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Digital Dependency: How Smartphones are Reshaping Youth Behavior

Muhammad Umair Farooq[1], Dr. Saifullah[2], Abid Hussain[3]

1. Assistant Professor, Department of Social Work, Govt. Graduate College Bhakkar, Punjab, Pakistan.
2. Community Development Officer, HUD & PHED Punjab, Pakistan.
3. Lecturer, Department of Social Work, Govt. Graduate College Bhakkar, Punjab, Pakistan.

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Corresponding Author:
Muhammad Umair Farooq
Email: umair.sw@gmail.com

Abstract: *Smartphones have become the necessity than novelty, and have transformed the developmental ecology of today's youth. The aim of this qualitative study was to explore the lived experiences of 13 participants aged 15–25 from educational environments in the urban and peri-urban area, and how the use of the smartphone and social media affects emotional regulation, social relationships, academic performance and physical health. Data were gathered using a phenomenological and narrative research design, involving semi-structured in-depth interviews, small group focus group discussions and media-elicitation methods in which participants considered their own screen-use log. Five major themes were found through thematic analysis in line with Braun and Clarke (2006): Emotional Regulation Through Devices, Social Connectivity versus Social Isolation, Academic Disruption and Attention Fragmentation, Sleep Disturbance and Physical Health, and Self-Reflection and Coping Strategies. Results showed that there was a paradox with technology: smart phones offered emotional support, creative expression and social interaction, but also anxiety, compulsive checking, lower confidence in face-to-face communication, academic distraction, and sleep disturbances. Importantly, the majority of participants exhibited some form of self-awareness and were using some sort of self-regulatory strategies. The results are analyzed using Bronfenbrenner's (1979) bio-ecological model and Self-Determination Theory (Ryan & Deci, 2017). The implications for digital literacy education, mental health practice, family practice and technology policy are discussed.*

Introduction

In only 10 years, smartphones have gone from novelty to necessity. In 2023, it was estimated that the world had an average of almost one mobile-broadband subscription per person, with 6.8 billion subscriptions in operation, according to the International Telecommunication Union (ITU, 2023). This diffusion is led by young people aged 15-24: 9 out of 10 U.S. teens now have a smartphone (Pew Research Center, 2023), and the average American adolescent is spending 7 hours 22 minutes a day on recreational screen usage (Rideout et al., 2022). Similar, though slightly less, numbers are being

reported throughout South Asia and sub-Saharan Africa as mobile data costs drop (GSMA, 2023).

While constant connectivity provides a wealth of information, community, and creative tools, there is an increasing amount of research that has associated heavy or dysfunctional usage with sleep disturbances, anxiety, attentional issues, and cyber-victimisation (Kuss & Griffiths, 2017; Odgers & Jensen, 2020). This shift towards perpetual connectivity has raised the question of its impact on the emotional, academic, social, and behavioral trajectories of the current generation and has become a pressing concern for educators, clinicians, and families (Twenge, 2017).

In spite of a large body of quantitative literature there is a lack of the voices of young people themselves. The majority of studies are conducted on adult proxies (parent/teacher questionnaires) or uses screen time as a single construct that neglects the contextual nature of how screens are used, such as nighttime use or distraction in the classroom (Ellis et al., 2020). This is where this study comes in, examining youth self-reports through a qualitative study. The investigation had three aims:

- To understand the experience of the young people in the way they use their smartphones and social media in the here and now.
- To determine self-reported behavioral changes related to that use.
- To create a map of areas of perceived risk, and areas of positive adaptation.

This led to three research questions: (a) what are youth's perceptions and interpretations of their own use of the smartphone? (b) What behavioral changes do they think that use brings about? (c) What social, emotional and academic issues do they connect with digital engagement that is intensive?

Literature Review

Prevalence and Time Trends

In most industrialized countries, there are more adolescents who own a cell phone than do not own one (Pew Research Center, 2023; GSMA, 2023). According to data from Common Sense Media, the amount of daily screen time for American tweens and teens increased by almost double from 2012 to 2022 (Rideout et al., 2022). This trend has been exacerbated by the COVID-19 pandemic, which has forced schooling and recreational activities to take place online (Ellis et al., 2020).

The relationship between behavioral addiction and self-regulation will be explored

Using the standard criteria of a behavioral addiction, Kuss and Griffiths (2017) compiled 10 empirical lessons: tolerance, withdrawal, and role conflict were all considered to be indicative of problematic smartphone use (PSU). A 2021 systematic review of 84 studies found a prevalence of PSU in university samples to be between 10-30% (Busch & McCarthy, 2021). Variable-ratio notification schedules have been shown to be involved in the consolidation of compulsive habit loops through the dopaminergic reward system (Montag & Elhai, 2020).

Social and Emotional Outcomes

The small associations found through meta-analytic evidence suggest that high smartphone usage is associated with depressive symptoms ($r \approx .15$; Odgers & Jensen, 2020). The mode of use is crucial, though: when participants are actively present in the internet, in need of social interaction, and either video calling or playing games together, social capital is reinforced, while passive "scrolling" predicts poorer well-being (Verduyn et al., 2017). Primack et al. (2017) reported that the more often young adults used social media, the more they felt socially isolated, even after controlling for how often they personally interacted with people in person. Dhir et al. (2018) also showed that compulsive SM usage leads to emotional fatigue, fear of missing out (FOMO), and increased anxiety. Valkenburg and Peter's (2011) Differential Susceptibility Model highlights dispositional and contextual moderators as being central to these disparate outcomes.

Academic Performance

There was a negative correlation between academic success and mobile multitasking. Lepp et al. (2015) reported a correlation of -0.28 between an increase of 1 standard deviation in daily smartphone use and undergraduates' GPA, when the relationship between sex and GPA was statistically controlled. In-class multitasking using digital devices was found to have a negative impact on both task performance and cognitive engagement (Junco, 2012). Although the picture isn't entirely bleak: a meta-analysis of 110 experiments showed a statistically significant positive effect of mobile-assisted language instruction (Hedges' g = 0.55) from which it is concluded that educational technology designed for the purpose of improving learning outcomes is beneficial (Sung et al., 2015).

Conceptual Gaps

The present study stems from two gaps in the literature. First, the majority of research is based on the adults' reflections rather than the adolescents. Second, quantitative survey designs assume that screen time is all the same, whereas in reality, there are contextually differentiated patterns in screen time, such as late night scrolling or distraction in the classroom (Ellis et al., 2020). Qualitative research can be of benefit to deepening theory and can help to inform context-sensitive policy, where adolescent meaning-making is at the center.

Theoretical Framework

The bio-ecological model of development (Bronfenbrenner, 1979) argues that development is a product of the influence one person has on another, as well as the interaction between the person, and the microsystems of family and school, the mesosystems of neighbourhoods and peers, the macrosystems of culture and policy, and the chronosystems of time. Smartphones add to this layering by bringing remote influences – global TikTok trends, international peer networks – into intimate microsystems like bedrooms, classrooms. This stratified ecology of youth experience can be analysed to reveal the intersections and contestations of youth and family values, school policies and cultural scripts regarding connectivity.

A complementary motivational lens was provided by Self-Determination Theory (SDT; Ryan & Deci, 2017). According to SDT, there are three basic needs that must be met to achieve psychological well-being: autonomy, competence, and relatedness. A recent meta-analysis validated the smartphone affordances for meeting and not meeting all these needs (Chen et al., 2021). For instance, messages can simultaneously increase relatedness and decrease autonomy through constant call for response. The practical implications of SDT for analysing interviews allowed the conditions under which the use of the smartphone felt empowering and entrapping to be identified.

Methodology

Research Design

The method chosen was a qualitative design, a combined approach of phenomenological and narrative. Phenomenological approach was chosen as it provided depth understanding of how participants experienced and understood their everyday use of digital interactions. This was supplemented by narrative inquiry, which presented the personal and social aspects of digital engagement in the richness of their participant's voice (Creswell & Poth, 2018). The semi-structured interviews were sufficient and flexible to cover the research questions and also allowed for the exploration of individual experience.

Participants and Sampling

Purposive sampling was used to obtain a rich, relevant and diverse set of perspectives. The target group was students aged 15-25 years, who are known to be the heaviest social media users and most vulnerable consumers of digital technology. The sampling method used was purposive maximum

variation sampling (Patton 2015) which involved stratifying by gender, socio-economic status and educational track. Gatekeepers were school counsellors and youth non-governmental organisations. Consent was obtained from informed parents of children under 18, and institutional ethics approval was obtained before data collection.

A total of 13 persons were included in the final sample. The 10 participants each participated in individual in-depth interviews, and two focus groups of four and three people were held to gain experience in collective reflection and cross-checking of themes that emerged.

Data Collection

Three data tools were used to generate data. Semi-structured individual interviews were used for primary data collection in person and/or through video conferencing per participant preference and logistical feasibility. Interviews were all audio recorded with the participants' knowledge and consent. An open-ended interview guide was used, which included the following questions as representatives: How do you use your phone on a typical day? Explain one time when social media affected you regarding "self." What is your reaction to the feedback or validation of an online message? Have relationships changed in any way due to social media and, if so, how?

Another data source was a media-elicitation technique. The participants were asked to record themselves using their device on a typical day and comment on this recording during the interview. This was grounded in observable behavior as opposed to unaided recall, which provided an important addition of reflexivity. Third, a short version of the Smartphone Addiction Scale (SAS-SV; Kwon et al., 2013) and a short demographic questionnaire were completed by all participants to obtain descriptive triangulation and to put qualitative accounts into the context of a validated measure of problematic use.

Data Analysis

The interviews were recorded and transcribed verbatim and entered into NVivo for systematic management and coding. Thematic analysis, using Braun and Clarke's (2006) six phase approach, was used: (1) familiarisation with the data was achieved through repeated reading of transcripts; (2) initial codes were generated, which captured meaningful features of the data; (3) searching for and collating codes into candidate themes; (4) reviewing themes in relation to the entire data set to ensure coherence and distinctiveness of each theme; (5) defining and naming the themes to reflect the essence of each pattern; and (6) the production of the final report, which was anchored in the thematic narratives and supported by direct participant quotations.

Two independent coders performed coding and discussion was held to resolve discrepancies until interrater reliability was achieved (Cohen's $\kappa = 0.82$). This integrated analytic strategy incorporated both inductive coding and a deductive template based on SDT need-categories (Fereday & Muir-Cochrane, 2006) and allowed for both theory-driven interpretation and discovery of data. The documentation of analytic decisions was done in a systematic manner through memo-writing. Member checking was done by presenting the generated themes with a sub-sample of the participants to enhance credibility and confirmability.

Ethical Considerations

Data was collected after receiving ethical approval from the appropriate institutional review board. Informed written consent was obtained from all participants, and from a parent/guardian for those under 18 years of age. Participants were told at all times that they could drop out of the study without penalty. Confidentiality was protected by using pseudonyms generated by the researcher and no identifying details are included in the data reported. There were no financial incentives or coercion used in the research. For more sensitive topics that came up, such as cyberbullying experiences, unwanted

contact and/or self-harm, participants were given referral information to counselling services. Data were stored securely on the institutional server for five years following the APA ethics standards (American Psychological Association, 2020) and encrypted.

Findings and Discussion

A thematic analysis generated five themes which together provide a map of the psychological, social and behavioural patterns that are evident in the relationship between participants and their smartphones and social media. Themes of Emotional Regulation Through Devices, Social Connectivity versus Social Isolation, Academic Disruption and Attention Fragmentation, Sleep Disturbance and Physical Health, and Self-Reflection and Coping Strategies highlight both the perceived benefits and the emerging concerns of intense digital engagement. Illustrative participant quotes and in the context of wider empirical research are provided for each theme.

Theme 1: Emotional Regulation Through Devices

In all interviews and focus group discussions, the use of smartphones and social media was identified as a primary coping mechanism for aversive emotional states such as boredom, stress, sadness and anxiety. Digital platforms served as on-demand mood-control devices providing quick release from discomfort.

Female, 17, "When I am nervous or feeling bad, I take a break and open TikTok and Instagram, it takes my mind off of it and after a while I am okay.

But for much of the participants this pattern of coping had become a pattern of emotional dependency. The affective regulation they described was often externalized and dependent on the feedback received, such as likes, comments and prompt responses from others instead of on the capacity for self-calming.

“It makes me feel like I am not being noticed if I do not hear back or get likes in a short period of time. - Male 19”

I look at my phone first thing in the morning, not necessarily for anything, just to see if anything happened, if it doesn't, I just feel like I'm invisible. - Female, 22"

These reports are consistent with research conducted by Elhai et al. (2017) reporting strong relationships between emotional regulation by smartphone and compulsive checking behavior and increased anxiety. This means that they are dependent on a person outside of themselves, and dependent on a platform to arrive at feelings of validation, which can be problematic for psychological resilience over the longer-run. This is from an SDT perspective (Ryan & Deci, 2017), it is a manifestation of thwarted autonomy: The participants reported feeling a sense of being controlled by the notification cycles and not self-directed in the management of their emotions.

Theme 2: Social Connectivity/ Social Isolation

Social media was valued widely as a medium to maintain social relationships, mostly for friends and family living far away. For some of the participants, platforms like WhatsApp, Instagram, and Snapchat represented a real continuity of relationships. But this virtual connection was felt as somehow lacking - it could hold a relationship but it could not replace being physically there.

Though I'm always connected with people, sometimes I feel lonely. - Female, 18

I have hundreds on my follower list but I'd say maybe three people that I would call if something went wrong. - Male, 21

Multiple participants indicated a decrease in face-to-face social confidence, stating feeling uncomfortable in physical, social situations due, in part, to less practice. One of the recurring sub-themes was FOMO and upward social comparison as a result of curated peer content.

Female, 16: "When I see others enjoying themselves without me, then I feel left out – even if I wasn't even planning on going in the first place."

"Everyone's highlight reel makes me feel like I am falling behind, or that I am doing something wrong with my life. - Male, 20"

Social Media Use
↓
Online Connectivity
↓
Maintaining Relationships
↓
BUT ALSO
↓
Less Face-to-Face Interaction
↓
FOMO + Social Comparison
↓
Loneliness & Isolation

The findings are similar to Primack et al. (2017), who also identified a significant link between social media use and social isolation after accounting for real-world social interactions. Dhir et al. (2018) also associated compulsive use with social media fatigue, anxiety, and decreased subjective well-being. The paradox expressed by the participants, continuous connectivity and increasing feelings of loneliness, can be understood as the displacement hypothesis that Valkenburg and Peter (2011) propose; that intensive social media use might be a substitute for a deeper and more emotionally fulfilling social relationship which usually occurs in person.

Theme 3: Academic Disruption and Attention Fragmentation

The most consistent and vividly reported effects of being a heavy smartphone user were academic disruptions. Participants described the short, deliberate, checking-in to turning into longer, unplanned scrolling that had downstream consequences for study time and attention.

"I make one call to check one message and then I'm an hour or more into reels; I panic because assignments are due. - Female, 17"

I can't focus like I used to. I start working on something and 2 minutes later I reach for my phone without even realising. - Male, 22

"Even in lectures I'm half-present. Part of me is always waiting for something – a notification, a reply. – Female, 20"

Another subjective experience described by participants was that they felt cognitively exhausted: unable to focus on a single task for a long time, even when they had taken their devices out of sight. This self-perception of decreased concentration is consistent with Junco's (2012) study in which in-class digital multitasking was found to significantly affect the completion of tasks as well as academic performance. Lepp et al. (2015) also found a dose-response curve for the relationship between smartphone use and grade-point average. This is a partly attentional and partly motivational mechanism: notifications are not always reinforced regularly, this makes it aversive to continue working on less immediately rewarding academic tasks. In this Theme, students will examine the link between sleep disturbances and physical health. One of the most frequent and significant usage habits reported was late night viewing. Most of the respondents said they often scrolled far into the night, that they couldn't seem to stop once

started.

Even when I'm tired, I can't stop scrolling - 2, 3 AM before falling asleep. I know I should but I don't. - Male, 18

"Get up tired after 8 hours of sleep - think my sleep is disturbed but don't know how to change it - female - 16."

In addition to fatigue, physical symptoms were reported by the participants, such as eye strain, headaches that persisted and a decrease in physical activity as compared to other times in their lives.

"My eyes hurt all the time. And I hardly ever leave my house anymore - I was playing sport every day, but now most evenings I'm on my phone. - Male, 19"

The accounts are similar to those of Lemola et al. (2015), who reported that high nighttime electronic media use in adolescents was independent of sleep quality, depressive symptomatology, and physical discomfort. There is a physiological mechanism, the suppression of melatonin by blue-light exposure, and a behavioral mechanism as absorbing content delays sleep onset and disrupts sleep. The health risks described by the participants are exacerbated by the sedentary behavior participants described.

Theme 5: Self-Reflection and Coping Strategies

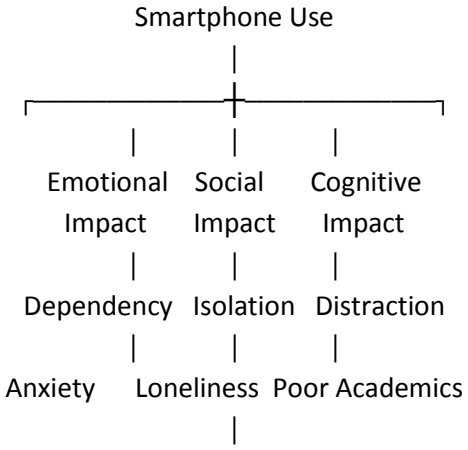
A significant finding in this study was how much many of the participants were aware of their own usage patterns. Instead of viewing themselves as passive victims of addictive technology, many of the participants talk about experimenting with self-regulatory strategies.

So I took off Instagram for a week and I was definitely more focused and relaxed and I didn't feel like I needed to constantly check what everyone else was up to. - Female, 21

I know how to check the time on screen, I know some guys set time limits for their phones, but I'm afraid I hit the limit pretty quickly - Male, 20

I've begun to put my phone in a different room when I'm studying, which is difficult at first, but it does work. - Female, 18"

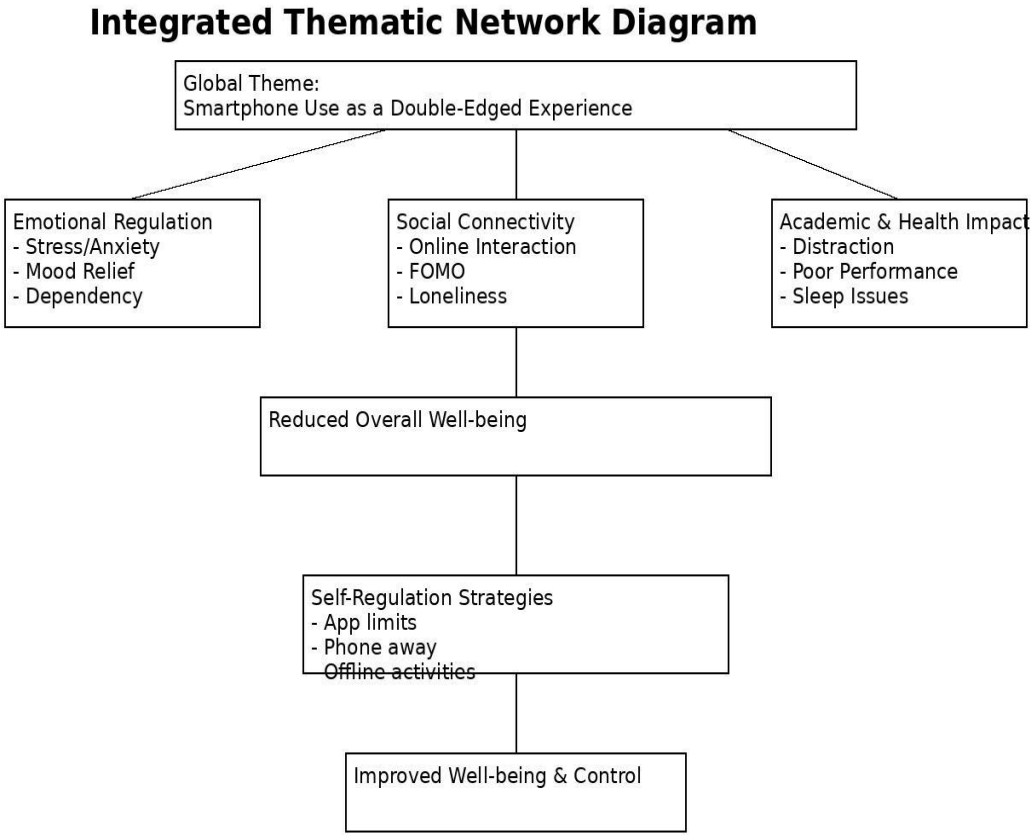
Examples of self-imposed interventions ranged from the deletion of apps, to the use of 'screen time' trackers, to the use of 'silent' or 'do not disturb' modes, charging phones away from the bedroom, and even purposeful replacement of phone time with other offline activities like exercise, reading, and in-person socializing. Kuss and Griffiths (2015) also noted that the younger social media users who are aware of the social aspects of digital media are not passive consumers but agents in the process of renegotiating healthy boundaries when they understand that there are negative impacts. These self-regulatory actions, from an SDT perspective (Ryan & Deci, 2017), are actions they are taking to regain autonomy and to regain competence, which they perceive as having been lost due to their compulsive use.



↓
Reduced Well-being
↑
|
Self-Regulation Strategies
(restore control & balance)

Integrated Conceptual Model

In each of the five themes, participants' experiences suggest a multifaceted approach to technology; the same gadget that offers comfort and connects people can also lead to anxiety, isolation, distraction and actual physical ailment. This paradox is logically consistent in Bronfenbrenner's (1979) model: the smartphone brings the macrosystem into the microsystem: the affordances and pressure of the wider digital culture come home. It is also coherent within SDT: smartphone affordances can serve to both satisfy and thwart the same basic needs, depending on the nature, mode, and intentionality of use.



Conclusion

This qualitative study explored the lived experiences of 13 young people (aged 15-25) on their journey in navigating opportunities and pressures associated with intensive smartphone and social media use. Five analytically distinct but empirically interrelated themes emerged: emotional regulation via device use;

social connectivity and isolation; academic disruption and attention fragmentation; sleep disruption and physical consequences; and active self-reflection and self-regulatory effort, all of which indicate a complex, paradoxical, and everyday relationship with digital technologies.

Smartphones are a source of emotional support and emotional dependence, they maintain social connections and cultivate feelings of isolation, they enable creativity and learning and they create a fragmentation of the cognitive abilities that are necessary for learning. Importantly, however, the subjects in this study were neither passive nor unreflective. Many have shown to hold some sort of informed critical awareness of their digital habits and were actively, if contingently, trying out ways to get hold of their digital habits. This discovery questions deficit discourses of youth digital culture and the need for external limitation, and supports a focus on enhancing self-regulatory capabilities.

There are implications of these findings for several stakeholder groups. The findings help educational institutions to embed attention-management and digital-literacy components in their curricula instead of imposing blanket device bans, and in a way that is based on evidence and context. The data suggest for mental health practitioners that normative and problematic uses should be differentiated, and that use is not inherently problematic; autonomy-supportive motivational messages should be used over fear-based messages. The results for families emphasize the importance of family-centered, family talk screen management. For the technology sector and policy makers, this marks an important reminder of how important it is to adopt default protective design features and invest in public digital well-being initiatives on the same scale as the challenge.

Future studies should aim for longitudinal, mixed-methods that include passive log data of device use as well as multiple qualitative interviews to establish causal direction and avoid confounding. Cross-study comparability would be improved if the contextual variables (such as location, social setting, time of day) were standardised across the studies. Young people co-researchers would be involved in the design of the study and dissemination which would enhance ecological validity and uptake of findings. The current study is a step toward this agenda as it focuses on the voices of young people themselves to provide a more nuanced and actionable picture of digital dependency than what can be gained from survey data alone.

Recommendations

Each of the principal stakeholder groups has the following evidence-informed recommendations. They are designed to be specific and actionable to encourage implementation, monitoring and incremental revision.

Schools and Universities

- Integrate attention-management into digital-literacy courses - such as a 30-minute lesson about setting up notifications, single-task learning strategies, and why the Pomodoro method works.
- Consider implementing structured device free times during the instructional day, with specific check-in times scheduled every 45-60 minutes, to minimize message-anxiety, but not forbid devices.
- Help teachers demonstrate appropriate device usage in the specific contexts they are in, such as putting on a screen during class time to fact-check something or putting away the device when it is no longer needed, so that using a device appropriately in that context becomes the norm.

Parents and Caregivers

- Create a family media agreement in writing, which includes: Device-free mealtimes, a shared charging station outside bedrooms after lights out and a family agreed upon shut down time.

- Change from time-based monitoring (e.g., no more than 2 hours) to goal-based monitoring (e.g., homework, chores, 30 minutes of outside activity before discretionary screen time) to encourage internal self-regulation, not compliance with time limits.
- Schedule monthly digital check-ins where youth and adults review screen-use reports together, share positive screen-use habits, and work together to solve potential problems of cyberbullying, sleep issues, and more.

Youth Themselves

- Set personalised limits on the 3 most time consuming applications using built-in device dashboards (iOS Screen Time; Android Digital Wellbeing) and review and recalibrate every week.
- Set aside time, at least once per day, to deliberately disconnect, in order to build tolerance for not being online, such as through exercise, listening to music, or engaging in in-person conversations.
- Focus on active rather than passive digital participation: developing content, engaging in meaningful communication, or engaging in a structured learning activity online, instead of, or in addition to, doing random, unstructured scrolling.

Public-Health and Education Policymakers Robert J. Samells and Robert C. Pianta are the two authors of this policy paper

- Support national digital well-being campaigns of a similar scale and scope to anti-smoking and road-safety campaigns, using focused messaging on sleep, mental health and being civil online.
- Make sure age-specific uses have clear labeling of persuasive design elements like infinite scroll, streak mechanics, and variable-ratio notifications.
- Incentivize telecom companies to provide low data educational packages that limit access to entertainment after midnight for under 18's subscribers, while also enabling them to receive education content.

Technology Industry

- Set the default protections for user-created accounts under 18 (e.g. a nightly Do-Not-Disturb window and a weekly screen-time report).
- Create in-app digital well-being dashboards that put into perspective not only daily totals, but streaks of consecutive use, making binge-use patterns salient to the user, with age-specific versions.
- Provide anonymised, aggregated usage data to independent researchers, with strong data-sharing agreements, to help support the interests of the public.

Mental-Health and Youth-Service Professionals

- Include a brief validated screener for the use of smartphones as part of the routine clinical intake process, which could be done using the SAS-SV short form (Kwon et al., 2013), to recognize problematic patterns early.
- Provide brief motivational interviewing-based interventions that focus on autonomy and values, and have been shown to produce better results on self-regulation in similar health behavior settings compared to fear-based interventions.
- In cases where digital dependency co-presents with anxiety, insomnia or reduced academic performance, set up structured pathways to community mental-health services from schools.

Researchers

- To identify causal mechanisms from cross-sectional correlation, move toward longitudinal (mixed-method) designs, using passively collected device-log data and repeated qualitative interviews.

- Ensure that contextual variables are reported in a standardized way and that time of day, social setting and physical setting are all reported to allow for meaningful comparison and replication across studies.
- Engage youth as active co-researchers in study design, study analysis, and study dissemination to enhance ecological validity and promote community ownership of study findings.

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