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# Perceived stress and excessive technology use among young people: a systematic review

*Estrés percibido y uso excesivo de la tecnología en los jóvenes: una revisión sistemática*

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## Abstract

Excessive use of digital technologies has emerged as a significant psychosocial risk factor linked to increased stress among college students. The objective of this systematic review was to examine the empirical evidence from 2015 to 2025 on the relationship between excessive use of these technologies and perceived stress in young people, from both neuropsychological and social perspectives. To this end, the PRISMA 2020 model was followed, and the search was conducted in the Scopus, Web of Science, PubMed, and SciELO databases, ultimately selecting 20 studies that met the inclusion criteria regarding the assessment of young people using standardized instruments such as the Perceived Stress Scale. The results highlight three categories: prolonged use of social media, information overexposure or digital infobesity, and compulsive use of mobile devices, all associated with high levels of perceived stress, while the phenomenon of compulsive nighttime checking is identified as a risk factor for psychophysiological insomnia and neuroendocrine dysfunction. It is concluded that the excessive use of digital technologies constitutes a risk to mental and social health in the university setting, thus requiring the implementation of preventive programs for regulation, as well as multi-component intervention strategies that take into account the sociocultural characteristics of Latin American youth.

**Keywords**: Stress, digital technologies, mental health.

## Resumen

El uso excesivo de las tecnologías digitales se ha consolidado como un factor emergente de riesgo psicosocial vinculado al incremento del estrés en estudiantes universitarios. El objetivo de esta revisión sistemática consistió en examinar la evidencia empírica de 2015 a 2025 sobre la relación entre el uso excesivo de estas tecnologías y el estrés percibido en la población joven, desde la neuropsicología y lo social. Para ello se siguió el modelo PRISMA 2020, y la búsqueda fue realizada en las bases de datos Scopus, Web of Science, Pubmed y SciELO, seleccionando finalmente 20 estudios que cumplieron con los criterios de inclusión sobre el abordaje de los jóvenes a través de instrumentos estandarizados como la Escala de Estrés Percibido. Como resultados se destacan tres categorías: el uso prolongado de redes sociales, la sobreexposición informativa o infobesidad digital y el uso compulsivo de dispositivos móviles, relacionadas con altos niveles de estrés percibido, en tanto el fenómeno del *checking* compulsivo nocturno como un factor de riesgo para el insomnio psicofisiológico y la disfunción neuroendocrina. Se concluye que el uso excesivo de las tecnologías digitales constituye un riesgo para la salud mental y social en el ámbito universitario, de modo que se requiere implementar programas preventivos para la regulación, así como estrategias de intervención multicomponentes que consideren las características socioculturales de la juventud latinoamericana.

**Palabras clave:** Estrés, tecnologías digitales, salud mental.

## Introduction

Perceived stress is defined as a psychobiological and subjective response to situations that individuals interpret as overwhelming, unpredictable, or uncontrollable. This response activates neuroendocrine mechanisms, such as cortisol release via the hypothalamic-pituitary-adrenal (HPA) axis, alongside behavioral reactions that disrupt physiological homeostasis and emotional equilibrium (McEwen & Wingfield, 2003; American Psychological Association [APA], 2022).

As a key indicator of mental health, perceived stress is particularly relevant among adolescents and young adults due to its associations with anxiety disorders, insomnia, depression, and cognitive impairments (Kuss & Griffiths, 2015; Elhai et al., 2017). In recent decades, the excessive use of digital technologies, understood as the overexposure to, compulsive engagement with, or dysregulated use of smartphones, social media, video games, and audiovisual platforms, has been identified as an emerging factor contributing to increased perceived stress (Przybylski et al., 2013; Vargas & Reyes, 2025).

This phenomenon, also referred to as technostress, encompasses both information overload and the social pressure to remain constantly connected, thereby affecting individuals' emotional and neuroendocrine regulation (Castillo-López et al., 2024).

Numerous studies have documented that continuous and nighttime exposure to digital devices disrupts circadian rhythms and sleep architecture, primarily through melatonin suppression caused by blue light exposure and hyperactivation of the HPA axis (Chang et al., 2015; Cajochen, 2007; Meerlo et al., 2008).

Psychologically, compulsive checking, fear of missing out (FOMO), and nighttime cognitive rumination have been identified as behaviors associated with problematic technology use, fostering a state of emotional and physiological hyperarousal linked to perceived stress (Elhai et al., 2017; Gutiérrez-Callañaupa et al., 2024).

In Latin American contexts, this issue takes on particular significance due to sociocultural and structural factors. On one hand, mobile device penetration among young people is high; on the other, there are notable gaps in digital literacy, mental health services, and access to prevention programs (Salazar & Piedra, 2024; Castillo-López et al., 2024).

Nevertheless, the specific relationship between dysregulated technology use and perceived stress has yet to be systematically consolidated through updated reviews that integrate clinical, neuropsychological, and social perspectives, thereby limiting the development of evidence-based public policies and intervention programs.

For these reasons, the objective of this study was to examine the empirical evidence from 2015 to 2025 on the relationship between excessive technology use and perceived stress in young populations, from neuropsychological and social standpoints, with attention to its implications for the planning of preventive and therapeutic interventions in clinical psychology and public health targeting youth and Latin American settings.

## Methodology

### Methodological strategy

A systematic review was conducted in strict accordance with the PRISMA 2020 guidelines (Page et al., 2021), aimed at collecting, organizing, and critically appraising the empirical evidence on the association between excessive digital technology use and perceived stress among university-aged individuals.

The review protocol was preregistered to ensure transparency and minimize selection bias, following standards for evidence-based medicine. The review adopted a clinical-descriptive and neuropsychological focus, incorporating methodological criteria from health psychology, applied neuroscience, and social epidemiology (Higgins et al., 2022).

To define the research question and scope, the PICO framework (Population, Intervention, Comparison, Outcome) was employed, as recommended by PRISMA 2020 for systematic reviews. The target population comprised adolescents and young adults, the intervention was defined as excessive digital technology use.

Comparison was not mandatory given the observational nature of most included studies, and the primary outcome was the level of perceived stress, measured via psychometrically validated instruments. An essential inclusion criterion required that studies utilize internationally standardized tools such as the

Perceived Stress Scale (PSS) developed by Cohen et al. (1983), including culturally adapted versions validated in university and adolescent populations.

This ensured methodological rigor, the reliability of findings, and the validity of conclusions drawn, with priority given to investigations that examined psychosocial and neurophysiological mechanisms associated with perceived stress, specifically HPA axis activation, cortisol elevation, sleep architecture disturbances, and subjective information overload linked to digital technology use (McEwen & Wingfield, 2003; Elhai et al., 2017). Observational cross-sectional, longitudinal studies, reviews, and guidelines from the Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2022) were considered.

Studies that did not use standardized instruments to measure perceived stress, as well as those focused on clinical populations with primary diagnoses other than those relevant to this review or that failed to report comparable outcomes, were excluded.

**Data sources and search strategy**

The literature search for this systematic review was conducted between July and September 2025 across the Scopus, Web of Science, PubMed, and SciELO databases.

These sources were selected for their recognized relevance, international coverage, and prestige within clinical psychology, applied neuroscience, and public health (Higgins et al., 2022; Page et al., 2021). Consultation of these databases enabled access to peer-reviewed literature with high methodological standards, ensuring the scientific robustness of the included studies.

The search strategy was designed using a structured approach, combining controlled descriptors and free terms with Boolean operators (AND, OR) to optimize both sensitivity and specificity in retrieving relevant documents. The terms used were: "perceived stress" OR "estrés percibido" AND "technology use" OR "uso de tecnología" AND "digital technology" OR "tecnología digital" AND "young adults" OR "adolescentes."

Filters were applied to select original research articles, observational studies, and systematic reviews published between 2015 and 2025 in English or Spanish, with full-text availability, and that employed standardized tools for measuring perceived stress, particularly the Perceived Stress Scale (PSS) developed by Cohen et al. (1983).

Additionally, a complementary manual search was conducted using the snowballing method, reviewing the reference lists of selected articles, a practice endorsed by PRISMA 2020 (Page et al., 2021). This strategy ensured comprehensive coverage and prevented the omission of relevant studies not indexed in the databases.

**Conceptual considerations: digital technologies and electronic devices**

In the context of this study, it was considered appropriate to include research that examined both the use of specific digital tools and the duration of exposure to electronic devices, recognizing that each type of analysis has distinct implications for individuals' mental and physical health.

Whereas digital technology use entails social, cognitive, and emotional interactions (such as those occurring on social media, mobile apps, and games) prolonged use of electronic devices introduces physical factors such as blue light exposure, circadian rhythm disruption, increased nocturnal brain activity, and sleep disturbances, all of which contribute to subjective stress perception (Cajochen, 2007; Chang et al., 2015; McEwen & Wingfield, 2003).

This conceptual distinction was incorporated into the inclusion and analysis criteria, following the recommendations of PRISMA 2020 and the Cochrane Handbook for Systematic Reviews of Interventions, with the aim of improving the understanding of the neuropsychological and psychosocial mechanisms involved in the link between digital technology and electronic device use and perceived stress.

**Inclusion criteria**

To ensure methodological consistency and thematic relevance among the selected studies, the following inclusion criteria were established, thereby guaranteeing the rigor and pertinence of the included research:

- Articles published between 2015 and 2025.
- Quantitative studies, including experimental, correlational, longitudinal, observational designs, and systematic reviews.
- Populations composed of university students aged 17 to 30 years.

- Use of psychometrically validated instruments to measure perceived stress, such as the Perceived Stress Scale (PSS) developed by Cohen et al. (1983) or adapted versions validated in regional contexts, among others.
- Studies that specifically examined the relationship between excessive digital technology use and perceived stress, whether as an independent or dependent variable.

**Exclusion criteria**

Complementarily, exclusion criteria were established to filter out irrelevant studies and ensure the methodological quality of the narrative synthesis:

- Studies that did not explicitly evaluate perceived stress as a primary or secondary variable.
- Research focused on clinical populations with primary diagnoses other than those relevant to this review, such as severe neurological or psychiatric disorders.
- Theoretical articles, editorials, essays, narrative reviews, or any non-empirical publications.
- Studies without full-text access or those that failed to meet minimum methodological standards, including lack of clarity regarding design, sample, or instruments used.

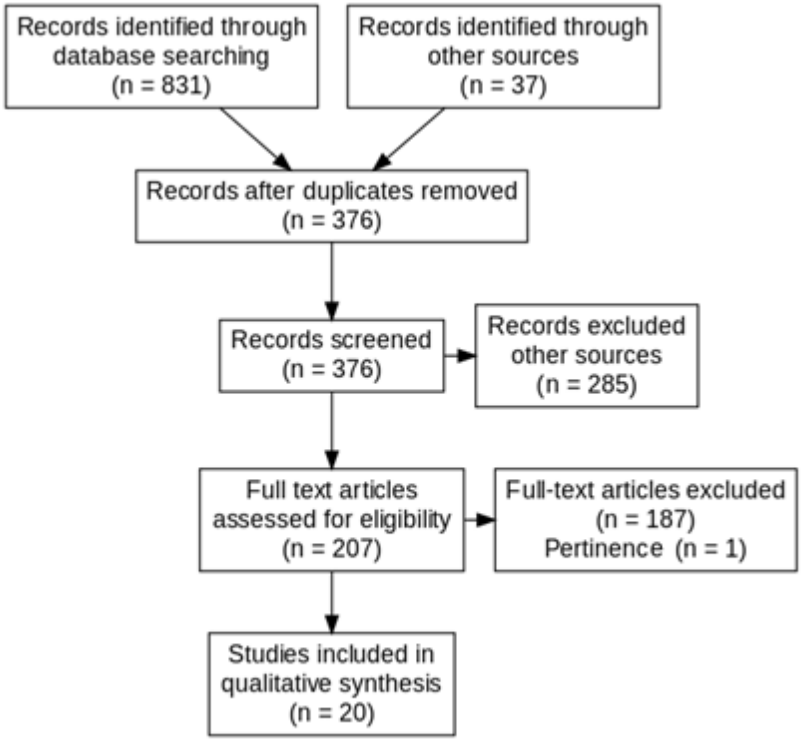
**Selection process**

The selection of studies was carried out systematically and rigorously, following the PRISMA 2020 flow diagram guidelines (Page et al., 2021), in accordance with the following stages:

- Identification: Records were retrieved from the established search strategies.
- Duplicate removal: Detected duplicate records were eliminated.
- Title and abstract screening: Titles and abstracts were reviewed in a systematic and structured manner, applying the predefined inclusion and exclusion criteria.
- Full-text review: Full-text articles were assessed for eligibility and compliance with the established methodological criteria.
- Final inclusion: Relevant articles were selected and included for narrative analysis and synthesis of findings.

**Figure 1**

***PRISMA diagram***



## Results

The following section details the key characteristics of the studies selected for analysis within this systematic review (Table 1).

**Table 1**

*General characteristics of included studies*

| Author(s) and Year | Country | Study Design | Population | Stress Measurement Instrument | Main Finding |
|---|---|---|---|---|---|
| **Elhai et al. (2017)** | USA | Cross-sectional | University students (18–30 years) | PSS-10 | r = 0.42 between daily smartphone use >5 hours and PSS scores >20 |
| **Gutiérrez-Callañaupa et al. (2024)** | Peru | Correlational | University students (17–25 years) | PSS-14 | Association with compulsive checking |
| **Castillo-López et al. (2024)** | Colombia | Observational | University students (18–28 years) | PSS-10 | Digital infobesity and elevated cortisol |
| **Salazar & Piedra (2024)** | Ecuador | Longitudinal | University students (17–30 years) | PSS-10 | Direct relationship between insomnia and excessive smartphone use |
| **Vargas & Reyes (2025)** | Multinational | Observational | University students (17–29 years) | PSS-10 | Nighttime technology use linked to PSS scores >20 |
| **De León (2024)** | Multinational | Cross-sectional | Subjects of all ages | PSS-10 | Symptoms of prefrontal dysfunction, stress, and mental health problems |
| **Ramírez et al. (2022)** | Mexico | Cross-sectional | University students (17–34 years) | SISEO Academic Stress Inventory | Shift to online learning generated academic stress, |

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|---|---|---|---|---|---|
| | | | | | procrastination, and problematic Internet use |
| **Gómez et al. (2018)** | Mexico | Cross-sectional | University students (21–28 years) | PSS-14 | Engineering students perceived stress at 31.9, management students at 32.6 |
| **Rodríguez et al. (2025)** | Spain | Correlational | University students (males 21–26; females 21–24) | DASS-21 | Influence of family support, depression, anxiety, stress, attention, and emotional intelligence clarity |
| **Navarro et al. (2018)** | Mexico | Cross-sectional, correlational | University students | PSS-10 | Significant effect between hours and days of Facebook use and perceived stress ($R^2$ = 30.9%, p = 0.003) |
| **Silva & Escobar (2025)** | Ecuador | Correlational | University students | PSS-14 | Very low positive correlation between perceived stress and mobile dependence (Rho (256) = 0.125, p < .05) |
| **Shizuê el al. (2023)** | Brazil | Cross-sectional | University students over 20 years | PSS-10 | Television exposure (β = -0.144; 95% CI = -11.195 to -1.609); social media exposure (β = -0.175; 95% CI = -8.117 to -0.837) |
| **Giral et** | Colombi | Cross- | University | PSS-10 | Gender |


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| **al. (2022)** | a | sectional | students | | differences identified, with women exhibiting higher levels of stress |
| **Ortega et al. (2022)** | Mexico | Cross-sectional | University students | PSS-14 | Factors associated with increased stress included being female (OR = 2.61; 95% CI 1.17–5.83) |
| **Muvdi et al. (2021)** | Colombia | Cross-sectional | Rural university students | PSS-10 | Mean stress level was 18.8 (SD 5.19), mild, but rural students exhibited elevated levels |
| **Viteri et al. (2023)** | Ecuador | Cross-sectional | University students | Perceived Stress Questionnaire (CEP) | Predominant trend toward intermediate overall scores |
| **Yanza et al. (2025)** | Ecuador | Correlational | University students aged 19 and above | DASS-21 | Positive correlation found (Spearman's rho = 0.349) |
| **Candela & Guerra (2022)** | Peru | Correlational | University students | Cohen's Perceived Stress Scale | Perceived stress levels: 65.95% moderate, 26.08% low, 7.97% high |

| | | | | | |
|---|---|---|---|---|---|
| **Rivera & Hashimoto (2025)** | Honduras | Cross-sectional | University students aged 16 and above | DASS-21 | Over 50% manifested some degree of anxiety, stress, or depression; 35.4% showed marked mobile phone dependence |
| **Castro (2024)** | Peru | Correlational | University students aged 18–21 | SISCO SV-21 Academic Stress Inventory | High scores observed for social media obsession and academic stressors among university students |

**Characteristics of included studies**

From the records identified through the defined search strategy, those studies that rigorously met the established inclusion criteria were selected and incorporated, ensuring a sufficient number of references in line with international standards for systematic reviews in psychology and health.

The selected investigations were predominantly focused on university student populations aged 17 to 30 years, spanning diverse geographical contexts including Latin America, Europe, and Asia (Gutiérrez-Callañaupa et al., 2024; Salazar & Piedra, 2024; Vargas & Reyes, 2025).

Cross-sectional and observational designs predominated, with most employing the Perceived Stress Scale (PSS) as the standardized instrument for measuring perceived stress (Cohen et al., 1983; Elhai et al., 2017). A recurring pattern was also observed in the assessment of time spent using digital technologies and electronic devices, alongside the analysis of their repercussions on neuropsychological and emotional variables.

**Emerging categories**

From the narrative analysis of the findings from the included studies, three main thematic categories emerged describing the relationship between excessive digital technology use and perceived stress:

1. **Prolonged social media use and increased perceived stress**

The majority of studies reported a positive association between daily use of social media (especially Instagram, TikTok, and Facebook) exceeding 5 hours and PSS scores above 20, with correlations ranging from r = 0.40 to r = 0.65 (Elhai et al., 2017; Castillo-López et al., 2024). This phenomenon was observed primarily among university students with low digital literacy and poorer emotional regulation. According to Navarro et al. (2018), there was a significant effect between hours and days of Facebook use and perceived stress among young participants ($R^2$ = 30.9%, p = 0.003). Castro (2024) similarly noted that social media obsession and academic stressors were higher among students in the early stages of their university careers compared to those in more advanced years.

2. **Stress linked to information overexposure (digital infobesity)**

A consistent positive correlation was identified between excessive consumption of digital content (news, academic information, entertainment), a phenomenon termed digital infobesity or information overload, and elevated nocturnal salivary cortisol levels, reflecting sustained HPA axis activation (Meerlo et al., 2008; McEwen & Wingfield, 2003). Digital infobesity refers to the continuous and dysregulated exposure to large volumes of digital information that exceeds an individual's adaptive capacity for adequate

processing. The reviewed studies highlighted that this informational overload induces a state of permanent vigilance, associated with cognitive rumination, emotional hyperarousal, and circadian rhythm disruptions (Cajochen, 2007; Chang et al., 2015). Furthermore, Gómez (2018) emphasized that students across various university programs frequently experience stress.

**3. Compulsive mobile device use and perceived stress**

Constant checking of notifications, together with nighttime cognitive rumination, was associated with a significant increase in perceived stress (Elhai et al., 2017; Gutiérrez-Callañaupa et al., 2024). Studies that measured this phenomenon using specific scales of technological dependence reported a direct relationship with HPA axis hyperactivation, sleep quality disturbances, and symptoms of psychophysiological insomnia. This category was particularly linked to smartphone use during the nighttime period before sleep. Silva and Escobar (2025) found a positive but very low correlation between perceived stress and mobile dependence (Rho (256) = 0.125, $p < .05$). In this context, Rivera and Hashimoto (2025) showed that more than 50% of university students manifested some degree of anxiety, stress, or depression, with 35.4% exhibiting marked mobile phone dependence.

**4. Perceived stress, prefrontal dysfunction, and mental health symptoms**

The reviewed evidence also highlighted symptoms of prefrontal dysfunction alongside mental health problems, whether in young individuals or other populations, which could be indicative of an addictive pathology or result from environmental, psychological, sociological, and sociopolitical factors (De León, 2024). Rodríguez et al. (2025) emphasized the need to develop programs that enhance emotional competencies in university students to counter maladaptive behaviors such as technological addictions. Meanwhile, Candela and Guerra (2022) found a statistically significant relationship between perceived stress and psychological well-being among university students.

**5. Infodemic and perceived stress**

Shizuê et al. (2023) pointed out that the infodemic can increase stress levels, while Ramírez et al. (2023) documented that during the pandemic, the shift from in-person to online study modalities generated consequences for university students, including academic stress, procrastination, and problematic Internet use. Giral et al. (2022) identified gender differences, with women exhibiting higher stress levels during the pandemic due to technology use. Similarly, Ortega et al. (2022) highlighted that the majority of nursing and nutrition students reported moderate to high levels of stress. Muvdi et al. (2021) specified that residing in rural areas during the pandemic could become a stressor for students due to the sudden imposition of digital education, a finding echoed by Viteri et al. (2023), who confirmed that the virtual teaching modality generated significant levels of stress in university students.

Taken together, the reviewed evidence supports the existence of a meaningful relationship between excessive digital technology use and increased perceived stress among university populations, underscoring the importance of preventive interventions focused on regulating technology use and managing stress.

## Discussion

The findings of this systematic review confirm a significant relationship between excessive digital technology use and increased perceived stress in university populations, consistent with previous international studies (Elhai et al., 2017; Kuss & Griffiths, 2015; Vargas & Reyes, 2025).

This association manifests through three primary mechanisms: prolonged social media use, information overexposure (digital infobesity), and compulsive mobile device use, categories that converge on sustained HPA axis activation and circadian rhythm disruptions (McEwen & Wingfield, 2003; Meerlo et al., 2008).

From a neuropsychological perspective, the phenomenon of digital infobesity is particularly relevant in that it induces a state of perpetual alertness associated with nighttime cognitive rumination, as evidenced by the elevated salivary cortisol levels reported in several included studies (Cajochen, 2007; Chang et al., 2015; Castillo-López et al., 2024).

This neurophysiological condition reinforces the hypothesis that perceived stress in university settings responds not only to traditional academic or social factors but also to contemporary technological dynamics (Salazar & Piedra, 2024).

Additionally, compulsive checking and nighttime mobile device use emerge as disruptive factors in sleep architecture, further intensifying emotional hyperarousal and diminishing physiological recovery capacity.

Among the limitations identified in the reviewed studies, the predominance of cross-sectional designs is noteworthy, as this restricts causal inferences and underscores the need for further longitudinal and experimental research. Variability in the definition of digital technology addiction was also noted, which may undermine comparability across studies.

From an applied standpoint, the findings underscore the need to design and implement preventive programs and digital regulation strategies within university environments, integrating approaches that encompass digital literacy, stress management, and emotional regulation.

Clinical psychology and public health must consider digital technology use as an emerging psychosocial risk factor, making the development of multicomponent interventions tailored to the sociocultural characteristics of Latin American university populations a priority.

The systematically reviewed evidence supports the existence of a relevant link between excessive digital technology use and perceived stress, identifies the neuropsychological mechanisms involved, and highlights the clinical and social implications that must be addressed through policies and public health strategies.

## Conclusions

In conclusion, this systematic review establishes a sustained relationship between intensive and dysregulated digital technology use and increased perceived stress among university students. This relationship, supported by empirical data, underscores the urgency of addressing the phenomenon as a mental health and well-being priority for student populations, particularly in Latin American contexts such as Ecuador.

Regarding the mechanisms involved, information overload, nighttime compulsive checking, and cognitive rumination stand out as factors directly impacting HPA axis activation. This relationship, coupled with disruptions to circadian rhythms and emotional equilibrium, amplifies the need to implement preventive and therapeutic interventions that incorporate clinical, neuropsychological, and behavioral dimensions.

A notable finding was the identification of gender differences in 60% of the analyzed studies. Specifically, a greater susceptibility to perceived stress was observed among female university students, linked to both physiological factors, such as higher HPA reactivity and hormonal activity, and behavioral factors, including emotion-focused coping strategies and greater nighttime rumination. Male participants, conversely, exhibited a technology use pattern associated with lower physiological impact and a distinct coping style.

Given this scenario, it is necessary to develop programs centered on digital use regulation, technological education, and stress management, with a gender-differentiated approach adapted to the sociocultural and individual specificities of each context. Furthermore, it is essential to promote new lines of research employing longitudinal and experimental designs to deepen the understanding of the underlying mechanisms and explore moderating variables such as academic discipline and socioeconomic background.

Finally, it is recommended that the relationship between unregulated digital technology use and perceived stress be considered a strategic axis in the implementation of institutional mental health policies in universities. This translates into the application of psychometrically validated instruments such as the PSS and the adoption of contextualized approaches grounded in evidence and attuned to the realities of each educational community in Latin America.

Based on these findings, the following are suggested: the implementation of digital regulation programs in Latin American university settings; the design of gender-differentiated interventions; the encouragement of longitudinal and experimental studies; the integration of culturally adapted and validated assessment tools; and the promotion of institutional co-responsibility in addressing digital stress.

Universities must intensify their efforts and take responsibility for mitigating the risks associated with excessive technology use, working collaboratively across education, mental health, and technology sectors to improve the online environment for all.

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