I-PACE. Social antecedents include poor peer relationships, family conflict, low parental monitoring and social-compensation motives (Kardefelt-Winther, 2014) ^[15]. Structural or design antecedents include variable-ratio reward schedules, frictionless access and notification architectures (Montag&Elhai, 2023) ^[23], and, at population level, cheap ubiquitous connectivity.

Consequences: Span several domains. Mental-health consequences include elevated depression, anxiety and stress, with evidence pointing to bidirectionality. Physical consequences include sleep disruption, eyestrain, musculoskeletal complaints and sedentary-related risks. Functional consequences include reduced academic and occupational performance and procrastination. Relational consequences include relationship strain, social withdrawal and reduced offline community participation (Kuss&Griffiths, 2011) ^[19].

Empirical Referents: The means by which the concept is measured, include Young’s Internet Addiction Test, the Bergen Facebook and Social Media Addiction Scales built on the six components (Andreassen *et al.*, 2016) ^[3], smartphone-addiction and nomophobia questionnaires, and instruments aligned to the DSM-5 and ICD-11 gaming criteria. The multiplicity of these referents and their differing cut-offs is itself a major source of the field’s disagreements, as Section 6 sets out.

Table 3: Attributes, antecedents and consequences of digital addiction

Defining attributes	Antecedents	Consequences
Impaired control; salience or preoccupation; mood modification; tolerance; withdrawal-like distress; conflict; relapse; continuation despite harm; functional impairment	Person: depression, anxiety, low self-esteem, impulsivity and low executive control, loneliness, social anxiety, personality profile, adverse childhood experiences, stress-reactivity. Social: poor peer and family relations, low monitoring, social-compensation motives. Structural: persuasive design, variable rewards, notifications, ubiquitous cheap access	Mental health: depression, anxiety, stress (bidirectional). Physical: sleep disruption, eyestrain, musculoskeletal complaints, sedentarism. Functional: academic and occupational decline, procrastination. Relational: strain, withdrawal, reduced offline participation

Source: Author's synthesis of the literature reviewed

Classification and diagnostic debates

1. What has been formally recognised?

Two authorities matter here. The American Psychiatric Association's DSM-5 (2013) ^[1] placed internet gaming disorder in Section III, "Conditions for Further Study," an explicit statement that the evidence did not yet warrant a full diagnosis, accompanied by nine provisional criteria intended to stimulate research. The World Health Organization's ICD-11 went further, formally including gaming disorder among disorders due to addictive behaviours, defining it as a pattern of digital or video gaming behaviour characterised by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite negative consequences, normally evident for at least twelve months and of sufficient severity to impair functioning (World Health Organization, 2019) ^[30]. Crucially, no broader internet addiction, smartphone addiction or social media addiction has been recognised as a formal disorder by either body. Gaming disorder remains the field's sole ratified diagnosis.

2. The overpathologising critique

The recognition of gaming disorder was, and remains, contested. Billieux *et al.* (2015) ^[4], in the influential commentary "Are we overpathologizing everyday life?", argued that the proliferation of putative behavioural addictions had been driven by an unwise application of the addiction model to ordinary behaviours, resting on atheoretical and confirmatory research strategies that assume rather than test addiction. Scholars have warned of moral panic, premature medicalisation and the pathologising of a normative recreational activity, and have asked how behavioural addiction might be conceptualised without pathologising common behaviours (Kardefelt-Winther *et al.*, 2017) ^[16]. This tension between clinical utility, since a validated diagnosis enables treatment, funding and research, and the risk of pathologising everyday enjoyment is the central diagnostic debate in the field.

3. Measurement problems

Several methodological faults inflate and destabilise estimates. Low or arbitrary cut-offs on screening instruments classify large fractions of ordinary users as addicted. Screening is not diagnosis: a positive screening score carries a substantial probability of not indicating addiction, because low base rates degrade the positive predictive value of any test. Confirmatory and atheoretical designs entrench the construct rather than probing it. Finally, instrument heterogeneity and differing thresholds make prevalence estimates non-comparable, a point illustrated starkly in the next section.

Prevalence and demographic patterns

Prevalence figures must be read against the measurement caveats set out above. With that caution, the best available meta-analytic evidence is as follows.

1. Global evidence

The most comprehensive synthesis is that of Meng *et al.* (2022) ^[21], covering 2,123,762 individuals from 64 countries. It reported a global pooled prevalence of 26.99 per cent (95% CI 22.73–31.73) for smartphone addiction, 17.42 per cent for social media addiction, 14.22 per cent for internet addiction, 8.23 per cent for cybersex addiction and 6.04 per cent for game addiction, with a higher burden in lower-income countries and a rising trend worsened by the COVID-19 pandemic. Cheng and Li (2014) ^[7], meta-analysing 31 nations across seven world regions, likewise found internet-addiction prevalence varying markedly by region and inversely related to quality of life, with higher risk in Asia and the Middle East than in North America and Europe.

For gaming disorder specifically, Stevens *et al.* (2021) ^[27] reported a pooled global prevalence of 3.05 per cent, with a male-to-female ratio of approximately 2.5 to 1, and cautioned that estimates are inflated by measurement and sampling factors. For problematic smartphone use, Sohn *et al.* (2019) ^[26], across 41 studies of 41,871 children and young people, found a median prevalence of 23.3 per cent, with a range from 14.0 to 31.2 per cent, and reported that problematic use was associated with roughly threefold increased odds of depression together with raised anxiety, stress and poor sleep.

2. India and South Asia

Indian evidence is now substantial and confirms that this is an emerging adolescent and student health issue. Among college students, Joseph *et al.* (2021) ^[13], pooling 50 studies across 19 Indian states using Young's Internet Addiction Test, estimated internet-addiction prevalence at 19.9 per cent (95% CI 19.3–20.5) at a cut-off of 50, rising to 40.7 per cent (95% CI 38.7–42.8) at a cut-off of 40 — a striking demonstration of cut-off sensitivity within a single dataset. Among school-going adolescents, a systematic review and meta-analysis of 15 Indian studies estimated moderate problematic internet use at 21.5 per cent (95% CI 17.0–26.8) and severe problematic use at 2.6 per cent (95% CI 1.6–4.2) on Young cut-offs of 50 and 80 respectively, indicating that about one adolescent in five is at risk (Joseph *et al.*, 2022) ^[14].

For smartphone use, Davey and Davey (2014) ^[8] reported, through a mixed-method systematic review and meta-analysis, a smartphone-addiction magnitude of 39 to 44 per cent among Indian adolescents. Community evidence is more conservative: the Indian Council of Medical Research-funded technology addiction survey conducted at the

National Institute of Mental Health and Neurosciences (NIMHANS) among 2,755 East Bengaluru residents aged 18 to 65 found internet dependence of 1.3 per cent, comprising 2 per cent of males and 0.6 per cent of females, and mobile-phone overuse of 4.1 per cent, comprising 2.5 per cent of males and 1.5 per cent of females (Sharma *et al.*, 2017) ^[25]. The divergence between community and student estimates is itself informative, reflecting both sampling frames and the concentration of risk among young, high-pressure populations.

Two demographic regularities recur across settings. The first is male preponderance in gaming and pornography, with the gap narrower or reversed for social media. The second is elevated risk among adolescents and university students relative to the general population. A meta-analysis of medical students reported an internet-addiction prevalence of 30.1 per cent, approximately five times general-population estimates (Zhang *et al.*, 2018) ^[32], underscoring the vulnerability of high-pressure student groups of direct relevance to academic libraries.

Consequences for health, performance and wellbeing

The consequences literature is consistent in direction but must be read cautiously on causation. Cross-sectional associations link problematic use with depression, anxiety, perceived stress and poor sleep (Sohn *et al.*, 2019) ^[26], and with reduced academic achievement and impaired offline social participation (Kuss & Griffiths, 2011) ^[19]. Clinical observation in Indian technology de-addiction settings adds reports of physical distress, social withdrawal and disrupted family bonding among heavy users presenting for care (Sharma *et al.*, 2017) ^[25].

Three interpretive cautions are warranted. First, directionality is frequently ambiguous: depression and loneliness are plausibly both antecedents, as compensatory-use theory proposes, and consequences, implying bidirectional or reciprocal relationships better captured by longitudinal designs. Second, effect sizes are often modest and mediated by third variables, with escapism motivation a candidate mediator of the stress-to-overuse link (Kardefelt-Winther, 2014) ^[15]. Third, not all heavy use is harmful: gaming and social media confer social, informational and recreational benefits for most users, and harm concentrates in the dysregulated minority who meet the defining attributes. Responsible synthesis therefore resists the deficit-only narrative that the overpathologising critique rightly targets.

Prevention and intervention

Because antecedents operate at several levels, effective response must be multi-level. **Table 4** organises interventions accordingly.

1. Individual and family levels

Cognitive-behavioural therapy is the best-supported psychological approach, targeting directly the maladaptive cognitions specified by Davis (2001) ^[9] and the cue-reactivity and executive components specified by I-PACE. Self-monitoring, goal-setting and structured usage-reduction

practices are increasingly common, although evidence on digital detox remains mixed. At the family level, parental support, monitoring and communication are protective, particularly for adolescents, and structured parent-group programmes have been developed in Indian clinical settings to build cyber-literacy, early recognition of warning signs and healthier family dynamics.

2. Educational and policy levels

Schools and universities can embed screen balance, self-regulation and critical media use into curricula. India's National Education Policy 2020 ^[22], with its emphasis on digital literacy, critical thinking and holistic student wellbeing, offers a natural policy vehicle for integrating digital-wellbeing content into higher education (Ministry of Human Resource Development, 2020) ^[22]. At the clinical and policy level, the Service for Healthy Use of Technology clinic established at NIMHANS, Bengaluru, provides a screening and outpatient model for technology-related problems that could be scaled elsewhere in South Asia; the associated survey work is reported by Sharma *et al.* (2017) ^[25].

3. Platform design

If persuasive design is a structural antecedent (Montag & Elhai, 2023) ^[23], then design is also a lever. Time-well-spent features, friction-adding digital nudges, default limits and reduced variable-reward intensity can be deployed by platforms, and regulation restricting addictive design features, particularly for minors, is emerging internationally.

4. The role of academic libraries and information professionals

This is the paper's distinctive LIS contribution. Academic libraries are already positioned as neutral, non-stigmatising, high-footfall campus spaces with a mandate for information literacy and a growing involvement in student wellbeing. A developing LIS literature documents libraries supporting student mental health through curated collections, dedicated wellbeing spaces, awareness campaigns, referral partnerships with counselling services and reading-for-wellbeing initiatives (Komariah *et al.*, 2022) ^[18].

Extending this work, libraries can champion digital wellbeing literacy as a proposed sub-domain of information literacy, comprising four elements: critical understanding of attention-economy design and algorithmic curation, so that students can recognise engineered persuasion; practical competence in self-monitoring screen use and configuring digital-wellbeing tools; curated, evidence-based collections together with signposting to clinical services; and the embedding of these competencies within existing information-literacy instruction and within continuing professional development for library staff. This reframes the librarian as an information gatekeeper for digital wellbeing, an achievable and mandate-consistent extension of professional practice rather than a departure from it.

Table 4: Levels of prevention and intervention

Level	Illustrative interventions	Relevance and exemplars
Individual	Cognitive-behavioural therapy; self-monitoring; goal-setting; structured usage reduction	Targets maladaptive cognitions (Davis, 2001) ^[9] and I-PACE mechanisms
Family	Parental monitoring, communication and boundary-setting; structured parent groups	Protective for adolescents; parent-group programmes in Indian clinical settings
Educational	Curriculum-embedded digital literacy, self-regulation	National Education Policy 2020 ^[22] digital-literacy and holistic-

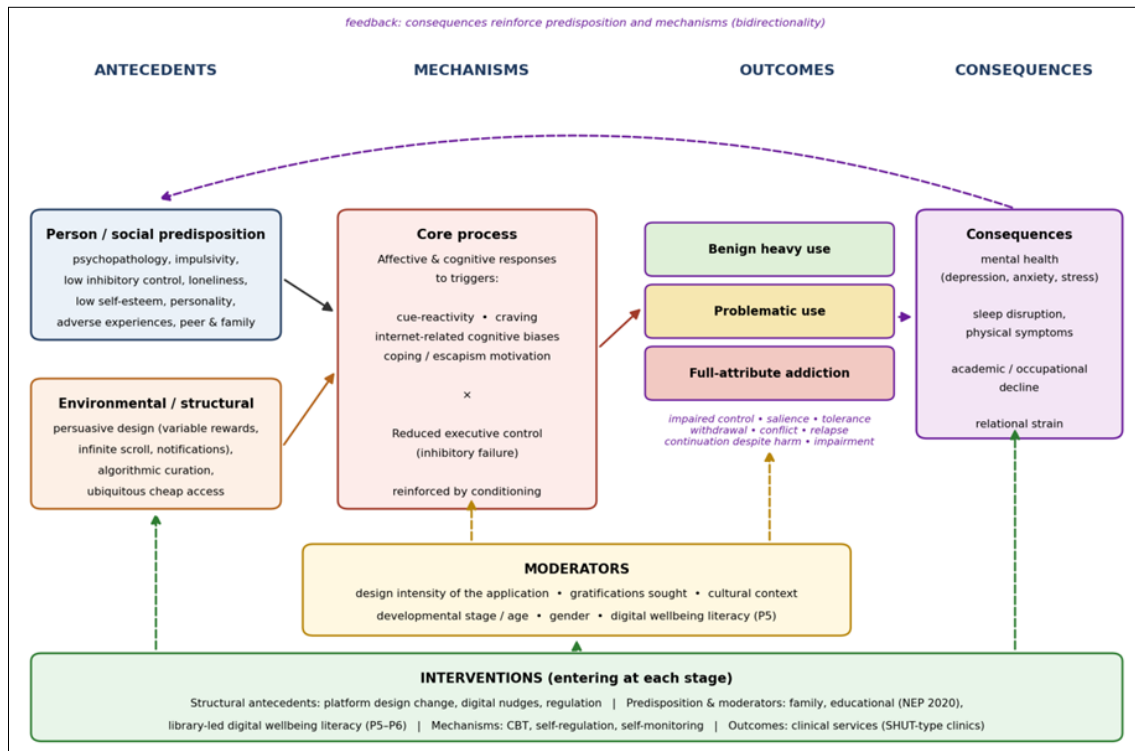
	and wellbeing content	wellbeing goals
Platform design	Digital nudges; time-well-spent features; default limits; reduced variable-reward intensity	Montag and Elhai (2023) ^[23] ; emerging regulation of addictive design
Clinical and policy	Specialist technology de-addiction services; screening; public advisories	NIMHANS Service for Healthy Use of Technology; survey evidence in Sharma <i>et al.</i> (2017) ^[25]
Library and information	Digital wellbeing literacy; curated collections; signposting; staff CPD	Komariah <i>et al.</i> (2022) ^[18] ; proposed librarian role as digital wellbeing gatekeeper

Source: Author's synthesis of the literature reviewed

A proposed conceptual framework: the AMMOI model

To synthesise the analysis, this paper proposes an integrative Antecedents–Mechanisms–Moderators–Outcomes–Interventions (AMMOI) framework, shown in Figure 1. The framework is deliberately compatible with I-

PACE (Brand *et al.*, 2016, 2019) ^[5, 6] but incorporates compensatory-use motivation (Kardefelt-Winther, 2014) ^[15] and, importantly, the structural and design layer (Montag&Elhai, 2023) ^[23] that person-centred models tend to under-weight.



Source: Author's own work

Fig 1: The Antecedents–Mechanisms–Moderators–Outcomes–Interventions (AMMOI) framework for digital addiction

1. Structure of the framework

Antecedents enter through two parallel streams. The first is person and social predisposition: psychopathology, impulsivity and low inhibitory control, loneliness, low self-esteem, personality, adverse experiences, and peer and family context. The second is environmental and structural: persuasive platform design, algorithmic curation and ubiquitous cheap access.

Mechanisms form the core process. Affective and cognitive responses to triggers — cue-reactivity, craving, internet-related cognitive biases and coping or escapism motivation — interact with reduced executive control, reinforced over time by conditioning. This is the engine that transforms inputs into behaviour.

Moderators include the design intensity of the specific application, the gratifications sought, cultural context, developmental stage and gender, and, as proposed here, digital wellbeing literacy.

Outcomes occupy a spectrum running from adaptive or benign heavy use, through problematic use, to a full-attribute addiction syndrome, with downstream

consequences for mental health, sleep, academic and occupational functioning and relationships.

Interventions are positioned as arrows targeting each stage: cognitive-behavioural therapy and self-regulation at the mechanism level; family, educational and library-led digital wellbeing literacy at the predisposition and moderator levels; and design change and regulation at the structural-antecedent level. Feedback loops run from consequences back to predisposition and mechanisms, formalising the bidirectionality noted in Section 8.

2. Testable propositions

P1: The relationship between use volume and functional impairment is non-linear; impairment is predicted by the co-occurrence of defining attributes rather than by volume alone.

P2: Coping and escapism motivation mediates the relationship between psychosocial adversity, such as stress and loneliness, and problematic use, extending Kardefelt-Winther (2014) ^[15].

P3: Reduced inhibitory control moderates the path from mechanism to outcome, such that cue-reactivity translates into problematic use more strongly where executive control is low, consistent with I-PACE.

P4: Application-level persuasive-design intensity moderates the path from predisposition to outcome, amplifying risk independently of person factors.

P5: Digital wellbeing literacy, including critical awareness of persuasive design, attenuates the path from predisposition to problematic use, functioning as a protective moderator.

P6: Library-embedded digital wellbeing literacy interventions produce measurable reductions in problematic-use scores among at-risk students relative to controls.

P7: In the Indian and South Asian context, male gender predicts gaming and pornography pathways specifically, whereas social-media pathways show weaker or reversed gender effects.

Propositions P5 and P6 are, to the author's knowledge, novel to the interface between LIS and digital-addiction research, and constitute the framework's principal claim to originality.

Research agenda

The analysis implies several priorities. Methodologically, the field needs longitudinal and cross-lagged designs to resolve directionality; convergence on validated, clinically anchored instruments with defensible cut-offs, in order to end the prevalence instability illustrated by Joseph *et al.* (2021) ^[13]; and clearer separation of problematic use from validated addiction. Conceptually, testing whether application-specific disorders share a common core or are genuinely distinct would clarify the coherence of the umbrella construct.

Contextually, India and South Asia need nationally representative cohorts spanning rural and urban settings and socio-economic gradients, together with evaluation of culturally embedded interventions and of curricula aligned to the National Education Policy 2020 ^[22]. For LIS specifically, propositions P5 and P6 invite controlled evaluations of library-based digital wellbeing literacy programmes, the development and validation of a digital wellbeing literacy competency scale, and studies of how problematic use reshapes students' information behaviour and library use.

Limitations

Several limitations follow from the paper's design. As a conceptual paper it presents no primary data, and its framework and propositions are analytic and remain empirically untested. The concept analysis is purposive and integrative rather than systematic: source selection, while spanning seminal and recent indexed work, was not exhaustive and did not use a formal search protocol or quality appraisal, which introduces potential selection bias. The underlying literature is dominated by cross-sectional, self-report evidence with uneven geographical coverage, limiting causal and cross-cultural inference. Prevalence figures cited here are not directly comparable owing to instrument and cut-off heterogeneity, and are reproduced

only as reported by their sources. Finally, the proposed digital wellbeing literacy construct and the library role are argued from analogy and adjacent evidence rather than from direct trials, and require the empirical testing set out in propositions P5 and P6.

Conclusion

Digital addiction is best understood not as a settled clinical fact but as a useful and contested umbrella concept whose credibility depends on disciplined conceptualisation. This analysis argues for a defensible middle position that rejects both the dismissive claim that nothing here is real and the inflationary claim that heavy use is addiction. The evidence supports a genuine minority phenomenon, marked by the co-occurrence of impaired control, salience, mood modification, tolerance, withdrawal, conflict, relapse and functional impairment, and arising from the interaction of personal vulnerability, social context and engineered platform design. Only gaming disorder has earned formal diagnostic status; the remainder is, appropriately, problematic use.

The response must be correspondingly multi-level, and it should include an actor that the psychological and public-health literatures have largely overlooked: the academic library. By reframing digital wellbeing literacy as a natural extension of information literacy, and by testing the framework's propositions, particularly those linking library-led literacy to reduced problematic use, LIS can make a distinctive contribution to one of the defining behavioural questions of the digital era.

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