




# Smartphonization among students: Opportunities and consequences

Monika Kowalska-Rutyna 

Academy of Applied Medical and Social Sciences, Elbląg, Poland

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## Abstract

**Introduction:** Smartphoneification has significantly changed communication, learning, and organization, providing benefits like better access to information and remote education. However, excessive smartphone use leads to health issues, sleep disturbances, and social problems such as nomophobia and phubbing. A study of students indicates that while smartphones aid education and organization, their overuse adversely affects health and sleep quality, with only half of the respondents aware of the associated risks.

**Aim:** The objective of this study is to understand the behaviors and feelings of students related to smartphone usage and its impact on daily life, learning, and health. The research aims to identify key aspects of smartphone usage such as time spent on the device, most frequently used applications, and purposes for their use.

**Material and methods:** The study surveyed 101 students from various fields over a month in November 2024, focusing on their smartphone usage habits and well-being. Participants answered questions about their daily smartphone use, including time spent, frequently used applications, and the impact on learning and concentration. The survey also explored mobile phone use before sleep, negative health effects, and the respondents' awareness of risks associated with excessive technology use.

**Results and discussion:** The study highlights smartphone benefits and drawbacks, particularly among women, emphasizing the need for education on responsible usage.

**Conclusions:** (1) Smartphones significantly support education, organization, and access to information but excessive use leads to health-related issues requiring increased user awareness. (2) There is a need for regulations and educational initiatives promoting responsible smartphone usage to mitigate negative phenomena like phubbing or nomophol.

Corresponding author:

Monika Kowalska-Rutyna, Academy of Applied Medical and Social Sciences, Lotnicza 2, 82-300 Elbląg, Poland.  
E-mail: m.kowalskarutyna@gmail.com

## 1. INTRODUCTION

Smartphonization, defined as the process of disseminating and integrating smartphone functions across various aspects of life, has become a significant social phenomenon of our time.<sup>1</sup> The rise in smartphone popularity, driven by technological advancements and global challenges such as the COVID-19 pandemic, has profoundly impacted the functioning of contemporary society. Smartphones, due to their multifunctionality, have replaced traditional mobile phones, offering users a wide range of capabilities from communication to education and entertainment.<sup>2</sup>

On one hand, smartphonization brings numerous benefits, such as access to information, the ability to learn remotely, and support for daily life organization.<sup>3</sup> On the other hand, uncontrolled use of these devices poses social challenges, leading to health issues like neck pain and sleep disorders, as well as phenomena such as nomophobia and phubbing. This article analyzes various aspects of smartphone usage, considering their impact on health, education, and daily life, based on survey results and existing literature.

The article attempts to provide a comprehensive view of the phenomenon of smartphonization, showcasing both its positive aspects and negative consequences, thereby facilitating a better understanding of the scale and nature of this global trend.

## 2. AIM

The primary objective of this study is to investigate the behaviors, perceptions, and feelings of students related to smartphone usage and its impact on daily life, learning, and health. The research specifically focuses on:

- (1) Understanding the time spent on smartphones by students.
- (2) Identifying the most frequently used applications.
- (3) Analyzing the primary purposes of smartphone usage.
- (4) Assessing the perceived impact of smartphones on learning, organization, and concentration.
- (5) Exploring awareness of risks associated with excessive smartphone use and its health effects.

This research aims to provide actionable insights that can inform educational initiatives and policies for responsible smartphone use.

## 3. MATERIAL AND METHODS

This study was conducted in November 2024 over a 1-month period at the Academy of Applied Medical and Social Sciences, Elbag, Poland. An online survey was distributed to a random sample of 101 students

via e-mail. The sample included part-time students in nursing, internal security, administration, and psychology, as well as full-time medical students. Participation was anonymous and entirely voluntary, with no external incentives provided. Despite its relatively short duration, the study achieved a reasonable sample size. However, one notable limitation is the overrepresentation of women in the sample group, which may affect the generalizability of the findings. The survey methodology was designed to collect self-reported data, ensuring ease of access and convenience for participants. The survey consisted of questions covering:

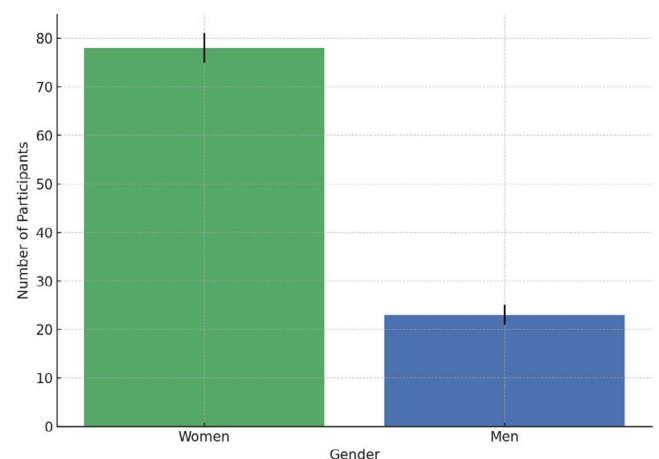
- (1) Gender, age, and field of study.
- (2) Time spent daily, most frequently used applications, and purposes of use.
- (3) Self-assessment of whether smartphones support learning and daily tasks.
- (4) Exploration of whether frequent phone-checking affects focus and productivity.
- (5) Examination of how often smartphones are used before bedtime and their effects on sleep quality.
- (6) Identification of any physical or mental health problems associated with smartphone use.
- (7) Assessment of participants' understanding of the potential risks related to intensive smartphone use.

This approach allowed for a comprehensive assessment of the behavioral, psychological, and physical dimensions of smartphone use.

## 4. RESULTS

The results illustrate both positive and negative aspects associated with mobile technology usage, revealing significant differences in user perceptions.

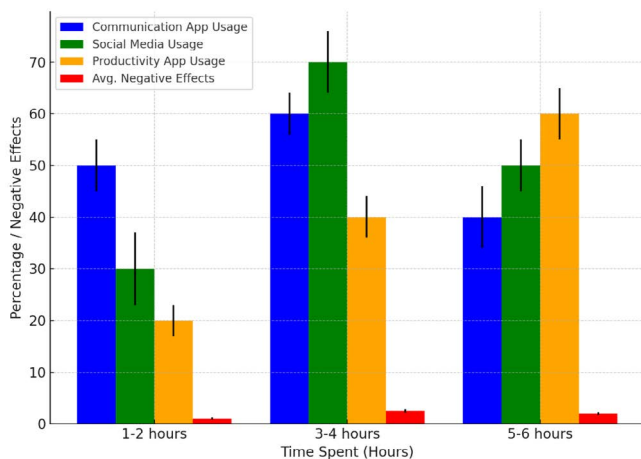
The study showed that women made up the majority of participants (77.2%), compared to men (22.8%) (Figure 1). This distribution may significantly impact the results, particularly concerning the reported negative



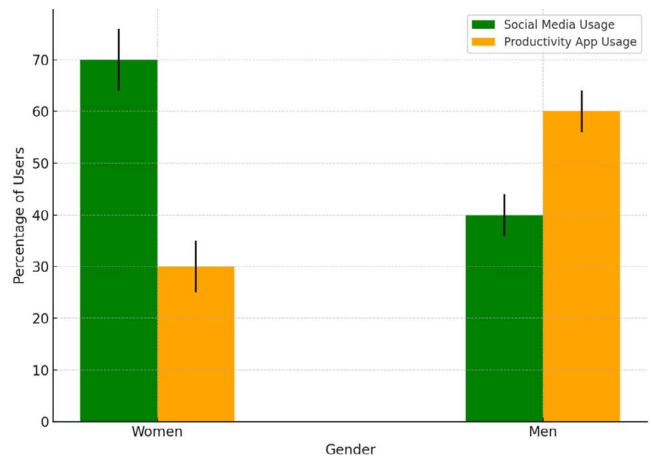
**Figure 1. Proportional distribution of participants by gender.**

effects of smartphone use. As highlighted by Ramjan et al.,<sup>9</sup> women are more likely to use smartphones for social purposes, such as social media and communication apps. This engagement may lead to greater perception of negative effects, including distraction, stress, and anxiety. Brennan and Dempsey<sup>4</sup> also emphasized that women often feel a greater impact of technology on their academic lives, indicating their higher involvement with apps that can be both beneficial and detrimental. The dominance of women in this sample suggests that the data may reflect their specific patterns of smartphone use, underscoring the need to account for this gender imbalance in further analyses to avoid biases. The high participation of women not only affects the results but also provides valuable insights into their unique patterns of technology use. These findings highlight the need for more detailed studies to better understand gender differences in smartphone use and their impact on daily life and academic performance (Figure 2).

Participants who spent 3–4 h daily on their smartphones reported the most significant negative effects, compared to those using their phones for 1–2 h or 5–6 h. This group likely engages in diverse activities, including social media, communication apps, and streaming platforms. The balance between personal and professional use may result in mental fatigue, as highlighted by Arumugam et al.,<sup>5</sup> who found that overuse of multi-tasking apps leads to greater cognitive strain. Participants who spent 1–2 h daily on their smartphones may primarily use smartphones for essential purposes like communication or quick access to information, resulting in fewer reported negative effects. Despite higher usage, participants in this category may engage more in productive or task-oriented apps, such as those for education or work, as noted by De Oliveira et al.<sup>6</sup> This purposeful usage may mitigate the negative impacts observed in the 3–4 h group. The findings suggest that



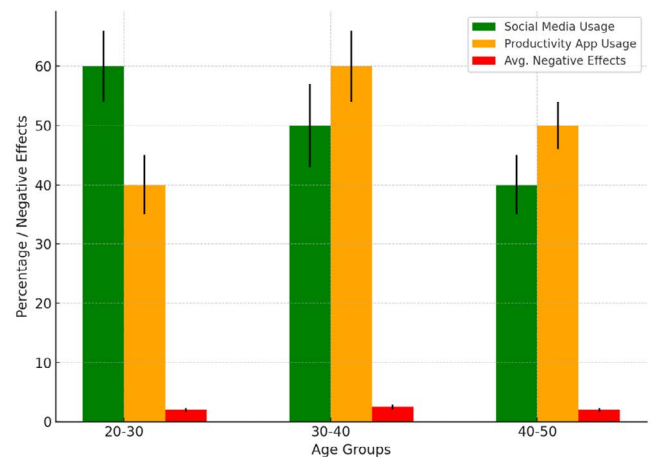
**Figure 2. Association between smartphone usage duration, app categories, and reported negative effects.**



**Figure 3. Differences in smartphone app usage patterns between genders.**

the type of app usage, rather than the time spent, plays a significant role in determining the negative effects of smartphone use. Encouraging more intentional and focused use of smartphones may help reduce their adverse impacts (Figure 3).

Women reported higher negative effects compared to men, reflecting significant gender differences in smartphone usage patterns. Women’s higher reported negative effects align with their dominant use of social media and communication apps, which, as Ramjan et al.<sup>1</sup> noted, are linked to increased stress, anxiety, and distraction. Men, who reported fewer negative effects, may spend more time on entertainment or gaming apps, which Arumugam et al.<sup>5</sup> found to have mixed impacts, including stress relief. Brennan and Dempsey<sup>4</sup> observed that both genders benefit from using educational apps, but men might focus more on these, resulting in lower negative effects. The reported gender differences highlight the importance of considering app categories when analyzing smartphone impacts. Strategies to address negative effects could include promoting healthier engagement with communication and social media apps, particularly for women (Figure 4).



**Figure 4. Age-related variations in app usage patterns and reported negative effects.**

Participants in the 30–40 age group reported slightly higher negative effects compared to other age groups, but no statistically significant differences were observed. This group likely uses smartphones intensively for professional and personal tasks. De Oliveira et al.<sup>6</sup> found that frequent professional use can contribute to stress and fatigue, particularly when combined with personal social media use. Participants in the 20–30 and 40–50 age groups may use smartphones more selectively, focusing on communication or streaming apps, which Brennan and Dempsey<sup>4</sup> associated with lower perceived negative effects. The slightly elevated negative effects in the 30–40 age group may reflect the pressures of balancing professional and personal smartphone use. These findings suggest the need for targeted interventions to address the unique demands of this age group.

## 5. RESULTS

Smartphonization, initially viewed as a significant step in technological advancement, now evokes both enthusiasm and concern. The findings indicate a substantial impact of smartphone usage on various aspects of users' lives – corroborated by numerous scientific publications – showing both positive outcomes and negative consequences associated with this phenomenon. Research indicates that half of the respondents experience adverse health effects linked to smartphone usage – a finding consistent with existing literature.

According to Lewandowska's findings, using mobile devices in uncomfortable positions leads to health issues such as neck pain or back problems – a phenomenon referred to as 'text neck.'<sup>7</sup> Additionally, Czerska's studies highlight an increase in sleep disorders alongside concentration problems and headaches resulting from prolonged smartphone use.<sup>8</sup> These health problems align with findings from De Oliveira et al.,<sup>6</sup> who noted that excessive smartphone use is associated with lower mental health outcomes, such as increased levels of depression, anxiety, and stress. Particularly in students, these behaviors exacerbate sleep disturbances and reduce academic motivation.<sup>6</sup>

The study results indicate that 50% perceive an impact from smartphone usage on sleep quality, which corresponds to scientific reports indicating that smartphone use before bedtime disrupts melatonin production, as highlighted by WHO. This disruption impedes sleep onset and negatively affects body recovery processes.<sup>9</sup> Ramjan et al.<sup>1</sup> emphasized that such behaviors are common among nursing students, whose frequent smartphone use – particularly for social me-

dia and non-professional purposes – can lead to poor sleep quality, ultimately impairing learning outcomes.<sup>1</sup> Czerska described the 'head-down generation,' referring to individuals heavily dependent on technology, spanning generations X, Y, Z, and C.<sup>8</sup> While this group is characterized by high adaptability to technology, they also face challenges like interpersonal communication issues and health problems. De Oliveira et al.<sup>6</sup> further corroborated these findings, noting that the generational reliance on smartphones is associated with declining health-related quality of life. This is especially pronounced in younger generations, such as Generation Z, where smartphone dependency rates are significantly higher.

Age-related patterns also influence smartphone behaviors. As highlighted in this study, participants in the 30–40 age group reported slightly higher negative effects than other age groups, consistent with findings by Brennan and Dempsey.<sup>4</sup> They noted that adults in this demographic often balance professional and personal smartphone usage, which can lead to increased stress and fatigue. Smartphonization has led to new social problems such as nomophobia or phubbing. This study found that 40% of respondents reported concentration issues stemming from frequent phone checking, which could be indicative of addiction-related behaviors.<sup>4</sup> Ramjan et al. similarly identified high levels of nomophobia among nursing students, leading to distraction and reduced academic performance.<sup>9</sup> Similarly, Brennan and Dempsey found that excessive social media use, a common behavior among students, contributes to reduced focus and academic difficulties.<sup>4</sup>

While smartphones offer significant benefits, such as improved communication and access to information, their drawbacks, including distractions, health problems, and addiction, cannot be overlooked. Arumugam et al. (2020) emphasized that while smartphones enhance learning and productivity, they also require effective strategies for managing usage time to mitigate negative impacts.<sup>1,10</sup>

The findings underline the dual nature of smartphone usage: a tool for connectivity and learning but also a source of health and social challenges. Studies by Ramjan et al., Arumugam et al., and De Oliveira et al. provide strong evidence for the need to implement educational initiatives and guidelines for responsible smartphone use.<sup>1,5,6</sup> This includes addressing addiction behaviors, promoting healthy usage habits, and emphasizing the importance of sleep hygiene. Such measures can mitigate the negative effects of smartphones while maximizing their benefits, particularly for younger generations and students.

## 5. CONCLUSIONS

- (1) Smartphones significantly support education, organization, and access to information but excessive use leads to health-related issues requiring increased user awareness.
- (2) There is a need for regulations and educational initiatives promoting responsible smartphone usage to mitigate negative phenomena like phubbing or nomophobia.

### CONFLICT OF INTEREST

None declared.

### FUNDING

None declared.

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