AI-DRIVEN DIGITAL ENVIRONMENTS AND THE RISE OF NOMOPHOBIA AMONG ADOLESCENTS

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ABSTRACT

This study has investigated the role of AI-driven in digital space in the development of nomophobia in adolescents and the need to understand the trends in smartphone addiction and the psychological consequences. The descriptive and analytical research design was utilized to collect primary data in a form of a structured questionnaire with demographic information, exposure to AI-based digital features, and the Nomophobia Questionnaire (NMP-Q). The sample of primary data consisted of 200 adolescents aged between 13 and 19 years. The results indicated that the frequency of use and exposure to AI-related services, including custom-personalized content feeds, push notifications, as well as AI-based recommendations, were very high. The percentage of adolescents with moderate to severe levels of nomophobia was very high which means that they are extremely psychologically dependent on mobile gadgets. The results of the correlation analysis showed strong and statistically significant positive correlation between exposure to AI-based digital spaces and the rates of nomophobia, which proved that the more people were exposed to AI-powered systems, the more anxious they became because of the fear of being separated with a mobile phone. The article highlighted the importance of AI-driven personalization and the persistent digital interaction in supporting the habitual use of smartphones and nomophobic behaviour among teenagers. The results indicated the necessity of digital literacy, parental education, ethical AI development, and prevention measures to ensure the healthy use of the digital world and prevent negative effects on adolescent mental health.

Keywords: *Artificial Intelligence, Digital Environments, Nomophobia, Adolescents, Smartphone Dependence, Psychological Well-being*

1. INTRODUCTION

Artificial Intelligence (AI) has emerged as a new phenomenon to the creation of modern digital space and an essential change in the way adolescents interact, learn, and communicate. AI-powered applications like customized social media feeds, intelligent recommendation systems, virtual assistants and adaptive learning platforms are engineered to optimize the user experience through constant behaviour and preference analysis. Although these technologies can make life more convenient and efficient, as well as more informative, they also make adolescents more addicted to digital devices, especially smartphones. Being at a critical stage of development (identity formation, emotional sensitivity, social validation needs), adolescents, in particular, are particularly prone to the immersive and persuasive power of AI-driven digital ecosystems.

The increased application of AI into the daily digital interactions has led to a behavioural condition called nomophobia, which can be described as the fear or anxiety people develop when they cannot connect to their mobile phones or digital networks. The constant availability of smartphone notifications, personalized content, and endless feedback loops of social engagement all underpinned by AI algorithms promote the continuation of habitual smartphone use to drive dopamine-rewarding behaviour. In adolescents, such mechanisms permeate the border between the need and the obsession, so that it seems essential to always be connected. Consequently, the lack of a smartphone or internet connection may cause emotional instability, anxiety, anger, and sensations of social alienation, the main predictors of nomophobia.

In addition, social networks that are powered by AI transform social networks and emotional control patterns among adolescents. AI-driven social media emphasize appearance, popularity, and comparison with others, which increases stress to spend most of the time online to stay sociable and stay relevant. The result of this continued connectivity is the fear of missing out (FoMO), increased social anxiety, and decreased tolerance of being alone or offline. In the long term, the overuse of AI in facilitating communication might undermine face-to-face communication abilities, sleep habits, and academic outcomes and well-being, which, in turn, supports the nomophobic loop among teenagers.

The connection between AI-driven digital spaces and the emergence of nomophobia is one of the most important issues to realize in the light of the growing digitalization of education and social life. Since AI is constantly developing and getting more and more embedded into the everyday lives of adolescents, the need to analyze its psychological and behavioural

consequences becomes urgent. The subtle discussion of this challenge can guide teachers, parents, and policymakers as well as mental health practitioners to create balanced digital practices, develop digital literacy, and ethical AI systems that support the well-being of adolescents in addition to technological progress.

1.1. Research Objectives

The key objectives of the study are:

- To determine how much the adolescents are exposed to AI-driven digital environments.
- To determine the degree of nomophobia among adolescents.
- To examine the connection between nomophobic behaviour and AI-based digital engagement.
- To study the psychological and behavioural consequences of too much smartphone addiction.
- To propose preventive measures of controlling nomophobia in adolescents.

2. REVIEW ON LITERATURE

Ohu and Jones (2025) investigated digital validation-seeking behaviour among teenagers and found that it is one of the major antecedents of internet vulnerabilities like romance scamming. Their article emphasized that overdependence on likes, comments, and online confirmation by adolescents made them emotionally dependent on online platforms. The researchers came to the conclusion that continuous digital validation contributed to pathological smartphone use, increased anxiety in case of non-connectivity, and decreased critical thinking, thus, leaving adolescents more vulnerable to psychological manipulation and digital exploitation.

Padmavathy (2023) examined how AI can be used to identify nomophobia by utilizing AI-based models to find dependencies on smartphone dependency. The article has shown that the machine learning methods could be used to predict the usage behaviour, frequency of notification, and emotion reactions in relation to separation with mobile phones. The results indicated the use of AI-based detection systems as early warning instruments to reveal persons that may develop nomophobia and help address psychological and behavioural problems promptly.

Si et al. (2025) proposed a machine learning model of nomophobia prediction on the basis of behavioural and usage data on smartphone use. Their study found out that protracted screen duration, habitual decision-making and reliance on mobile connectivity were high predictors

of nomophobia in users. The paper has highlighted that AI predictive models provided the right and scalable solutions to comprehend smartphone addiction behaviours, which supports the connection between AI-mediated digital spaces and increased nomophobic attitudes, especially among younger people.

Sui, Sui, and Irwin (2024) carried out an environmental scan to investigate the nomophobia prevalence in students in a Canadian university. In their research they found out that a considerable percentage of university students had moderate to high proportions of nomophobia with the major part being as a result of ubiquitous smartphone connectivity and dependence on mobile connectivity in their academic and social life. The authors have highlighted that the digital environment of the university, which was a constant online interaction, led to an increase in anxiety in the absence of the smartphones.

Tung et al. (2025) examined the mediating effect of nomophobia between the relationship between problematic social media use; problematic smartphone use and psychological distress among university students. The results suggested the idea of nomophobia where excessive use of digital was significantly mediated by the relationship between nomophobia and psychological distress (anxiety and stress). The report came up with a conclusion that reliance on smartphones and social media magnified emotional susceptibility, and nomophobia was a pivotal psychological process that connected digital excess with psychological issues.

Yao and Yang (2025) explored the regulatory challenges of addictive designing features of AI-based platforms, adolescent digital wellbeing in China. Their research underscored the role of AI-guided personalization, unlimited scrolling, and engagement systems which fed compulsive consumption habits among young consumers. The authors were able to assert that the lack of regulatory control enabled the use of such addictive properties to continue and worsen digital dependency/nomophobia among teenagers. They recommended better governance strategies and ethical AI design to protect the mental health and digital wellbeing of adolescents.

3. RESEARCH METHODOLOGY

The research methodology provides a description of the methodology used in order to investigate the effects of AI-driven digital environments on the problem of nomophobia in adolescence. It outlines the research design, sampling, data sources, tools and methods of analysis that would ensure a proper data collection, ethical practices and sound interpretation of the research results.

3.1. Research Design

The current research design is descriptive and analytical as it will investigate how AI-driven digital environments are related to the occurrence of the negative phenomenon of nomophobia among adolescents. The quantitative research method is mostly utilized to quantify the levels of nomophobia, the trends of smartphone usage, and the exposure to AI-related digital programs. The design can be used to collect data systematically and analyse them statistically in order to determine the trends, associations, and behavioural outcomes of digital dependency among adolescents.

3.2. Study Population

The study population comprises of adolescents of ages 1319 years of age; students of secondary schools and junior colleges. The reason why this age group is chosen is because of the level of smartphone usage, social media, and AI-driven applications and the increased psychological susceptibility to digital addiction.

3.3. Sample Size and Sampling Technique

The study uses a stratified random sampling technique to select 200 adolescents to be used in the study. The stratification is carried out on age, gender and educational level to have a balanced representation. This approach will increase the validity and externalizability of the results.

3.4. Sources of Data

The study relies on both primary and secondary data sources.

- **Primary Data:** Collected through a structured questionnaire administered to adolescents.
- **Secondary Data:** Collected from books, research journals, government reports, academic databases, and published works on the topics of AI, digital environments, smartphone addiction, and nomophobia.

3.5. Research Instrument

The current research study uses a standardized structured questionnaire comprising of two parts to gather its data. Section A contains the background data about demographic variables (age, gender, education level, amount of daily screen time, smartphone use patterns) in order to get

a better idea about the background of the respondents. Section B uses the Nomophobia Questionnaire (NMP-Q), which is a reliable and commonly used tool assessing fear and anxiety related to the separation with a mobile phone and also includes additional items to quantify the exposure of the adolescent to AI-related digital functionalities, including personalized content, algorithm-based recommendations, and frequent notifications.

3.6. Variables of the Study

- **Independent Variable:** Exposure to AI-driven digital environments (social media algorithms, notifications, personalized content).
- **Dependent Variable:** Level of nomophobia among adolescents.
- **Control Variables:** Age, gender, socioeconomic background, and academic level.

3.7. Data Collection Procedure

Data collection is done with the consent of educational institutions and parents. The questionnaires will be given face to face and in monitored options on the internet to ensure there is understanding and ethical consideration. The study purpose is explained to the participants, and the confidentiality of the responses is ensured.

3.8. Tools and Techniques of Data Analysis

The data obtained is duly coded and tabulated and analyzed with the help of appropriate statistical software. The demographic features and the degree of nomophobia are summarized by the use of descriptive statistics, which include the percentage analysis, mean, and standard deviation, whereas the correlation is used to test the connection between the exposure to AI-driven digital settings and nomophobia in adolescents. Moreover, a chi-square test is used to determine the correlation between the chosen demographic variables and the level of nomophobia and the findings are organized in the form of tables, charts, and graphs in order to make them understandable and easy to read.

3.9. Ethical Considerations

The research is conducted in accordance with high standards of ethics. It is voluntary and informed consent is taken on part of parents and adolescents; anonymity of respondents is also guaranteed. The collected data is utilized merely on academic grounds.

4. RESULTS AND DISCUSSION

The section provides an analytical and interpretative discourse of the data gathered in order to understand how AI-driven digital settings affect nomophobia among teenagers. It combines both empirical data and logical argument to outline patterns in terms of demographic traits, exposure to AI-based digital elements and the frequency of nomophobia as well as the correlation between AI exposure and nomophobic behaviour. The results are clearly demonstrated with the help of tables and graphical representations, which allow forming a complete picture of the effects of using AI-based digital engagement on the psychological dependence of adolescents on smartphone use.

4.1. Demographic Profile of the Respondents

In this section the demographic profile of the respondents in terms of age, gender, and screen time on a daily basis is introduced. It offers a summary of the age groups of adolescents, equal gender representation, and their rates of using the smartphone, which is a fundamental background to the issues of their exposure to AI-mediated digital space and nomophobic behaviour. Table 1 has the demographics of the adolescents that took part in the study. The variables that will be taken into consideration are age, sex, and time spent on the screens daily. The age is divided into 3 categories, 13 to 15 years, 16 to 17 years and 18 to 19 years to indicate the difference in development during the adolescence period. The classification of gender distribution is male and female in order to have a balanced representation. Daily screen time is categorized into three levels less than 3 hours, 3 -5 hours, and above 5 hours to analyze differences in the patterns of smartphone usage among the respondents.

Table 1: Demographic Characteristics of Adolescents (N = 200)

Variable	Category	Frequency
Age (Years)	13–15	68
	16–17	82
	18–19	50
Gender	Male	98
	Female	102
Daily Screen Time	Less than 3 hours	42
	3–5 hours	76
	More than 5 hours	82

Table 1 results indicate that among 200 adolescents, 82 respondents are of the age group 16-17 years, then there are 68 respondents of the age group 13-15 years, and 50 respondents of age group 18-19 years, meaning higher representation of mid adolescents. Participation is balanced with gender ratio slightly at 102 and 98 respectively. With respect to a daily screen time, most teenagers (82 respondents) mentioned spending more than 5 hours on smartphones daily followed by 76 respondents who spent between 3 and 5 hours on smartphones, with only 42 respondents spending less than 3 hours on the screen. This large proportion of the continued use of the screen brings to the fore a lot of exposure of young people to digital devices and the possibility of greater exposure to AI-based digital worlds and the potential of getting nomophobic.

Figure 1 gives a graphical display of the demographic factors of adolescents in percentage form. The figure shows how the respondents are allocated in terms of age groups, gender, and daily screen time. The age is narrowed down into three categories (13-15 years, 16-17 years, and 18-19 years), gender is divided into male and female, and the amount of screen time used daily is divided into three levels of usage to portray trends in smartphone use among the teens..

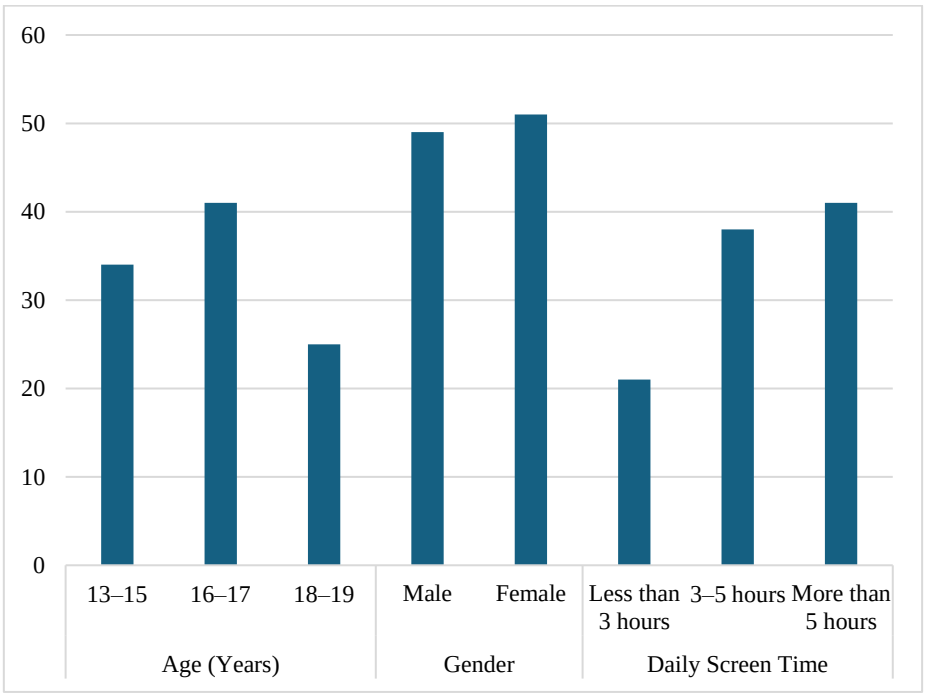

Figure 1: Graphical Representation of in Percentage Demographic Characteristics of Adolescents

The figure indicates that the highest proportion (41.0 percent) is the adolescents of the 16-17 years age group, secondly, the adolescents of the 13-15 years age group (34.0 percent), and lastly, thirdly, the adolescents of the 18-19 years age group (25.0 percent). The gender balance is close to being 51.0 percent female and 49.0 percent male, and this implies an equal representation. With regard to the daily screen time, a significant percentage of adolescents (41.0%) say they spend over five hours a day on smartphones, with 38.0% spending 3-5 hours a day and only 21.0% spending less than three hours a day. This trend indicates high rates of smartphone use among young people, which implies that children are more exposed to AI-based online spaces that can potentially lead to the emergence of the so-called nomophobic behaviour.

4.2. Exposure to AI-Driven Digital Environments

In this section the degree of exposure of adolescents to AI-powered digital capabilities including custom feeds, notifications, and algorithm-based recommendations are pointed out. The data demonstrates that these features are used extensively, which means that the user is highly immersed in the digital world of AI control leading to the possible development of habitual use of a smartphone and nomophobia. Table 2 and Figure 2 represent the degree of exposure of adolescents to the selected AI-based digital characteristics, i.e., custom content feeds, push notifications, and algorithm-based recommendations. The exposure levels have been grouped as low, moderate and high to demonstrate differences in the strength of interaction with the AI-based digital worlds. The classification assists in the perception of the frequency of adolescents using algorithmic functions that shape content consumption and behaviour of smartphone use.

Table 2: Level of Exposure to AI-Based Digital Features

AI-Driven Feature	**Low Exposure (%)**	**Moderate Exposure (%)**	**High Exposure (%)**
Personalized Content Feeds	18.5	34.0	47.5
Push Notifications	12.0	29.5	58.5
Algorithm-Based Recommendations	21.0	36.0	43.0

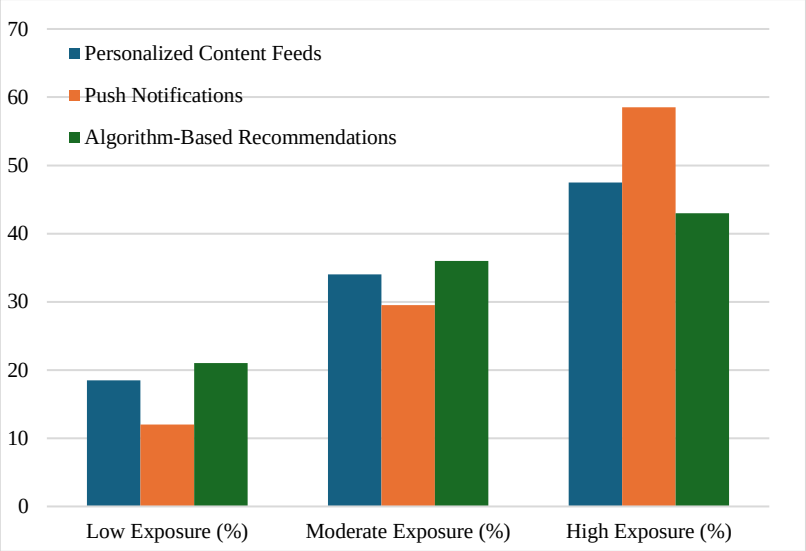

Figure 2: Graphical Representation of Percentage in Level of Exposure to AI-Based Digital Features

The findings show that a big percentage of teenagers have high exposure to AI-driven digital capabilities in all categories. Personalized content feeds have high exposure of 47.5% and 58.5% respondents report high exposure to push notifications, so it is the most conspicuous AI-driven feature. A significant high exposure rate of 43.0 is also registered by algorithm-based recommendation. Comparatively, small doses are not very high and they lie within the range of 12.0 to 21.0. The results imply that teenagers are extensively exposed to AI-powered virtual space, where personalization and constant notifications can strengthen the habitual smartphone use and create more susceptibility to nomophobia.

4.3. Level of Nomophobia among Adolescents

This section puts emphasis on the degree of nomophobia among adolescents demonstrating that the majority of them are relatively moderate to severe nomophobic implying significant psychological addiction to smart phones and heightened anxiety due to separation with mobile phones. Table 3 displays a breakdown of the adolescents based on the levels of their nomophobia measured using the Nomophobia Questionnaire (NMP-Q). The scores are categorized into three mild, moderate, and severe to classify the respondents into three categories and to be able to provide a clear assessment of the levels of fear and anxiety towards the separation of the mobile phone in the adolescent population.

Table 3: Distribution of Nomophobia Levels Based on NMP-Q Scores

Nomophobia Level	Frequency
Mild	46
Moderate	94
Severe	60
Total	200

The findings indicate that there are 94 adolescents who stand under the moderate nomophobia and this is the most significant group followed by 60 adolescents with severe nomophobia and 46 adolescents with mild nomophobia. Such distribution is a sign that a significant majority of adolescents have moderate and severe nomophobia, which is a high level of psychological dependence on smartphones. The findings of the higher rates of nomophobia imply that the constant interaction with AI-based digital space can lead to an increase in anxiety and unease linked to the absence of a mobile phone in adolescents.

The percentage-based descriptive statistics of nomophobia levels in the teenagers, in accordance with their scores on the Nomophobia Questionnaire (NMP-Q), are shown in Figure 3. The number assigns the respondents a mild, moderate and severe category of nomophobia, which offers a graphical summary of the presence of fear and anxiety associated with the use of the mobile phone in the research sample.

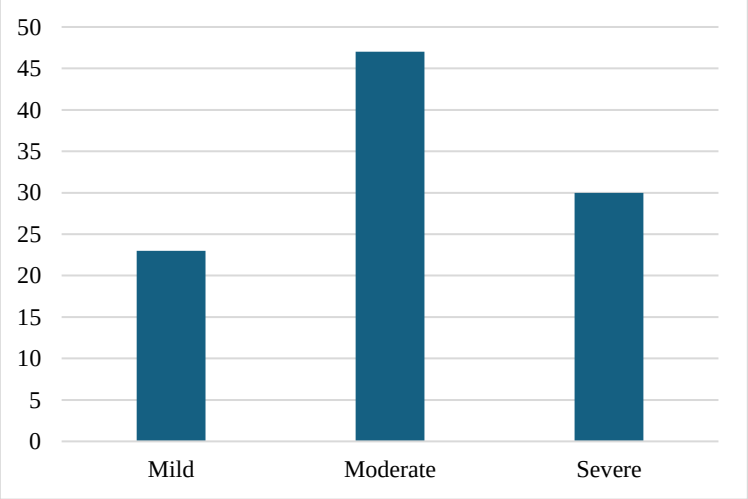

Figure 3: Graphical Representation of Percentage in Distribution of Nomophobia Levels Based on NMP-Q Scores

The percentage shows that 47.0 percent of individuals at the adolescence stage are moderate nomophobes, which accounts to the greatest percentage, 30.0 percent are severe nomophobes, and 23.0 percent are mild nomophobes. These results show that the percentage of adolescents having moderate to high levels of nomophobia is quite large and indicates a high level of psychological attachment to smartphones. The moderate and severe rates of nomophobia can possibly be associated with the over-involvement of AI-based digital environments, which promote the continuity of connectivity and the dependence on mobile devices.

4.4. Relationship between AI Exposure and Nomophobia

The section explores the relationship between the exposure of adolescents to AI-powered digital settings and their nomophobia. The results indicate that there is a positive relationship that is very strong and statistically significant thus the more the interaction with the AI-based functions is personalization and high frequency of notifications the more is the smartphone dependence and anxiety over mobile phone separation among adolescents. Table 4 brings the findings of the correlation analysis performed to test the interconnection between the exposure of adolescents to AI-based digital environments and their nomophobia levels. The correlation coefficient, r, and the level of statistical significance by defining the degree and direction of the association between the two variables are reported in the table giving a quantitative measure of the strength and direction of the association.

Table 4: Correlation between AI Exposure and Nomophobia Levels

Variable	**Correlation Coefficient (r)**	**Significance (p-value)**
AI Exposure & Nomophobia	0.68	< 0.01

The results indicate that AI exposure was strongly positively correlated with levels of nomophobia where the correlation coefficient was found to be $r = 0.68$ which is considered significant at $p < 0.01$. This shows that the more exposure an adolescent is exposed to AI-driven digital features the more the higher the level of nomophobia is. The statistically significant outcome proves that AI-based personalization, frequent notifications, and engagement based on the algorithm contribute significantly to the strengthening of smartphone addiction and anxiety associated with the separation and loss of the mobile phone.

5. CONCLUSION

The present research has also concluded that AI-based digital space plays a major role in the formation of adolescent's smartphone usage behaviours as well as the development of nomophobia. The results showed the high rates of exposure to AI-based functions like customized content feeds, push notifications, and suggestions based on algorithms, as well as excessive daily screen time in adolescents. The number of those who were moderate to severely nomophobic (high psychological addiction to mobile devices) was significant. The positive link between nomophobia and AI exposure had a statistically significant significance to affirm that mobile phone separation anxiety was increased by continuous personalization and engagement-driven digital design. In general, the paper emphasized the fact that although AI-based technologies contribute to improving connectivity and accessibility, their uncontrolled and excessive utilization is significantly threatening to the mental health of adolescents. It mentioned that there should be digital literacy efforts, educational and parental support, ethical AI design, and balanced digital use to reduce the effects of nomophobic behaviour and support less-adverse digital behaviours in adolescents.

REFERENCES

1. *Al Ali, N., & Matarneh, S. (2024). Exploring the role of smartphone use and demographic factors in predicting nomophobia among university students in Jordan. International Journal of Adolescence and Youth, 29(1), 2302400.*
2. *Alodhialah, A. M., Almutairi, A. A., & Almutairi, M. T. (2025). Assessment of Knowledge and Outcomes of Nomophobia Among Students at a Selected Degree College in Riyadh. Risk Management and Healthcare Policy, 667-678.*
3. *Caba-Machado, V., Machimbarrena, J. M., Díaz-López, A., Sevilla-Fernández, D., Pérez-Sancho, C., & González-Cabrera, J. (2024). Nomophobia questionnaire short-form: psychometric properties and longitudinal association with anxiety, stress, and depression in adolescents. International Journal of Human–Computer Interaction, 40(17), 4585-4595.*

4. *Hessari, H., Busch, P., & Smith, S. (2025). Tackling nomophobia: the influence of support systems and organizational practices. Psychology, Health & Medicine, 30(3), 572-601.*

5. *Jahrami, H., Fekih Romdhane, 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. Psychology, Health & Medicine, 29(5), 889-904.*

6. *Jiménez-Jiménez, V., Chivite-Cebolla, C., Jódar, R., López, E. P., Conejo-Pérez, M. N., & Sánchez-Martínez, M. (2025). Mapping Severe Child Nomophobia with Hierarchical Clustering and ROC. Psychology Research and Behavior Management, 1883-1892.*

7. *Karagöz, Y., Filiz, M., Karaşin, Y., & Kuzgun, Ş. (2025). Nomophobia and netlessphobia: implicatıons for psychologıcal resilience and happiness. British Journal of Guidance & Counselling, 1-16.*

8. *Maftei, A., & Pătrăușanu, A. M. (2024). Digital reflections: narcissism, stress, social media addiction, and nomophobia. The Journal of psychology, 158(2), 147-160.*

9. *Nandita, K. B., & Rajan, S. K. (2025). Finding balance in a digital world: Equanimity as a predictor of nomophobia. Journal of Human Behavior in the Social Environment, 35(6), 955-965.*

10. *Ohu, F. C., & Jones, L. A. (2025). An Examination of Digital Validation-Seeking Behaviours in Adolescents as Precursors to Romance Scamming. Scientia Moralitas, 10.*

11. *Padmavathy, R. D. (2023). AI In Nomophobia Detection: Leveraging Artificial Intelligence to Identify and Address Smartphone Dependency. EPRA International Journal of Multidisciplinary Research (IJMR), 9, 275-279.*

12. *Si, T., Sharma, A., Singh, A., & Khan, I. (2025, June). Trapped in the Mobile Screen: A Machine Learning Approach to Predict Nomophobia. In 2025 International Conference on Electronics, AI and Computing (EAIC) (pp. 1-5). IEEE.*

13. *Sui, A., Sui, W., & Irwin, J. (2024). Exploring the prevalence of nomophobia in a Canadian university: An environmental scan. Journal of American college Health, 72(4), 1176-1183.*

14. *Tung, S. E. H., Gan, W. Y., Poon, W. C., Lee, L. J., Ruckwongpatr, K., Kukreti, S., ... & Lin, C. Y. (2025). The mediating effect of nomophobia in the relationship between problematic social media use/problematic smartphone use and psychological distress among university students. Psychology, Health & Medicine, 1-17.*

15. *Yao, Y., & Yang, F. (2025). Governing Addictive Design Features in AI-Driven Platforms: Regulatory Challenges and Pathways for Protecting Adolescent Digital Wellbeing in China. Youth, 5(4), 122.*

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