

“I Can’t Do It Without My Phone”: Nomophobia and Its Impact on Academic Performance – A Systematic Literature Review

LAZAROVÁ, E.¹, HOLÚBEK, J.², ONDRÁŠKOVÁ, V.^{1,2}, RÓZSA, Z.^{1,3}

1 | Alexander Dubcek University of Trencin, Faculty of Social and Economic Relations, Department of management and human resource development, Trencin, Slovakia

2 | Doktorand j.s.a., Trencin, Slovakia

3 | The University of Johannesburg, DHET-NRF SARChI in Entrepreneurship Education, Department of Business Management, College of Business and Economics, Johannesburg, South Africa

Citation | Lazarová, E., Holúbek, J., Ondrášková, V. & Rózsa, Z. (2025). I Can’t Do It Without My Phone”: Nomophobia and Its Impact on Academic Performance – A Systematic Literature Review. *Adiktologie*, 25(3), 153–164.

INTRODUCTION: Nomophobia, the fear of losing access to a mobile phone or the Internet, is becoming increasingly prevalent among students due to the rapid digitalization of society and can affect their ability to concentrate, the quality of social relationships and academic performance. The aim of this systematic literature review is to provide an overview of the development, focus, theoretical framework and methodological nature of previous research in this area, as well as to identify research gaps and potential directions for further research.

METHODS: The study uses the PRISMA methodology and includes 18 empirical articles identified in the Web of Science database. **RESULTS:** The findings show that research is largely cross-sectional, often

without a clearly defined theoretical basis, with approaches to measuring academic performance varying considerably. **CONCLUSIONS:** The results point to the need for more methodologically robust, longitudinal and theoretically anchored research to provide a deeper understanding of the mechanisms through which nomophobia is related to students’ academic functioning.

Keywords | Nomophobia – Academic performance – Smartphone – Learning

Submitted | July 2, 2025

Accepted | August 25, 2025

Grant affiliation | This research was funded by the Cultural and Educational Grant Agency of the Ministry of Education, Research, Development and Youth of the Slovak Republic KEGA 009TnUAD-4/2025 Development of an innovative micro-credential program for lifelong learning in the field of human resources and personnel management and Slovak, Research Agency APVV-23-0562 Application of circular economy principles to the creation of circular business models in manufacturing and non-manufacturing sectors in Slovakia and creation of new performance metrics to identify and quantify circular economy effects and Scientific Grant Agency of the Ministry of Education, Research, Development and Youth of the Slovak Republic and the Slovak Academy of Sciences VEGA 1/0448/24 Research on key determinants of human capital and economic growth in the context of digital economy development.

Corresponding author | Emília, Lazarová, Alexander Dubcek University of Trencin, Faculty of Social and Economic Relations, Department of management and human resource development, Trencin, Slovakia, Študentská 3, 911 50 Trencin, Slovakia

emilia.lazarova@tnuni.sk

1 INTRODUCTION

The significant proliferation of smartphones and the constant presence of digital technologies (Ahmed et al., 2024; Erdmann et al., 2024; Ramon Saura et al., 2025; Rózsa et al., 2024) are also having an increasingly perceptible impact on the school environment (Alshehri, 2024). Nomophobia, the anxiety associated with losing access to a mobile phone or the internet, is increasingly common, particularly among pupils and students who are highly attached to their devices (Gezgin et al., 2018; C. Yildirim et al., 2015).

Accustomed to instant feedback and a constant flow of digital stimuli, students gradually lose patience and the ability to focus on their studies (Efstathiou et al., 2025; Samaha et al., 2016). Meanwhile, learning is often disrupted by repeated checking of mobiles, which reduces its effectiveness and also weakens social bonds and classroom interaction (Ayaz-Alkaya et al., 2025; Kuss et al., 2018). Moreover, excessive mobile phone use and nomophobia have also been shown to negatively affect interpersonal relationships among students, as the preference for online communication over face-to-face contact leads to a decline in the ability to engage in authentic dialogue, show empathy, and actively listen, which can contribute to social isolation and feelings of loneliness even in a team setting (Elhai et al., 2017; Sadeghi et al., 2025).

These findings highlight the urgent need to systematically investigate the effects of nomophobia on academic performance, as the available research evidence is still very limited. To date, we have been able to identify only three relevant studies. The first of these analyses the prevalence of mental disorders in nursing students based on meta-analyses and identifies nomophobia as a growing behavioural threat with a prevalence of 30%, but addresses the link to academic performance only marginally and without a direct causal analysis (Efstathiou et al., 2025). The second study, while listing academic performance among the related domains, does not address it systematically, does not provide an in-depth analysis, and does not pursue this variable as a major research topic (Jahrami et al., 2024). A third study, one of the few, directly links smartphone overuse, including nomophobia, to academic performance, but exclusively in a population of nursing students (Ramjan et al., 2021). Hence, the need to purposefully examine the relationship between nomophobia and academic performance in the broader student population remains a significant and as yet unfilled research gap.

The aim of this study is therefore to provide an overview of the development, focus, theoretical and methodological nature of research in the area under investigation, as well as to identify research gaps and potential directions for further research. The aim of the study is further defined by the following research questions:

● **RQ1:** What are the main bibliometric characteristics of scholarly production related to the topic under study in terms of annual publication activity, most relevant sources, country production, average number of citations per year, and most cited papers?

● **RQ2:** What are the thematic areas of focus of published studies on the topic under study based on the analysis of frequency and co-occurrence of keywords?

● **RQ3:** What theories and conceptual frameworks are most frequently used in studies related to the topic under study?

● **RQ4:** What methodological approaches and strategies for operationalizing variables are most commonly used in studies related to the topic under investigation?

The first part of the study establishes a theoretical framework for examining nomophobia as a factor influencing academic achievement. The second part of the study, devoted to methodology, details the process of searching, selecting and processing the analysed studies. The third section provides answers to the research questions posed and formulates recommendations for further research.

Theoretical background

Yildirim and Correia (2015) define nomophobia as the fear of not being able to communicate, connect to the internet, get information instantly or enjoy the convenience that a smartphone provides (Caglar Yildirim et al., 2015). It is a specific form of technological dependence in which the use of technology itself is not the problem, but the fear of its absence (Yildiz Durak, 2019). This phenomenon, first named in the United Kingdom in 2008, is now increasingly manifested especially among young people and students (Aladag et al., 2023; Alan et al., 2022; Hessari et al., 2024; Rajguru et al., 2024; Rodríguez-García et al., 2020).

According to Tavalacci et al. (2015), nomophobia represents a phenomenon between a syndrome and digital addiction, which, although not officially classified as a psychiatric disorder, shows significant psychological consequences (Tavalacci et al., 2015). Bhattacharya et al. (2019) point out that unlike traditional phobias, nomophobia does not represent a fear of a particular object, but an anxiety triggered by the loss of digital connection (Bhattacharya et al., 2019).

Nomophobia is manifested by the need to be online all the time, the urge to check notifications or social networks, and feelings of anxiety when a signal is lost, the battery runs out, or when physically separated from the device (Aladag & Altinpinar, 2023; Santl et al., 2022). It is characterized by four core dimensions: (1) fear of not being able to communicate, (2) anxiety about not being connected, (3) the need for immediate access to information, and (4) fear of losing the convenience that the mobile device provides (Aladag & Altinpinar, 2023; Hessari et al., 2025; Rodríguez-García et al., 2020).

In terms of negative impacts, nomophobia is associated with mental health disorders such as anxiety, depression, irritability or sleep problems (Alan et al., 2022; Gezgin et al., 2017; Matusik et al., 2011). In young people, it can lead to impaired concentration, decreased motivation and reduced quality of social connections in offline environments (Demirci et al., 2014; Jilisha et al., 2019).

Constant online availability reduces the ability to relax and recover (Bragazzi et al., 2014), increasing the risk of stress and burnout syndrome (Alan et al., 2022; Costa et al., 2023; Randler et al., 2016). The long-term negative impact of nomophobia can include reduced self-esteem, increased feelings of loneliness and lower life satisfaction (Glumbic et al., 2020; Notara et al., 2021), while in extreme cases social isolation, detachment from reality or the phenomenon of phantom vibration syndrome - the subjective sensation of the phone vibrating without any real stimulus - can occur (Rosenberger, 2015).

Nevertheless, there are also positive aspects of nomophobia. Many young people perceive the smartphone as a tool for safety, autonomy, and instant connection to the world - it makes it easier to navigate, access emergency contacts, and maintain social connections (Ford et al., 2022; Prochazkova et al., 2024). Smartphones provide quick access to information and support the development of digital skills, which can contribute to personal growth (Fletcher-Brown et al., 2021). For some students, a mobile device can serve as a means to plan tasks effectively, promote teamwork or organisational autonomy (Paush et al., 2024; Sui et al., 2021; Wang et al., 2018).

In an academic setting, mobile phones can positively impact learning, especially when used for educational purposes. Studies confirm their benefits especially in language, social studies or mathematics learning (Crompton et al., 2018; Sung et al., 2015). Mobile technologies also support personalized learning and better retention (Saran et al., 2010; Steel, 2012; Sumuer, 2021). Moreover, the quality of academic performance is closely linked to the setting of educational programs, which should be responsive to the needs of practice, focus on competency development, and promote student self-reflection (Miovisky et al., 2024). Similarly, Pisova (2024) draws attention to the need to develop students’ learning skills in meaningful, practically anchored contexts. Such a direction for learning can contribute not only to improved academic outcomes, but also to higher levels of student engagement and personal responsibility for their own learning (Pišová et al., 2024).

On the other hand, however, several studies have shown that the use of smartphones during learning for unrelated activities (e.g., chatting, watching videos, browsing social networks) significantly reduces attention, promotes multitasking, and leads to cognitive overload. These factors negatively affect comprehension, retention, and long-term learning (Chen et al., 2015; Kuznekoff et al., 2013; Lepp et al., 2013). Multitasking caused by smartphones divides cognitive resources between the academic task and distracting stimuli, thus impairing the ability to process information more deeply. This negative impact is even more pronounced for students with higher levels of nomophobia, who are more likely to be distracted by notifications and messages during class (Lin et al., 2021; Sumuer, 2021).

2 METHODS

We used the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) recommendations for transparent and systematic reporting of the study selection process. This

framework provides a standardised process for the identification, screening, appraisal and inclusion of studies in a systematic review. The entire process was visualized using the PRISMA flow diagram, which shows the different stages of literature review processing and the reasons for exclusion of studies (Page et al., 2021).

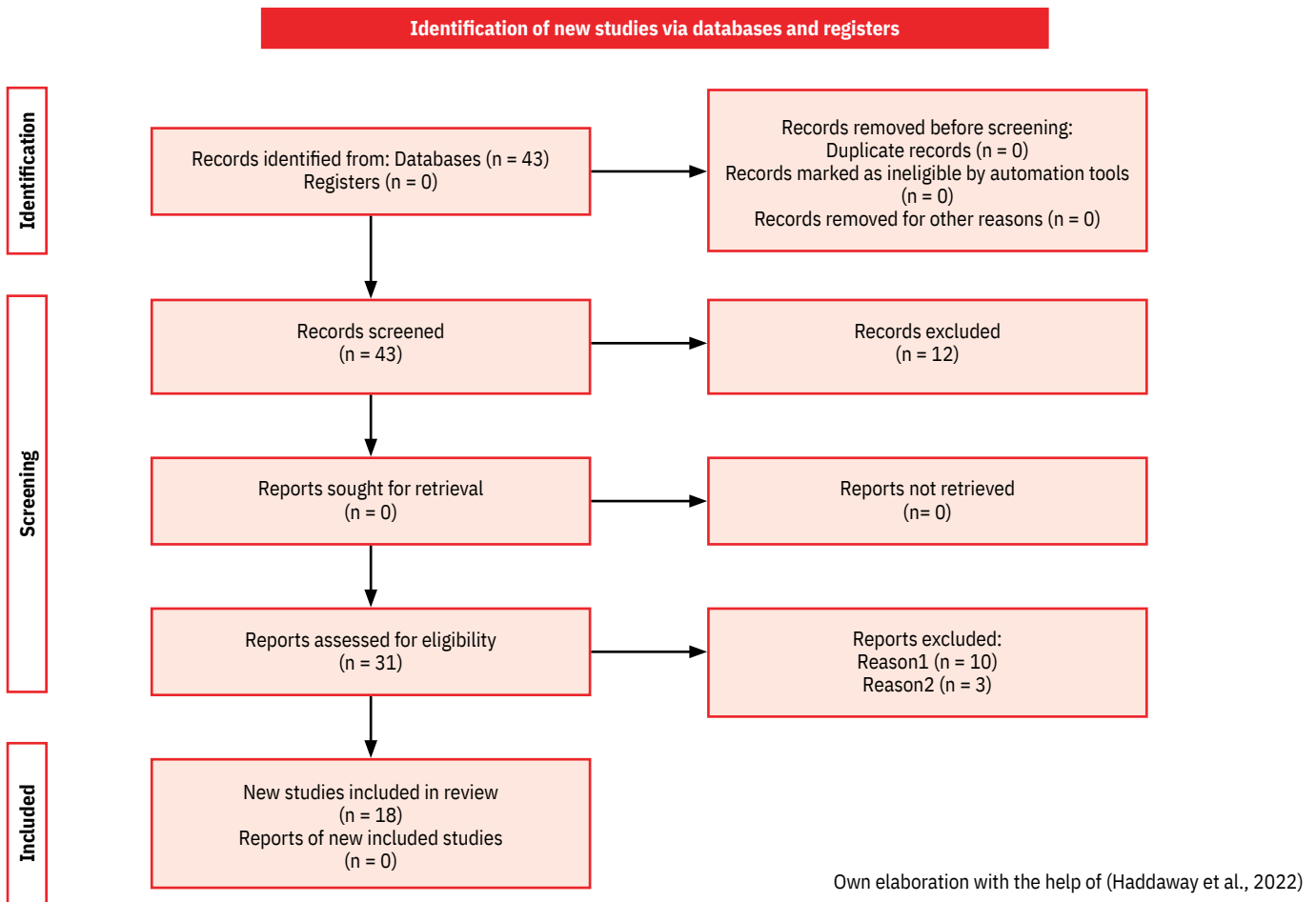
Of the 43 records identified in the Web Of Science (SSCI) database, no duplicates or records flagged as non-compliant by the automated tools were removed. After initial screening, 12 records were excluded on the basis of title and abstract (the target group was non-students), with 31 studies progressing to the eligibility assessment stage. Of these, 13 studies were subsequently excluded due to failure to meet pre-specified inclusion criteria for the review. Of these, ten studies were excluded because they investigated a different relationship to the one of interest (reason 1), namely they did not focus on the relationship between nomophobia and academic performance. The other three studies were excluded on the grounds (2) that they were syntheses of evidence from meta-analyses (Efstathiou et al., 2025), integrative literature reviews (Ramjan et al., 2021), and bibliometric analyses (Jahrami et al., 2024), and thus did not provide primary empirical data relevant to the aims of this systematic review. As a result, 18 studies were included in the systematic review (Fig.1).

The search string used was aimed at identifying studies that contained the terms ‘nomophobia’ or ‘nomophobic’ in combination with the term ‘performance’ in any field of the record.

An analysis of the trend in publication activity (Fig. 2) shows that research on the relationship between nomophobia and academic performance has been minimal between 2017 and 2019, with only one study published per year. There was a slight increase in 2020, and then in 2021, the output skyrocketed to 6 publications, representing a peak of interest in the topic. This increase may be related to the COVID-19 pandemic, which has significantly increased reliance on digital technologies while intensifying concerns about student mental health, creating favorable conditions for research on nomophobia and its impact on academic performance. However, from 2022 onwards, we observe a decline and fluctuation in publication activity, with the number of studies dropping to 1, rising again to 3 in 2023, falling to zero in 2024, and 3 new publications in 2025. These trends suggest that although interest in the subject persists, it is not stable. This suggests that this is a relatively new area of research that has only just begun to gain the attention of the academic community. R software with the Bibliometrix package was used to analyse the bibliometric data. The NVivo 15 environment was used for the qualitative analysis of the textual data.

A limitation of this research design is the fact that the search was conducted within only one database, the Web of Science (SSCI). This approach may have led to the omission of relevant studies indexed in other databases such as Scopus, PubMed or ERIC, thus potentially limiting the completeness and representativeness of the retrieved body of literature. On the other hand, Web of Science only indexes peer-reviewed and high-quality journals, which reduces the risk of including irrelevant or low-quality studies.

Figure 1 | PRISMA flow diagram



3 RESULTS AND DISCUSSION

In the following section, we present the results corresponding to **research question 1**, which focuses on the basic bibliometric characteristics of scholarly production in the field. Specifically, we analyze the evolution of annual publication activity, identify the most important publication sources, determine the production by country, the average number of citations per year and the most cited scientific papers. These data provide an overview of the trends and impact of research in the topic under study.

Table 1 shows the most relevant sources from which the articles included in the systematic review came. The majority of publications (2 each) come from the journals *Applied Cognitive Psychology* and *Nursing Education in Practice*, highlighting the interdisciplinary nature of the topic of nomophobia, linking psychology and education (particularly nursing). Other sources (e.g., *Computers in Human Behavior*, *Cyberpsychology, Information Technology & People*) contributed one article each, suggesting a wide thematic range and diverse research contexts.

Research on the impact of nomophobia on academic performance is global in nature, but at the same time there are significant regional differences in the intensity of academic interest. The highest number of studies comes from Saudi Arabia (14

studies), indicating a strong research interest in this issue within the Middle East. This is followed by Turkey (9 studies) and the United States (8 studies), which are among the countries with established research environments in psychology and digital technologies. Spain (5 studies), France and India (4 studies each), as well as China and the Philippines (3 studies each) are also strongly represented, demonstrating the interest in this topic in the European and Asia-Pacific region. Less but still present research activity can be observed in Pakistan, Singapore and South Korea (2 studies each), as well as in Australia, Denmark, Finland and Jordan (1 study each).

Figure 2 | Annual scientific production

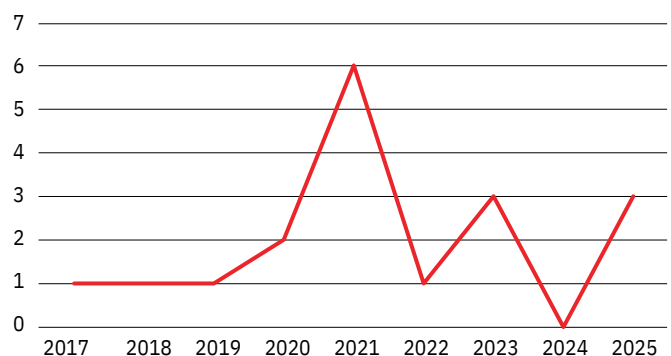


Table 1 | Most relevant sources

Sources	Articleses
APPLIED COGNITIVE PSYCHOLOGY	2
NURSE EDUCATION IN PRACTICE	2
BEHAVIOUR & INFORMATION TECHNOLOGY	1
BRITISH JOURNAL OF OCCUPATIONAL THERAPY	1
CIN-COMPUTERS INFORMATICS NURSING	1
COMPUTERS IN HUMAN BEHAVIOR	1
COMPUTERS & EDUCATION	1
CYBERPSYCHOLOGY-JOURNAL OF PSYCHOSOCIAL RESEARCH ON CYBERSPACE	1
INDIAN JOURNAL OF PSYCHIATRY	1
INFORMATION TECHNOLOGY & PEOPLE	1
INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	1
JOURNAL OF COMPUTING IN HIGHER EDUCATION	1
NURSING OUTLOOK	1
PSYCHOLOGICAL REPORTS	1
PSYCHOLOGY RESEARCH AND BEHAVIOR MANAGEMENT	1
RISK MANAGEMENT AND HEALTHCARE POLICY	1

Figure 3 | Countries production



The following graph (Fig. 4) illustrates the evolution of the annual number of citations of studies addressing the relationship between nomophobia and academic performance between 2017 and 2025. The data suggest that although the topic has experienced a period of intense interest and citation (particularly in 2019 and 2021), its scholarly impact has been declining in recent years, which may reflect declining relevance or, more likely, the need for new, methodologically robust approaches to investigating it.

Among the most influential publications (Table 2) is the study by Fu et al. (2021) in the journal Behaviour & Information Technology (Fu et al., 2021), which has received 103 citations and significantly dominates the list. This is followed by articles by Ahmed et al. (2019) in the Indian Journal of Psychiatry (41 citations) (Ahmed et al., 2019) and Gentina et al. (2018) in Computers & Education (40 citations) (Gentina et al., 2018).

Figure 4 | Figure 4 Average citations per year 7

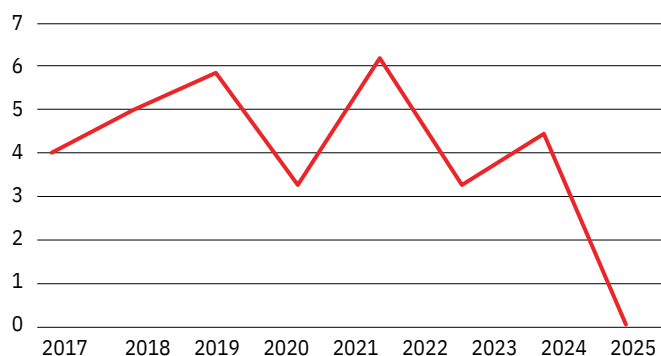


Table 2 | Most cited papers

Paper	DOI	Total citations
FU S, 2021, BEHAV INF TECHNOL	10.1080/0144929X.2020.1716848	103
AHMED S, 2019, INDIAN J PSYCHIATRY	10.4103/psychiatry.IndianJPsychiatry_361_18	41
GENTINA E, 2018, COMPUT EDUC	10.1016/j.compedu.2018.07.011	40
LIN Y, 2021, COMPUT HUM BEHAV	10.1016/j.chb.2021.106835	39
LEE S, 2017, APPL COGN PSYCHOL	10.1002/acp.3323	36
MARQUEZ-HERNANDEZ VV, 2020, NURSE EDUC PRACT	10.1016/j.nepr.2020.102910	28
BUCTOT DB, 2021, INT J ENVIRON RES PUBLIC HEALTH	10.3390/ijerph18105219	19
BERDIDA DJE, 2023, NURSE EDUC PRACT	10.1016/j.nepr.2023.103645	16
ALDHAHIR AM, 2023, PSYCHOL RES BEHAV MANAG	10.2147/PRBM.S404898	14
SCHWAIGER E, 2022, CYBERPSYCHOLOGY	10.5817/CP2022-1-5	13

In this section, we present the answer to **research question 2**, which focuses on the identification of the main thematic areas within the research topic. By visualizing the frequency of occurrence of keywords (wordcloud) and analyzing their co-occurrence, we reveal the dominant research directions, conceptual connections, and thematic clusters that characterize the scholarly production to date. These results provide deeper insights into the content focus of published studies.

The Word cloud visualization presents a graphical representation and summary of the most frequently occurring key terms related to the issue of nomophobia as they emerge from the analyzed literature. Based on size and highlighting, these are among the most frequently occurring words: students, indicating the target group that is most frequently studied in relation to nomophobia; nomophobia as the central concept of the analyzed issue; smartphone and phone, indicating the main technological object of addiction; use and usage, related to the

frequency and patterns of mobile device use; academic, performance and learning, reflecting the impact of nomophobia and technology use on academic performance; addiction, indicating pathological forms of behaviour associated with smartphone use; and finally, terms such as social, health, stress and sleep, indicating the psychological, physical and social consequences of nomophobia. These terms represent the main thematic lines of research and also indicate the complexity of the impacts of digital addiction in higher education settings.

The visualisation of the co-occurrence of keywords shown in Fig. 6 illustrates the thematic links. The most dominant terms in the network are “nomophobia”, “addiction”, “academic-performance”, “validation”, “stress” and “anxiety”, indicating the most common research focus in this area. However, several thematic clusters are clearly forming. For example, the blue cluster focuses on the psychological and behavioural consequences of nomophobia, such as anxiety, sleep disturbances, technology habits and smartphone use. The red cluster mainly reflects the methodological dimension of the research, including terms such as ‘validation’, ‘questionnaire’ and ‘prevalence’, indicating an emphasis on the development and validation of instruments to measure nomophobia and related phenomena. The purple cluster links mental health, stress and well-being, highlighting the connections between nomophobia, mental well-being and students’ subjective experiences.

Less connected concepts such as ‘gender-differences’, ‘problematic internet use’ or ‘crash risk’ suggest the existence of fringe or specific research lines that are not yet fully integrated into the mainstream discourse. Overall, this network reveals that research on nomophobia is multidimensional, bridging the fields of psychology, education, and technology, while also pointing to research directions that require further attention.

In this section, we address **research question 3**, which explores the theoretical underpinnings and conceptual frameworks used in studies related to the topic under investigation. Identifying frequently applied theories allows us to better understand the scientific basis of existing research as well as the dominant approaches to interpreting the phenomena under study. At the

Figure 5 | Word cloud

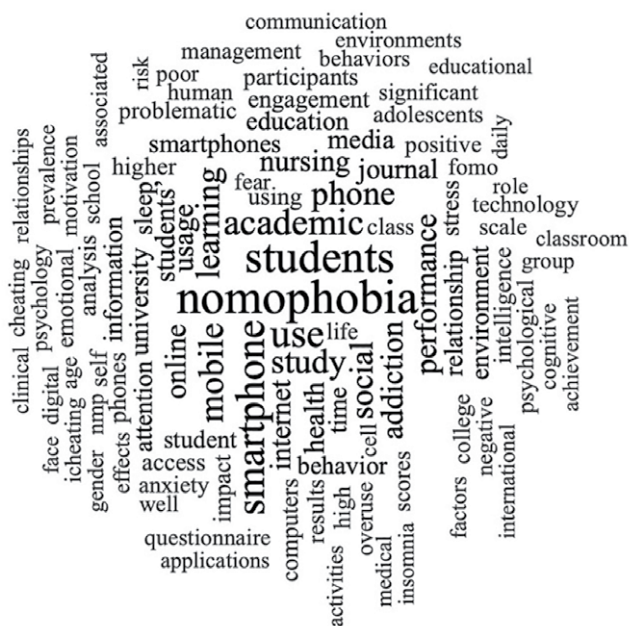
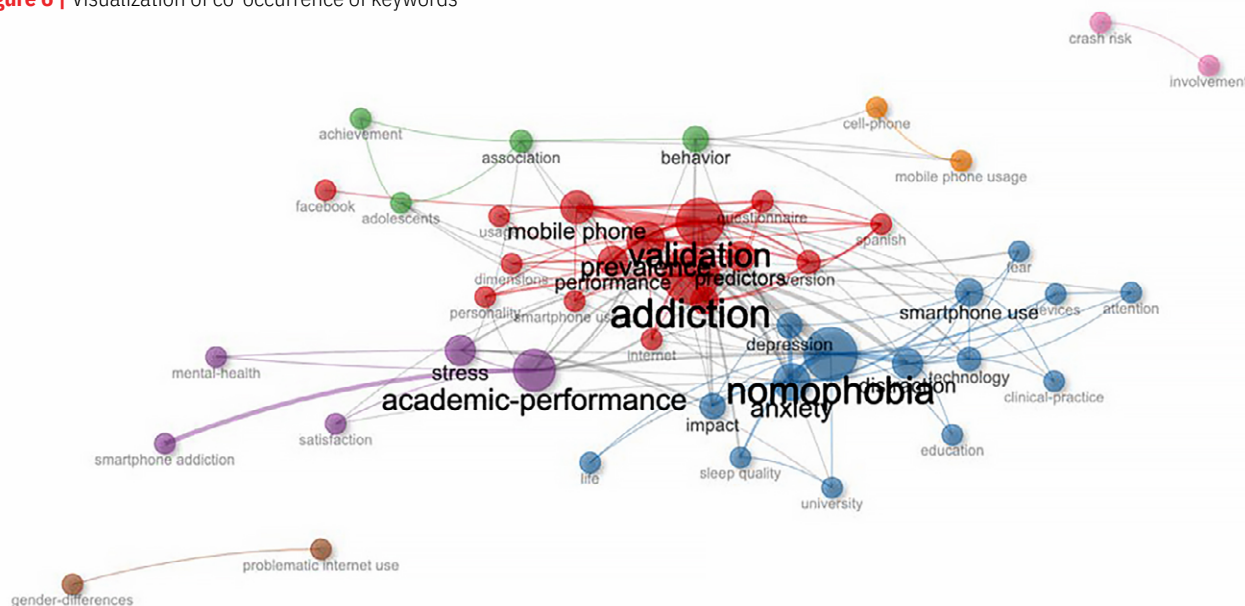


Figure 6 | Visualization of co-occurrence of keywords



same time, these findings point to prevailing trends and potential gaps in the theoretical grasp of the issue.

Most of the analysed studies were empirical in nature without deeper theoretical anchoring. Only 7 of the 18 articles explicitly stated a theoretical framework that served as the basis for the research design and interpretation of the results. The approaches used included: The engagement theory (Avci et al., 2023), Self-regulated learning theory, Social cognitive theory (Berdida et al., 2023), Prospect theory (Gentina et al., 2018), Activity theory and Psychological trait theory (Lin et al., 2021), Extended self theory (Schwaiger et al., 2022), Cognitive theory of multimedia learning (Sumuer, 2021) a Stimulus-Organism-Response (S-O-R) framework (Fu et al., 2021).

Activity Theory (Engeström, 2001) examines how people perform activities in social and technological contexts, emphasizing the relationship between external stimuli and psychological processes through the concepts of internalization and externalization. The theory is often used in the field of human interaction with technology and, in the context of nomophobia, explains how the constant presence of a smartphone can change students' habits and behaviours (Lin et al., 2021). Extended Self Theory (Clayton et al., 2015) posits that the smartphone becomes part of the user's identity, thereby taking on personal meaning. Its presence unconsciously weighs on attention, even when it is not being actively used. In the context of nomophobia, this theory explains why separation from the phone causes anxiety - namely, it disrupts the sense of psychological wholeness and control, which negatively

affects concentration and academic performance. (Schwaiger & Tahir, 2022). Prospect Theory (Tversky et al., 1981) explains decision making under risk, where gains and losses are evaluated according to their probability. Nomophobic behaviour can be seen as a consequence of a distorted risk analysis, students overestimate the 'loss' of access to a phone and are willing to take risks, for example by using a mobile phone in inappropriate situations, just to avoid separation anxiety (Gentina et al.,

2018). Psychological Trait Theory (Tobar, 2012) focuses on enduring characteristics, such as personality traits or tendencies to anxiety disorders, that influence behaviour. In the context of nomophobia, the theory suggests that repeated experiences of heavy smartphone use can lead to the development of a trait that manifests as a fear of separation, affects daily routines, and reduces academic performance (Lin et al., 2021). Self-Regulating Learning Theory (Zimmerman, 2013) describes how students actively manage their learning through planning, monitoring, and assessment. However, nomophobia interferes with self-management - reducing concentration, promoting procrastination, and impairing motivation, thereby negatively affecting student achievement (Berdida & Grande, 2023). Social Cognitive Theory (Bandura, 1986) explains behavior as the result of the interaction of personal factors, behavior, and environment. In the case of nomophobia, peer observation plays a role as well as low self-esteem - students who do not believe they can handle tasks without a phone are more prone to dependence on technology (Berdida & Grande, 2023). S-O-R Theory (Stimulus-Organism-Response) emphasizes that behavior is the result of the interaction between an external stimulus, internal psychological processes, and the subsequent response. In the context of nomophobia, the stimulus is excessive smartphone use, which causes health problems such as insomnia or visual difficulties, which in turn leads to a decline in academic performance. This theory highlights the importance of mediating psychological factors that link digital behaviour to learning outcomes (Fu et al., 2021; Zhang et al., 2019). Finally, The Engagement Theory (Kearsley et al., 1998) emphasizes that students learn more effectively when they are meaningfully and actively engaged in learning through collaboration and technology. However, nomophobia can disrupt this engagement because it distracts from learning and undermines focused engagement in learning activities (Avci & Kula, 2023).

In the following section, we answer **research question 4**, which focuses on the analysis of methodological approaches and ways of operationalizing the variables in the identified studies.

The investigation of nomophobia and its association with academic performance was dominated by quantitative methods based on questionnaire surveys. Examples include studies by Avci & Kula (2023), Berdida & Grande (2023), Lin et al. (2021) or Schwaiger & Tahir (2022) (Avci & Kula, 2023; Berdida & Grande, 2023; Lin et al., 2021; Schwaiger & Tahir, 2022). The second approach chosen was an experimental or quasi-experimental design (Ahmed et al., 2019; Gutiérrez-Puertas et al., 2020; Lee et al., 2017; Lee et al., 2021; Sumuer, 2021).

In questionnaire-based investigations, with one exception (Avci & Kula, 2023), nomophobia has been operationalized using the Nomophobia Questionnaire-Q (NMP-Q). The questionnaire contains 20 items divided into four dimensions: inability to communicate, loss of connectivity, unavailability of information, and giving up the convenience that the telephone provides. Respondents express their agreement with each statement on a Likert scale, which measures the intensity of their dependence and emotional response to the potential absence of a mobile device (C. Yildirim & A.-P. Correia, 2015; Yildirim et al., 2016).

On the other hand, academic performance was operationalized differently in the studies analyzed, reflecting the complexity of this construct. Objective quantitative indicators such as grade point average (GPA) (Aldhahir et al., 2023; Alodhialah et al., 2025; Fu et al., 2021), percentage score of the last academic exam (Ahmed et al., 2019), or students' ranking derived from GPA (Lin et al., 2021) have been used most frequently. In some cases, these indicators were supplemented with study habits and accompanying variables such as the number of hours devoted to study per week or the number of disciplinary warnings (Aldhahir et al., 2023).

In addition to academic achievement, individual authors have also included psychometric instruments focusing on study behaviour, motivation or engagement in the assessment of academic performance. For example, The Student's Engagement Scale in online environments (Sun et al., 2012), which assesses the behavioral, affective and cognitive components of student engagement, was used in a study by Avci and Kula (2023) (Avci & Kula, 2023). Other prominent instruments were the MSLQ - Motivated Strategies for Learning Questionnaire (Pintrich, 1991), applied in a study by Berdida and Grande (2023) (Berdida & Grande, 2023), and The Academic Procrastination Scale, used as an indicator of procrastination (Özbay et al., 2025).

Some studies have approached academic performance through adolescents' lifestyles (e.g., the Adolescent Lifestyle Profile-Revised 2 (ALP-R2) scale), thereby taking into account the broader psychosocial context of learning (Buctot et al., 2020). Others have focused on cognitive abilities, using instruments such as the Stroop Color and Word Test (Trenerry et al., 1989) and Raven's Progressive Matrices (Raven, 1941) to assess nonverbal reasoning (Schwaiger & Tahir, 2022).

An innovative approach is the study by Gentina et al. (2018), which looked at academic performance through the prism of "iCheating"-technology-mediated cheating as measured by a proprietary research scale (Gentina et al., 2018). Other authors have in turn examined decision making as part of ac-

ademic behaviour through the Melbourne Decision Making Questionnaire (Márquez-Hernández et al., 2020) or functional academic performance through the Canadian Occupational Performance Measure (Torpil et al., 2021).

Several studies have used experimental and quasi-experimental methodological approaches (Lee et al., 2017; Lee et al., 2021; Sumuer, 2021). In the study by Lee et al. (2017), participants were randomly divided into four groups: phone use allowed, phone ownership with no use allowed, complete phone removal, and a control group with no instruction. All participants watched a 20-minute lecture during which they received simulated messages to induce a distraction effect. After the lecture, they completed a test and questionnaires on nomophobia, obsessiveness, and mindfulness (Lee et al., 2017). Similarly, Lee et al. (2021) investigated the effect of mobile phone on distraction and learning in an experiment with two groups: a group allowed to use mobile phone for academic purposes and a group without instruction. Participants received anonymous text messages while watching a video lecture to simulate distractions during instruction (Lee et al., 2021). Sumuer's (2021) study used a quasi-experimental design with two groups - students with limited and unrestricted access to a mobile phone during the lecture. The students were divided into two groups, both of which attended the same 30-minute lecture led by the researcher, using a presentational teaching method. The teaching procedure was identical in both cases. One week before the lecture, the students completed a test measuring their initial knowledge. The lecture was followed by the same test assessing the knowledge gained (Sumuer, 2021).

Further research recommendations. Studies examining nomophobia among students agree that it is a widespread phenomenon with multiple negative consequences on daily life, academic performance, and mental health. Most research confirms the high prevalence of nomophobia - for example, Aldhahir et al. (2023) reported prevalence in up to 97.3% of respondents (Aldhahir et al., 2023), while Buctot et al. (2020) found that even only 0.5% of students did not exhibit any form of nomophobia. Moderate to severe forms were found across fields of study, particularly in health fields (Buctot et al., 2020).

Several studies (e.g., Ahmed et al., 2019; Alodhialah et al., 2025; Berdida et al., 2023) have demonstrated an inverse relationship between nomophobia scores and academic performance, with this relationship tending to be mediated by decreases in motivation, attention, and increased rates of procrastination (Ahmed et al., 2019; Alodhialah et al., 2025; Berdida & Grande, 2023; Márquez-Hernández et al., 2020; Özbay et al., 2025). Findings suggest that nomophobia also negatively affects the ability to focus on complex tasks (Schwaiger & Tahir, 2022) and reduces performance on tests (Lee et al., 2021; Sumuer, 2021).

Nomophobia is also strongly associated with psychological difficulties such as anxiety, panic reactions and increased stress, especially in situations where students do not have access to their mobile phone (Alodhialah et al., 2025; Ayaz-Alkaya et al., 2025). Some students also experience sleep disturbances, decision-making problems and a decrease in overall well-being (Fu et al., 2021; Gentina et al., 2018; Márquez-Hernández et al., 2020).

The most common risk factors include female gender, single marital status, living away from home and, paradoxically, a higher educational average (Aldhahir et al., 2023). This suggests that nomophobia does not escape academically successful students. On the other hand, Ahmed et al. (2019) found no statistically significant differences in NMP scores between different academic groups ($p = 0.152$), suggesting some variability in outcomes (Ahmed et al., 2019).

Experimental studies further suggest that limiting mobile phone use during class leads to better attention and higher performance (Gutiérrez-Puertas et al., 2020; Lee et al., 2017). These findings support the need to create school policies aimed at regulating smartphone use in academic settings.

Some studies have also extended the view by linking nomophobia to other phenomena such as fear of missing out (FoMO), internet addiction, or lower levels of well-being (Avci & Kula, 2023; Buctot et al., 2020). Nomophobia has also been identified as a contributing factor to reduced performance in areas such as sleep, physical activity or interpersonal relationships (Torpil et al., 2021).

Overall, studies agree that nomophobia is a complex problem that negatively affects students' academic performance, psychological well-being, and overall functioning. Despite some differences in research details and methods, it is clear that this is a phenomenon requiring systematic attention from educators, institutions, and health professionals.

Based on the studies analyzed, the following recommendations for further research in the field of nomophobia can be proposed.

Most of the research to date is cross-sectional in nature, which limits the possibility of inferring causal relationships. Therefore, we recommend that longitudinal studies should be conducted to follow nomophobia and its impact on students' academic performance, psychological health, and daily functioning over a long period of time.

Prevention and intervention programs aimed at reducing nomophobia and dependence on mobile devices should be designed, implemented, and evaluated. Research should investigate which specific strategies (e.g., digital detox, behavioral interventions, educational campaigns) are most effective in different population groups.

Given the differences in cultural and social contexts across studies, future research should explore how nomophobia manifests across regions, cultures, and age groups. A focus on internation-

al comparisons could provide a deeper understanding of risk factors and associations.

Given the sustainability of the boom in online education (Bilan et al., 2024; Razminiene et al., 2024), it would be useful to explore how hybrid and distance forms of learning affect nomophobia, digital addictions, and academic engagement. It is important to clarify what digital strategies support the healthy use of technology in new learning environments.

4 CONCLUSIONS

The findings of this study show that nomophobia is a growing and complex phenomenon that has significant implications for academic environments, particularly in higher education. Based on a systematic analysis of 18 empirical studies, it can be concluded that nomophobia negatively affects students' academic performance through decreased concentration, impaired motivation, procrastination, and impaired study habits. In addition, psychological and physical difficulties such as anxiety, sleep disturbances and stress are also associated with nomophobia, further impairing the ability to learn effectively.

The bibliometric analysis also showed that this is a relatively young but dynamically developing research area, the international nature of which confirms the global relevance of the problem. Nevertheless, most research has been shown to be cross-sectional in design, often lacking a firm theoretical grounding, and the operationalization of academic performance is highly heterogeneous.

The results also suggest a need for the development of more theoretically and methodologically robust research that could contribute to a deeper understanding of the mechanisms through which nomophobia affects academic performance. Intervention and longitudinal studies, as well as research on the effectiveness of school-based strategies to regulate digital behaviour, would merit particular attention.

In light of the above, we recommend that academic institutions and educators begin to view nomophobia as a relevant factor influencing the quality of education. Implementing educational campaigns, creating rules for the use of technology during instruction, and promoting digital well-being could be the first steps to mitigate its effects on students' academic performance and mental health.

Authors' contributions: Rózsa Zoltán was responsible for the conceptualization of the study and provided overall supervision throughout the research process. Holúbek Jakub collected the data included in the systematic literature review and conducted their formal analysis. Lazarová Emília and Ondrášková Viera contributed to the writing of the manuscript through reviewing and editing of the text to ensure clarity, coherence, and academic rigor. All authors have read and approved the final version of the manuscript.

Declaration of interest: The authors declare that they have no financial, personal, or other conflicts of interest that could have influenced the work reported in this paper.

REFERENCES

- Ahmed, S., Pokhrel, N., Roy, S., & Samuel, A. J. (2019). Impact of nomophobia: A nondrug addiction among students of physiotherapy course using an online cross-sectional survey [Article]. *Indian Journal of Psychiatry*, 61(1), 77-80. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_361_18
- Aladag, O., & Altinpinar, I. (2023). Nomophobia and its effects on seafarers. *Work*, 74. <https://doi.org/10.3233/WOR-210948>
- Alan, H., Bekar, E. O., & Güngör, S. (2022). An investigation of the relationship between smartphone addiction and job performance of healthcare employees [Article]. *Perspectives in Psychiatric Care*, 58(4), 1918-1924. <https://doi.org/10.1111/ppc.13006>
- Aldhahir, A. M., Bintalib, H. M., Siraj, R. A., Alqahtani, J. S., Alqarni, O. A., Alqarni, A. A., Alghamdi, H. S., Alyami, M. M., Naser, A. Y., Fatani, A., & Alwafi, H. (2023). Prevalence of nomophobia and its impact on academic performance among respiratory therapy students in Saudi Arabia [Article]. *Psychology Research and Behavior Management*, 16, 877-884. <https://doi.org/10.2147/prbm.S404898>
- Alodhialah, A. M., Almutairi, A. A., & Almutairi, M. (2025). Assessment of knowledge and outcomes of nomophobia among students at a selected degree college in Riyadh [Article]. *Risk Management and Healthcare Policy*, 18, 667-678. <https://doi.org/10.2147/rmhp.S508434>
- Alshehri, A. (2024). Social media in tourism: A Twitter (x) social graph approach to #alula. *Journal of Tourism and Services*, 15(28), 253-267. <https://doi.org/10.29036/jots.v15i28.715>
- Avcı, Ü., & Kula, A. (2023). Examining the predictors of university students' engagement, fear of missing out and internet addiction in online environments [Article]. *Information Technology & People*, 36(7), 2687-2717. <https://doi.org/10.1108/itp-05-2021-0416>
- Ayaz-Alkaya, S., Köse-Kabakcioglu, N., & Terzi, H. (2025). Fear of lacking access to mobile devices ("nomophobia"): A preliminary study of prevalence, predictors, and relationship to perceived stress in nursing students [Article]. *Nursing Outlook*, 73(4), 7, Article 102434. <https://doi.org/10.1016/j.outlook.2025.102434>
- Bandura, A. (1986). Social foundations of thought and action. *Englewood Cliffs, NJ*, 1986(23-28), 2.
- Berdida, D. J. E., & Grande, R. A. N. (2023). Nursing students' nomophobia, social media use, attention, motivation, and academic performance: A structural equation modeling approach [Article]. *Nurse Education in Practice*, 70, 9, Article 103645. <https://doi.org/10.1016/j.nepr.2023.103645>
- Bhattacharya, S., Bashar, M. A., Srivastava, A., & Singh, A. (2019). Nomophobia: No mobile phone phobia. *Journal of Family Medicine and Primary Care*, 8(4). https://journals.lww.com/jfmpc/fulltext/2019/08040/nomophobia__no_mobile_phone_phobia.2.aspx
- Bilan, Y., Nam, S., & Nam, D. (2024). The role of management in preventing occupational accidents in the mining sector. *Acta Montanistica Slovaca*, 29(4).
- Bragazzi, N. L., & Del Puente, G. (2014). A proposal for including nomophobia in the new DSM-V. *Psychology Research and Behavior Management*, 155-160.
- Buctot, D. B., Kim, N., & Kim, S. H. (2020). The role of nomophobia and smartphone addiction in the lifestyle profiles of junior and senior high school students in the Philippines. *Social Sciences & Humanities Open*, 2. <https://doi.org/10.1016/j.ssaho.2020.100035>
- Chen, B., Seilhamer, R., Bennett, L., & Bauer, S. (2015). Students' mobile learning practices in higher education: A multi-year study. *Educause Review*, 7(3), 225-235.
- Clayton, R. B., Leshner, G., & Almond, A. (2015). The extended self: The impact of iPhone separation on cognition, emotion, and physiology. *Journal of Computer-Mediated Communication*, 20(2), 119-135.
- Costa, C., Teodoro, M., Coco, M., Verduci, F., Giambò, F., Italia, S., Alibrandi, A., & Fenga, C. (2023). Smartphone use among resident physicians: Prevalence and risk factors in clinical practice [Article]. *Sage Open*, 13(3), 10, Article 21582440231194463. <https://doi.org/10.1177/21582440231194463>
- Crompton, H., & Burke, D. (2018). The use of mobile learning in higher education: A systematic review. *Computers & Education*, 123, 53-64. <https://doi.org/https://doi.org/10.1016/j.compedu.2018.04.007>
- Demirci, K., Orhan, H., Demirdas, A., Akpinar, A., & Sert, H. (2014). Validity and reliability of the Turkish version of the smartphone addiction scale in a younger population. *Klinik Psikofarmakoloji Bülteni-Bulletin of Clinical Psychopharmacology*, 24(3), 226-234.

- Efstathiou, M., Kakaidi, V., Tsitsas, G., Mantzoukas, S., Gouva, M., & Dragioti, E. (2025). The prevalence of mental health issues among nursing students: An umbrella review synthesis of meta-analytic evidence [Review]. *International Journal of Nursing Studies*, *163*, 13, Article 104993. <https://doi.org/10.1016/j.ijnurstu.2025.104993>
- Elhai, J. D., Dvorak, R. D., Levine, J. C., & Hall, B. J. (2017). Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. *Journal of affective disorders*, *207*, 251-259.
- Engeström, Y. (2001). Expansive learning at work: Toward an activity theoretical reconceptualization. *Journal of education and work*, *14*(1), 133-156.
- Fletcher-Brown, J., Carter, D., Pereira, V., & Chandwani, R. (2021). Mobile technology to give a resource-based knowledge management advantage to community health nurses in an emerging economies context. *Journal of Knowledge Management*, *25*(3), 525-544. <https://doi.org/10.1108/JKM-01-2020-0018>
- Ford, K., Bellis, M. A., Judd, N., Griffith, N., & Hughes, K. (2022). The use of mobile phone applications to enhance personal safety from interpersonal violence – an overview of available smartphone applications in the united kingdom. *BMC public health*, *22*(1), 1158. <https://doi.org/10.1186/s12889-022-13551-9>
- Fu, S., Chen, X., & Zheng, H. (2021). Exploring an adverse impact of smartphone overuse on academic performance via health issues: A stimulus-organism-response perspective. *Behaviour & Information Technology*, *40*. <https://doi.org/10.1080/0144929X.2020.1716848>
- Gentina, E., Tang, T. L. P., & Dancoine, P. F. (2018). Does gen z's emotional intelligence promote icheating (cheating with iphone) yet curb icheating through reduced nomophobia? [Article]. *Computers & Education*, *126*, 231-247. <https://doi.org/10.1016/j.compedu.2018.07.011>
- Gezgin, D., Sahin, Y., & Yildirim, S. (2017). The investigation of social network users' nomophobia levels regarding to various factors. *Educational Technology Theory and Practice*, *7*(1), 1-15.
- Gezgin, D. M., Cakir, O., & Yildirim, S. (2018). The relationship between levels of nomophobia prevalence and internet addiction among high school students: The factors influencing nomophobia. *International Journal of Research in Education and Science*, *4*(1), 215-225.
- Glumbic, N., Brojcin, B., Zunic-Pavlovic, V., & Dordevic, M. (2020). Problematic mobile phone use among adolescents with mild intellectual disability [Article]. *Psihologija*, *53*(4), 359-376. <https://doi.org/10.2298/psi190729014g>
- Gutiérrez-Puertas, L., Márquez-Hernández, V. V., Gutiérrez-Puertas, V., Granados-Gómez, G., & Aguilera-Manrique, G. (2020). The effect of cell phones on attention and learning in nursing students [Article]. *Cin-Computers Informatics Nursing*, *38*(8), 408-414. <https://doi.org/10.1097/cin.0000000000000626>
- Haddaway, N. R., Page, M. J., Pritchard, C. C., & McGuinness, L. A. (2022). Prisma2020: An r package and shiny app for producing prisma 2020-compliant flow diagrams, with interactivity for optimised digital transparency and open synthesis [<https://doi.org/10.1002/cl2.1230>]. *Campbell Systematic Reviews*, *18*(2), e1230. <https://doi.org/https://doi.org/10.1002/cl2.1230>
- Hessari, H., Busch, P., & Smith, S. (2025). Tackling nomophobia: The influence of support systems and organizational practices [Article]. *Psychology Health & Medicine*, *30*(3), 572-601. <https://doi.org/10.1080/013548506.2024.2417310>
- Hessari, H., Daneshmandi, F., Busch, P., & Smith, S. (2024). Workplace nomophobia: A systematic literature review [Article]. *Current Psychology*, *43*(31), 25934-25954. <https://doi.org/10.1007/s12144-024-06222-y>
- Jahrami, H., Romdhane, F. F., Pandi-Perumal, S. R., Bahammam, A. S., & Vitiello, M. V. (2024). Global research evidence on nomophobia during 2008-2022: A bibliometric analysis and review [Review]. *Psychology Health & Medicine*, *29*(5), 889-904. <https://doi.org/10.1080/13548506.2023.2268888>
- Jilisha, G., Venkatachalam, J., Menon, V., & Olickal, J. J. (2019). Nomophobia: A mixed-methods study on prevalence, associated factors, and perception among college students in puducherry, india. *Indian Journal of Psychological Medicine*, *41*(6), 541-548. https://doi.org/10.4103/IJPSYM.IJPSYM_130_19
- Kearsley, G., & Shneiderman, B. (1998). Engagement theory: A framework for technology-based teaching and learning. *Educational technology*, *38*(5), 20-23.
- Kuss, D. J., Harkin, L., Kanjo, E., & Billieux, J. (2018). Problematic smartphone use: Investigating contemporary experiences using a convergent design. *International Journal of Environmental Research and Public Health*, *15*(1), 142.
- Kuznekoff, J. H., & Titsworth, S. (2013). The impact of mobile phone usage on student learning. *Communication Education*, *62*(3), 233-252. <https://doi.org/10.1080/03634523.2013.767917>
- Lee, S., Kim, M. W., McDonough, I. M., Mendoza, J. S., & Kim, M. S. (2017). The effects of cell phone use and emotion-regulation style on college students' learning [Article]. *Applied Cognitive Psychology*, *31*(3), 360-366. <https://doi.org/10.1002/acp.3323>
- Lee, S., McDonough, I. M., Mendoza, J. S., Brasfield, M. B., Enam, T., Reynolds, C., & Pody, B. C. (2021). Cellphone addiction explains how cellphones impair learning for lecture materials [Article]. *Applied Cognitive Psychology*, *35*(1), 123-135. <https://doi.org/10.1002/acp.3745>
- Lepp, A., Barkley, J. E., Sanders, G. J., Rebold, M., & Gates, P. (2013). The relationship between cell phone use, physical and sedentary activity, and cardiorespiratory fitness in a sample of u.S. College students. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 79. <https://doi.org/10.1186/1479-5868-10-79>
- Lin, Y. Q., Liu, Y., Fan, W. J., Tuunainen, V. K., & Deng, S. L. (2021). Revisiting the relationship between smartphone use and academic performance: A large-scale study [Article]. *Computers in Human Behavior*, *122*, 11, Article 106835. <https://doi.org/10.1016/j.chb.2021.106835>
- Márquez-Hernández, V. V., Gutiérrez-Puertas, L., Granados-Gómez, G., Gutiérrez-Puertas, V., & Aguilera-Manrique, G. (2020). Problematic mobile phone use, nomophobia and decision-making in nursing students mobile and decision-making in nursing students [Article]. *Nurse Education in Practice*, *49*, 7, Article 102910. <https://doi.org/10.1016/j.nepr.2020.102910>
- Matusik, S. F., & Mickel, A. E. (2011). Embracing or embattled by converged mobile devices? Users' experiences with a contemporary connectivity technology. *Human Relations*, *64*(8), 1001-1030. <https://doi.org/10.1177/0018726711405552>
- Miovsky, M., Orlikova, B., Lososova, A., Amer, J., Ashburner, F., Ferrer, X., Javakhshvili, J., Kader, R., Orte, C., & Volfova, A. (2024). Development of curricula and sustainability of university-based master's programmes in addiction studies: A pilot comparative study. In: Adiktologie.
- Notara, V., Vagka, E., Gnardellis, C., & Lagiou, A. (2021). The emerging phenomenon of nomophobia in young adults: A systematic review study. *Addiction & Health*, *13*(2), 120.
- Özbay, Ö., Dogan, U., Adigüzel, O., & Özbay, S. C. (2025). Modeling factors associated with academic procrastination in university students [Article; Early Access]. *Psychological Reports*, *26*. <https://doi.org/10.1177/00332941251335573>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., . . . Moher, D. (2021). The prisma 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, *372*, n71. <https://doi.org/10.1136/bmj.n71>
- Pauš, V., KOMRSKA, S., Dolejš, M., & Suchá, J. (2024). Resilience and depressivity among czech adolescents in relation to internet gaming disorder: Representative sample. *Addictology/Adiktologie*(2).

- Pintrich, P. R. (1991). A manual for the use of the motivated strategies for learning questionnaire (mslq).
- Pířov, M., & Lukavsk, K. (2024). Technoference in parents of primary school-aged children and its associations with parental problematic screen use and sociodemographic characteristics. In: Adiktologie.
- Prochazkova, M., Kmecova, I., & CAHA, Z. (2024). Identifying differences in the application of hr marketing tools in companies in the secondary sector--a case study of mining, construction, and manufacturing industries. *Acta Montanistica Slovaca*, 29(2).
- Rajguru, A. J., Mishra, A. K., Bhargava, R., Sarkar, S., & Balhara, Y. P. S. (2024). Exploring risk factors and determinants: A scoping review of factors associated with nomophobia [Review]. *Indian Journal of Psychiatry*, 66(7), 25. https://doi.org/10.4103/indianjpsychiatry.indianjpsychiatry_244_24
- Ramjan, L. M., Salamonsen, Y., Batt, S., Kong, A., McGrath, B., Richards, G., Roach, D., Wall, P., & Crawford, R. (2021). The negative impact of smartphone usage on nursing students: An integrative literature review [Review]. *Nurse Education Today*, 102, 18, Article 104909. <https://doi.org/10.1016/j.nedt.2021.104909>
- Randler, C., Wolfgang, L., Matt, K., Demirhan, E., Horzum, M. B., & Beřoluk, ř. (2016). Smartphone addiction proneness in relation to sleep and morningness-eveningness in german adolescents. *Journal of Behavioral Addictions*, 5(3), 465-473.
- Raven, J. C. (1941). Standardization of progressive matrices, 1938. *British Journal of Medical Psychology*, 19(1), 137-150. <https://doi.org/https://doi.org/10.1111/j.2044-8341.1941.tb00316.x>
- Razminien, K., & Tvaronaviien, M. (2024). Advancing circular economy through knowledge transfer: A decade of research insights. *Acta Montanistica Slovaca*, 29(2).
- Rodrguez-Garca, A.-M., Moreno-Guerrero, A.-J., & Lpez Belmonte, J. (2020). Nomophobia: An individual's growing fear of being without a smartphone--a systematic literature review. *International Journal of Environmental Research and Public Health*, 17(2), 580. <https://www.mdpi.com/1660-4601/17/2/580>
- https://mdpi-res.com/d_attachment/ijerph/ijerph-17-00580/article_deploy/ijerph-17-00580.pdf?version=1579170735
- Rosenberger, R. (2015). An experiential account of phantom vibration syndrome. *Computers in Human Behavior*, 52, 124-131. <https://doi.org/https://doi.org/10.1016/j.chb.2015.04.065>
- Sadeghi, N., Rezaeian, S., Janatolmakan, M., Heidarian, P., & Khatony, A. (2025). Exploring the prevalence of nomophobia, its contributing factors, and the relationship with social interaction anxiety among nursing students [Article]. *Bmc Medical Education*, 25(1), 11, Article 372. <https://doi.org/10.1186/s12909-025-06902-8>
- Samaha, M., & Hawi, N. S. (2016). Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Computers in Human Behavior*, 57, 321-325.
- Santl, L., Brajkovic, L., & Kopilař, V. (2022). Relationship between nomophobia, various emotional difficulties, and distress factors among students. *European Journal of Investigation in Health, Psychology and Education*, 12(7), 716-730.
- Saran, M., & Seferoglu, G. (2010). Supporting foreign language vocabulary learning through multimedia messages via mobile phones. *Hacettepe University Journal of Education*, 38(3), 252-266.
- Schwaiger, E., & Tahir, R. (2022). The impact of nomophobia and smartphone presence on fluid intelligence and attention [Article]. *Cyberpsychology-Journal of Psychosocial Research on Cyberspace*, 16(1), 16, Article 5. <https://doi.org/10.5817/cp2022-1-5>
- Steel, C. (2012). Fitting learning into life: Language students' perspectives on benefits of using mobile apps. *ascilite*,
- Sui, A., & Sui, W. (2021). Not getting the message: Critiquing current conceptualizations of nomophobia. *Technology in Society*, 67, 101719. <https://doi.org/https://doi.org/10.1016/j.techsoc.2021.101719>
- Sumuer, E. (2021). The effect of mobile phone usage policy on college students' learning [Article]. *Journal of Computing in Higher Education*, 33(2), 281-295. <https://doi.org/10.1007/s12528-020-09265-9>
- Sun, J. C. Y., & Rueda, R. (2012). Situational interest, computer self-efficacy and self-regulation: Their impact on student engagement in distance education. *British journal of educational technology*, 43(2), 191-204.
- Sung, Y.-T., Chang, K.-E., & Yang, J.-M. (2015). How effective are mobile devices for language learning? A meta-analysis. *Educational Research Review*, 16, 68-84. <https://doi.org/https://doi.org/10.1016/j.edurev.2015.09.001>
- Tavolacci, M. P., Meyrignac, G., Richard, L., Dechelotte, P., & Ladner, J. (2015). Problematic use of mobile phone and nomophobia among french college students: Marie-pierre tavolacci. *European Journal of Public Health*, 25(suppl_3), ckv172.088. <https://doi.org/10.1093/eurpub/ckv172.088>
- Tobar, D. A. (2012). Trait anxiety and mood state responses to overtraining in men and women college swimmers. *International Journal of Sport and Exercise Psychology*, 10(2), 135-148.
- Torpil, B., nsal, E., Yildiz, E., & Peketin, S. (2021). Relationship between nomophobia and occupational performance among university students [Article]. *British Journal of Occupational Therapy*, 84(7), 441-445, Article 0308022620950984. <https://doi.org/10.1177/0308022620950984>
- Trenerry, M. R., Crosson, B. A., DeBoe, J., & Leber, W. R. (1989). *Stroop neuropsychological screening test*. Psychological Assessment Resources.
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *science*, 211(4481), 453-458.
- Wang, G., & Suh, A. (2018). Disorder or driver? The effects of nomophobia on work-related outcomes in organizations. Proceedings of the 2018 CHI conference on human factors in computing systems,
- Yildirim, C., & Correia, A.-P. (2015). Exploring the dimensions of nomophobia: Development and validation of a self-reported questionnaire. *Computers in Human Behavior*, 49, 130-137. <https://doi.org/https://doi.org/10.1016/j.chb.2015.02.059>
- Yildirim, C., & Correia, A. P. (2015). Exploring the dimensions of nomophobia: Development and validation of a self-reported questionnaire. *Computers in Human Behavior*, 49. <https://doi.org/10.1016/j.chb.2015.02.059>
- Yildirim, C., Sumuer, E., Adnan, M., & Yildirim, S. (2016). A growing fear: Prevalence of nomophobia among turkish college students. *Information Development*, 32(5), 1322-1331.
- Yildiz Durak, H. (2019). Investigation of nomophobia and smartphone addiction predictors among adolescents in turkey: Demographic variables and academic performance. *The Social Science Journal*, 56(4), 492-517. <https://doi.org/10.1016/j.soscij.2018.09.003>
- Zhang, H., Wang, Z., Chen, S., & Guo, C. (2019). Product recommendation in online social networking communities: An empirical study of antecedents and a mediator. *Information & Management*, 56(2), 185-195.
- Zimmerman, B. J. (2013). From cognitive modeling to self-regulation: A social cognitive career path. *Educational Psychologist*, 48(3), 135-147. <https://doi.org/10.1080/00461520.2013.794676>