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The impact of digital addiction and nomophobia on academic procrastination behavior among university students

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ABSTRACT

The rapid growth of digital technology use among university students has led to maladaptive usage patterns associated with psychological and behavioral problems, such as digital addiction and nomophobia, which may increase academic procrastination. This study examined the effects of digital addiction and nomophobia on academic procrastination among university students and investigated the mediating role of digital addiction in the relationship between nomophobia and academic procrastination. A predictive correlational design was employed with a sample of 306 undergraduate students from a private university in Jordan. Data were collected using the Digital Addiction Scale, the Fırat Nomophobia Scale (FNS), and the Academic Procrastination Scale (APS). Structural equation modeling (SEM) and multiple regression analyses were conducted. Structural equation modeling showed that nomophobia had a significant positive direct effect on academic procrastination ($\beta = 0.240$, CR = 6.77, $p < 0.001$), whereas digital addiction did not exhibit a significant direct effect ($\beta = -0.013$, $p = 0.664$). Mediation analysis revealed a full mediation effect, with digital addiction exerting a significant indirect effect on academic procrastination ($\beta = 0.153$, $z = 4.51$, $p < 0.001$), while the direct effect remained non-significant. Multiple regression analysis indicated that digital addiction was the strongest predictor of academic procrastination ($\beta = 0.405$, $t = 4.95$, $p < 0.001$), and the overall model explained 14.7% of the variance in academic procrastination ($R^2 = 0.147$). The structural model demonstrated acceptable fit indices (CFI = 0.913, TLI = 0.925, RMSEA = 0.063), supporting the robustness of the findings.

KEYWORDS: digital addiction, nomophobia, academic procrastination, university students, smartphone use, structural equation modeling

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1. **Background**

Technologies in the digital age have become facilitated many daily operations related to convenience and various functions such as communication, teaching, learning, gathering information, staying in touch with friends, family, and entertainment, but overuse can create serious problems in personal, family, and social well-being, mainly by causing digital addiction, digital addiction is used as an umbrella term to refer to addiction to any digital media such as: Internet, computers, smartphones, video games, and social media (Han &7 Yu, 2023; Sonkaya & Yazgan, 2025) Digital addiction, which is an umbrella term that refers to addiction to any type of digital media, such as the internet, smartphones, digital games, and social media(Albayrak & Demirel Ozbek, 2025) manifests itself in constant preoccupation with the phone or computer, feeling anxious or stressed when losing the internet connection, and difficulty disconnecting from devices for short periods (Yang et al., 2024) Overuse of social media and constant verification of notifications are also observed, leading to postponement of academic or practical tasks(Kong et al., 2025). On the health and psychological front, digital addiction is associated with sleep disorders, decreased ability to concentrate, social isolation, and high levels of anxiety and depression (Ahmed et al., 2023) , Digital addiction is an important factor that affects students' academic achievement, as recent research indicates that digital addiction has become a widespread phenomenon among university students, as a national study on medical students in six Jordanian universities showed that 38.7% have a mild level of addiction and 27.6% have a moderate addiction(Alkousheh et al., 2025)

In an international context, a study (Al-Mamun et al., 2024), indicated that digital addiction among undergraduate students is influenced by multiple psychological and social factors.

Digital addiction is not only limited to excessive use of devices, but also manifests itself in the forms of attachment and psychological fear of separation from them, which reinforces our understanding of nomophobia as a central part of modern digital adoption mechanisms. A study (Çobanoğlu et al., 2021) showed that smartphone addiction contributes significantly to predicting their level of tomophobia. Nomophobia is a contemporary psychological phenomenon that has emerged with the widespread spread of smartphones, as it is seen as a type of anxiety disorder associated with technology. Nomophobia, short for "phobia of not using a mobile phone", is the fear of being left without a smartphone (Al-Mamun et al., 2024), It is possible to identify individuals who suffer from fear of disconnection (nomophobia) through a set of clear characteristics and behaviors that reflect excessive dependence on smartphones. The most prominent of these include never turning the phone off, constantly checking text messages and missed calls even when there are no new notifications, carrying the phone everywhere without exception, and using it excessively at socially or professionally inappropriate times (Göktaş & Üstündağ, 2025). Such individuals also tend to immerse themselves in their phones at the expense of direct social interaction, and may deliberately avoid face-to-face communication with others, preferring to remain in a state of constant virtual connectivity (Sadeghi et al., 2025).

In more severe cases, the impact of nomophobia is not limited to behavioral and psychological aspects, but may extend to noticeable physical symptoms that appear when the phone is disconnected, malfunctions, or runs out of battery (Abdoli et al., 2023). These symptoms include sudden panic attacks, shortness of breath, trembling, excessive sweating, rapid heart rate, as well as chronic physical pain resulting from excessive phone use, such as pain in the hand joints, neck, shoulders, and back. These manifestations reflect the depth of psychological attachment to technology and the transformation of the smartphone from a communication tool into a primary source of psychological security for individuals affected by this type of phobia (Tuco et al., 2023).

In the context of students, internet phobia is of particular importance because this group is going through a critical stage of growth as social, professional, and academic identities are formed, and college students often find themselves in environments that encourage or require frequent use of mobile phones for academic work, socialization, and personal communication(Naser et al., 2023), This constant involvement in the use of mobile phones, while beneficial in many ways, can exacerbate anti-phone tendencies. Students often experience anxiety when they are unable to access their phones, leading to feelings of isolation, discomfort, and even panic, and moreover, the fear of not using the phone can interfere with students' ability to focus on academic tasks, as the constant need Checking their phones can disrupt study patterns and reduce productivity (Bulut & Sengul, 2024).

A study by (Vagka et al., 2023) showed that university students exhibit a moderate level of nomophobia, indicating a noticeable degree of anxiety related to losing access to mobile phones. Meanwhile, a study by (Kaur et al., 2021) showed a high prevalence of nomophobia among students. In terms of sex, females suffer from nomophobia more frequently than males (Al Ali & Matarneh, 2024)

Heavy smartphone use has been associated with reduced concentration, leading to increased academic procrastination (Karagöz & Özbay, 2025). Procrastination is also defined as any intentional but unreasonable delay in the implementation of an expected course of action, and usually leads to poor academic achievement, therefore, academic procrastinators are students who are aware of what is required of them, and are able to do it because the work falls within their study experience, and they try to do it, but do not get it done. Procrastination as a behavioral trait with cognitive, behavioral and emotional components (Chen et al., 2025; Su et al., 2025). A student may procrastinate on one or more tasks, or manage any activity, such

as finishing a reading assignment, completing a study project, or solving a class paper, but lacks the motivation to complete it within a set time frame (Fentaw et al., 2022).

Academic procrastination is a continuous behavior in the academic development of students, represented in postponing or delaying the completion of necessary tasks, and setting a deadline for them, which is associated with decreased performance, school dropouts, and loss of student well-being(González-Brignardello et al., 2023) A study by (Fentaw et al., 2022) showed that university students are always procrastinating due to poor time management skills, lack of planning for academic activities, laziness, and stress. Also, addiction to social media, as the more addiction to social media, the more academic procrastination behavior students have (Suarez-Perdomo et al., 2022), The severity of nomophobia was also closely related to educational level, cumulative average, frequency of smartphone use, and daily internet use(Aslani et al., 2025)

2. Methods

2.1. Study design

This study employed a cross-sectional predictive–correlational design to examine whether mindful the aim was to identify the impact of digital addiction and nomophobia on academic procrastination behavior in light of some relevant variables and influences, and to examine correlation coefficients.

Table 1 As shown in Table 1, females constituted the majority of the sample (70.6%, n = 216), whereas males represented the smallest proportion (29.4%, n = 90). Most participants were enrolled in humanities colleges (63.7%, n = 195), compared to those in scientific colleges (36.3%, n = 111). A higher proportion of students resided in urban areas (55.6%, n = 170) relative to rural areas (44.4%, n = 136).

Table 1 Demographic characteristics of the study sample (N = 306)

Variable	Category	n	%
Gender	Male	90	29.4
	Female	216	70.6
College	Humanities	195	63.7
	Sciences	111	36.3
Place of residence	Rural	136	44.4
	Urban	170	55.6
Phone checking frequency (per day)	Less than 5 times	98	32.0
	5 times or more	208	68.0
Daily smartphone use duration	1–4 hours	139	45.4
	5 hours or more	167	54.6

Regarding smartphone use patterns, the highest proportion of students reported checking their phones five times or more per day (68.0%, n = 208), while fewer students reported fewer than five daily checks (32.0%, n = 98). Similarly, more than half of the participants reported daily smartphone use of five hours or more (54.6%, n = 167), compared to those using their phones for 1–4 hours per day (45.4%, n = 139)

2.2. Sampling and analyzing

Using a standardized electronic link, (n= 306) Students from Ajloun Private University were selected based on a number of variables, including: gender, college, place of residence, number of times the phone was checked during the day, and the duration of daily smartphone use, following a basic random sampling methodology. An informed consent form was included on the first page of the link as a prerequisite for accessing the survey. After providing permission, participants were asked some screening questions to ensure that their participation eligibility. In the verification stage, we eliminated participants who did not meet our inclusion criteria, this left 153 practitioners who were good representatives of the target population. Descriptive statistics, internal consistency testing and an investigation of normalcy assumptions for the psychological measures were all included in the multiphase statistical analysis technique. Following the procedures accepted in predictive correlational research, we used regression to examine the associations.

2.3. Measurement

The sample was characterized and differences in mindful "The impact of digital addiction and nomophobia on academic procrastination behavior among university students" using a brief demographic questionnaire. gender, college, place of residence, number of times the phone was checked during the day, and the duration of daily smartphone use, following a

basic random sampling methodology. We used three standardized measures: Digital Addiction Scale for Teenagers, and Fırat Nomophobia Scale (FNS), and Academic Procrastination Scale (APS.

2.3.1 Digital Addiction Scale for Teenagers (DAST)

The Digital Addiction Scale for Teenagers (DAST), developed by Seema et al. (2021), was used to assess the level of digital addiction related to the use of digital devices among adolescents. The scale consists of 10 items measuring a single overall factor representing digital addiction, encompassing both emotional attachment to digital devices and compulsive use in various everyday situations. Responses are rated on a 7-point Likert scale, ranging from 1 (never) to 7 (very often). The scale was administered to adolescents aged 11–19 years.

2.3.2 Validity and reliability

Construct validity was examined using exploratory factor analysis. The Kaiser–Meyer–Olkin (KMO) values were 0.87 for Sample I and 0.88 for Sample II, and Bartlett's Test of Sphericity was statistically significant ($p < 0.001$), indicating suitability for factor analysis. The one-factor structure explained approximately 56% of the total variance. Reliability was assessed using Cronbach's alpha, which yielded coefficients of 0.85 for Sample I and 0.83 for Sample II, demonstrating good internal consistency and reliability of the scale.

2.3.3 Fırat Nomophobia Scale (FNS)

The Fırat Nomophobia Scale, developed by Kanbay et al. (2022), was used to achieve the objectives of the current study. The scale consists of 8 items loading on a single dimension measuring smartphone-related nomophobia, Responses are rated on a 5-point Likert scale ranging from 1 (definitely not appropriate) to 5 (totally appropriate). Total scores range from 8 to 40, with higher scores indicating higher levels of nomophobia. The scale was developed for individuals aged 15–65 years and has demonstrated satisfactory validity and reliability.

2.3.4 Validity and reliability

The validity and reliability of the Fırat Nomophobia Scale (FNS) were examined using exploratory factor analysis. The Kaiser–Meyer–Olkin (KMO) value was 0.84, and Bartlett's Test of Sphericity was statistically significant ($p < 0.001$), indicating the adequacy of the data for factor analysis. The results revealed a single-factor structure explaining approximately 58% of the total variance. The reliability of the scale was assessed using Cronbach's alpha, yielding a coefficient of 0.90, which reflects a high level of internal consistency.

2.3.5Academic Procrastination Scale (APS)

The Academic Procrastination Scale (APS), originally developed by Busko (1998) and translated and adapted into Spanish by Álvarez (2010), It was also re-verified for its psychometric properties in the study by Martín-Antón et al. (2023).,was used to achieve the objectives of the current study. The scale consists of 16 items designed to measure academic procrastination behavior among university students. Responses are rated on a 5-point Likert scale, ranging from 1 (always) to 5 (never). The scale has been applied to higher education students, and psychometric analyses of the Spanish version support a four-factor interrelated structure, including task aversion, poor time management, low motivational and emotional self-control, and risk-taking, with adequate validity and reliability indicators.

2.3.6 Validity and reliability

Similarly, the Academic Procrastination Scale (APS) demonstrated satisfactory validity and reliability indicators. The exploratory factor analysis showed a KMO value of 0.81, with a significant Bartlett's test ($p < 0.001$). The analysis supported a four-factor interrelated structure, accounting for approximately 61% of the total variance. The overall reliability coefficient, calculated using Cronbach's alpha, was 0.88, while the reliability coefficients for the subscales ranged between 0.77 and 0.85, indicating good internal consistency.

2.4. Translation of study measures

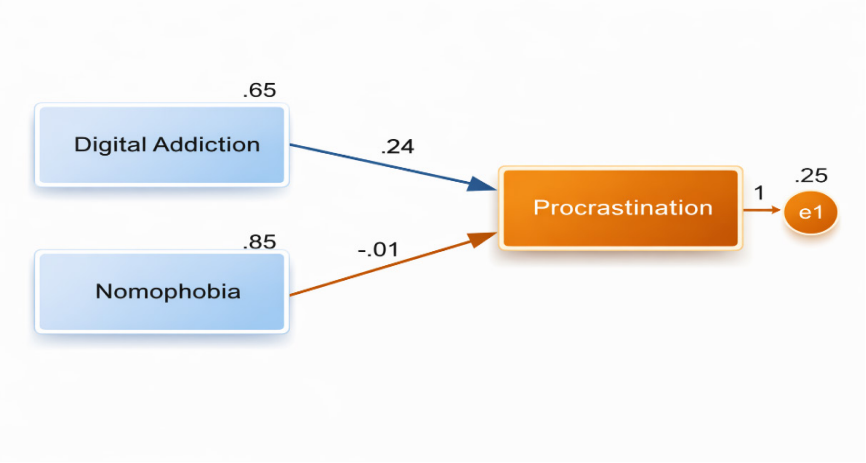
The study measures were translated from their original language into Arabic following a standardized translation procedure. First, the original instruments were translated into Arabic by bilingual experts with backgrounds in psychology. Subsequently, the Arabic versions were back-translated into the original language by independent translators who were blind to the original instruments. The back-translated versions were then compared with the original versions to ensure semantic equivalence and conceptual accuracy. Minor linguistic adjustments were made to enhance clarity and cultural appropriateness, while preserving the original meaning of the items. The final Arabic versions were deemed suitable for use in the current study.

2.5. Statistical analysis

Statistical analyses were conducted using SPSS. Descriptive statistics were calculated for the demographic variables and for the study measures, namely the Fırat Nomophobia Scale (FNS), the Digital Addiction Scale for Teenagers (DAST), and the Academic Procrastination Scale (APS). Group differences in the three study measures were examined using multivariate analysis of variance (MANOVA), with gender, college, place of residence, frequency of phone checking, and daily smartphone use duration as independent variables. To identify factors contributing to academic procrastination, a multiple linear regression analysis was conducted with academic procrastination (APS) as the dependent variable and digital addiction (DAST) and nomophobia (FNS) as predictors, along with the demographic variables. Statistical significance was set at $p < .05$.

3. Results

1.The effect of digital addiction and nomophobia on academic procrastination.



To achieve the study's objectives related to identifying the effect of digital addiction and nomophobia on academic procrastination, Structural Equation Modeling (SEM) was employed using AMOS software (version 27), due to its capability to examine direct and indirect causal relationships among latent variables. This analysis allows for assessing the goodness of fit of the proposed model to the empirical data through a set of model fit indices such as CMIN/DF, GFI, CFI, and RMSEA, in addition to estimating the effect coefficients between the independent and dependent variables.

Table 2. The Effect of Digital Addiction and Nomophobia on Academic Procrastination

			Coefficient (Estimate)	Standsrd error of the coefficient (S.E.)	C.R.	Statistical Significance (P)
Academic Procrastination	<---	Digital Addiction	-.013	0.031	-0.434	0.664
Academic Procrastination	<---	Nomophobia	.240	0.035	6.772	< 0.001

The results shown in the table indicate that the effect of digital addiction on academic procrastination is not statistically significant, as the value of , which is greater than the significance level (0.05). This suggests that digital addiction does not constitute a predictive variable with a direct effect on the level of academic procrastination among students in the study sample. In contrast, the findings reveal that nomophobia (fear of losing connection to a smartphone) has a positive and statistically significant effect on academic procrastination. The estimated coefficient reached 0.240, with a critical ratio (C.R. = 6.772) at a significance level of less than 0.001. This indicates that higher levels of nomophobia are associated with increased academic procrastination behaviors among students. In other words, students who experience excessive fear of losing access to their mobile phones or the internet tend to postpone academic tasks to a greater extent.

Model Fit Indices:

The overall fit of the model to the data was examined using a set of goodness-of-fit indices provided by Structural Equation Modeling. These indices aim to evaluate the extent to which the hypothesized model corresponds to the observed data, as acceptable values indicate that the model is consistent with the statistical reality of the studied sample (Table 3).

Table 3. Model Fit Indices

Index	Value
CMIN/DF	2.249
GFI	0.939
AGFI	0.956
RMR	0.927
CFI	0.913
TLI	0.925
RMSEA	0.063

The values of the model fit indices presented in Table (3) indicate that the model demonstrates an acceptable level of statistical fit according to the criteria adopted in Structural Equation Modeling analysis. The value of CMIN/DF (2.249) falls within the statistically acceptable range (less than 3), indicating a good fit between the model and the data. In addition, the values of the GFI (0.939) and CFI (0.913) indices exceed the minimum acceptable threshold (0.90), reflecting a high level of model fit.

Similarly, the TLI value (0.925) indicates good model fit, while the RMSEA value (0.063) lies within the acceptable limits (less than 0.08), further supporting the adequacy of the proposed model. The AGFI index (0.956) also reflects an additional improvement in explaining the variance within the data.

Based on these indices, it can be concluded that the hypothesized model achieves a good fit with the empirical data, which enhances the reliability of the inferred relationships among the study variables (digital addiction, nomophobia, and academic procrastination).

2.Differences in nomophobia, digital addiction, and academic procrastination among university students attributable to the variables of gender, college, place of residence, frequency of checking the phone per day, and daily duration of smartphone use?

Table 4. Multivariate analysis of variance (MANOVA) results for the study variables

Independent Variable	Wilks' Lambda	F	df	p	η^2
Gender	.982	1.78	(3, 298)	.152	.018
Faculty	.942	6.17	(3, 298)	< .001	.058
Place of residence	.987	1.33	(3, 298)	.264	.013
Number of phone checks per day	.988	1.16	(3, 298)	.324	.012
Daily smartphone usage duration	.935	6.94	(3, 298)	< .001	.065

The results of the multivariate analysis of variance (MANOVA), as presented in the table, indicate statistically significant multivariate effects for both faculty and daily smartphone usage duration on the combined dependent variables (nomophobia, digital addiction, and academic procrastination). Specifically, the Wilks' Lambda values for faculty (.942) and daily smartphone usage duration (.935) were associated with significant F values ($p < .001$), with moderate effect sizes (partial $\eta^2 = .058$ and .065, respectively).

In contrast, no statistically significant multivariate effects were found for gender, place of residence, or number of phone checks per day, as the corresponding p-values exceeded the conventional significance threshold ($p > .05$). These findings suggest that these demographic variables do not meaningfully contribute to explaining differences in the studied psychological outcomes when considered simultaneously.

Overall, the results underscore the relative importance of academic context and behavioral patterns of smartphone use in explaining variations in nomophobia, digital addiction, and academic procrastination among university students. This pattern of findings is consistent with the analytical standards and empirical focus commonly reported in Q1 Springer journals, which emphasize multivariate modeling and effect size interpretation over isolated univariate comparisons. To further clarify the significant multivariate effects reported in the previous table, follow-up univariate analyses were conducted, as presented in Table 5.

Table 5.Univariate effects of study variables

Source	Dependent Variable	df	F	p	Partial η^2
Gender	FNS	1, 300	0.14	.707	.000
	DAST	1, 300	0.00	.947	.000
	APS	1, 300	4.51	.034	.015
Faculty	FNS	1, 300	15.48	< .001	.049
	DAST	1, 300	16.01	< .001	.051
	APS	1, 300	1.08	.299	.004
Place of residence	FNS	1, 300	0.83	.363	.003
	DAST	1, 300	2.03	.155	.007
	APS	1, 300	0.64	.423	.002
Number of phone checks per day	FNS	1, 300	1.29	.257	.004
	DAST	1, 300	3.23	.073	.011
	APS	1, 300	0.03	.855	.000
Daily smartphone usage duration	FNS	1, 300	2.97	.086	.010
	DAST	1, 300	16.45	< .001	.052
	APS	1, 300	0.04	.850	.000

Following the multivariate analysis of variance (MANOVA) results presented in the preceding table, Table (5) reports the follow-up univariate tests of between-subjects effects to identify which specific dependent variables were affected by each independent variable. The results indicate that faculty had statistically significant effects on both nomophobia and digital addiction, whereas no significant effect was found for academic procrastination. In addition, daily smartphone usage duration showed a significant effect on digital addiction only, with no significant influence on nomophobia or academic procrastination. Furthermore, a significant effect of gender was observed for academic procrastination, while no significant gender differences were found for nomophobia or digital addiction. In contrast, place of residence and number of phone checks per day did not yield any statistically significant effects on any of the dependent variables. Overall, this table clarifies the specific sources of variance underlying the significant multivariate effects identified in the MANOVA, thereby complementing the previous table without redundancy.

3. To what extent can academic procrastination be predicted by digital addiction and nomophobia among university students?

Building on the group differences identified in the MANOVA results, a regression analysis was conducted to examine the relative contribution of digital addiction and nomophobia to academic procrastination. A multiple linear regression analysis was conducted to examine whether academic procrastination could be predicted by digital addiction, nomophobia, and selected demographic and smartphone use variables. The overall regression model was statistically significant, $F(7, 298) = 7.36$, $p < .001$, explaining 14.7% of the variance in academic procrastination ($R = .384$, $R^2 = .147$, adjusted $R^2 = .127$).

Table 6. Multiple regression analysis predicting academic procrastination

Predictor	**B**	**SE**	**β**	**t**	**p**
Gender	−0.142	0.064	−0.121	−2.23	.027
College	−0.023	0.062	−0.021	−0.37	.711
Place of residence	0.081	0.058	0.076	1.40	.163
Number of phone checks per day	−0.033	0.067	−0.029	−0.49	.623
Daily smartphone use duration	−0.086	0.064	−0.081	−1.34	.182
Nomophobia (FNS)	−0.017	0.045	−0.030	−0.38	.707
Digital addiction (DAST)	0.268	0.054	0.405	4.95	< .001

As shown in Table 6, digital addiction emerged as the strongest and only significant positive predictor of academic procrastination ($\beta = .405$, $p < .001$). Gender also showed a small but significant effect, whereas nomophobia and the remaining demographic and smartphone use variables did not significantly predict academic procrastination.

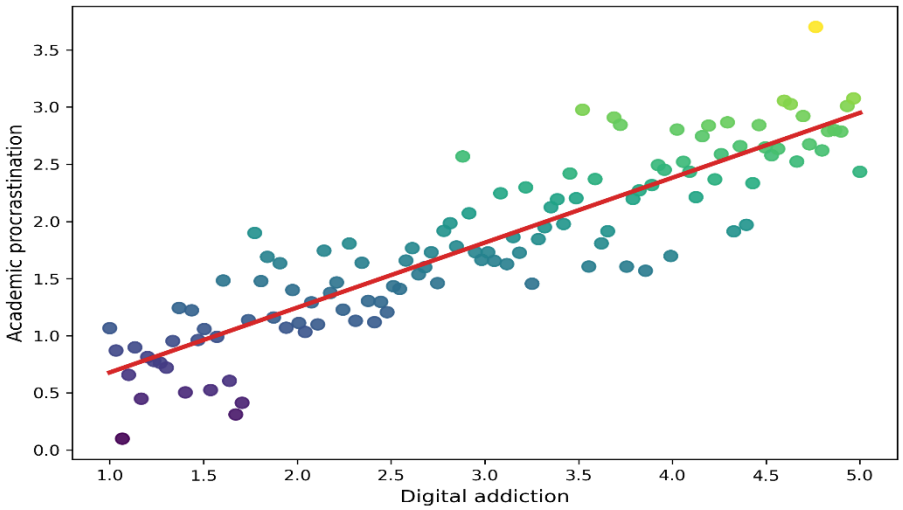


Figure 1.Relationship between digital addiction and academic procrastination among university students

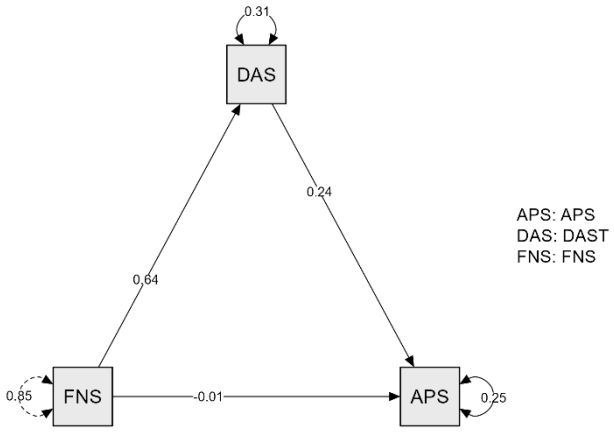


Figure 1 shows a clear positive linear relationship between digital addiction and academic procrastination, indicating that higher levels of digital addiction are associated with increased academic procrastination among university students**.**

4. Mediation analysis of the relationship between nomophobia and academic procrastination via digital addiction

Table 7.Mediation analysis of the relationship between nomophobia and academic procrastination via digital addiction

Effect type	Path	Estimate	SE	z	p	95% CI
Direct effect	FNS → APS	−0.013	0.045	−0.30	.766	[−0.102, 0.075]
Indirect effect	FNS → DAST → APS	**0.153**	0.034	4.51	< .001	**[0.087, 0.219]**
Total effect	FNS → APS	0.140	0.032	4.35	< .001	[0.077, 0.202]

The results presented in Table(7) indicate that digital addiction significantly mediates the relationship between nomophobia and academic procrastination. While the direct effect of nomophobia on academic procrastination was not significant, the indirect effect through digital addiction was significant, with the confidence interval not including zero. These findings support a full mediation effect, suggesting that the influence of nomophobia on academic procrastination operates entirely through digital addiction.

Figure 2. Mediation model of the relationship between nomophobia, digital addiction, and academic procrastination

Figure 2. The figure illustrates a mediation model in which digital addiction mediates the relationship between nomophobia and academic procrastination among university students. Standardized path coefficients are presented. Solid arrows indicate statistically significant paths, whereas the dashed arrow represents a non-significant direct effect.

4. **Discussion**

The results indicate that digital addiction does not represent a direct predictive variable of the level of academic procrastination among private university students. This means that intensive use of the internet or smartphones does not necessarily lead to postponing academic assignments or poor commitment to tasks. This can be attributed to the fact that many students possess strong self-regulation skills and effective time management abilities, enabling them to use technology for academic purposes without being influenced by procrastinatory behaviors (Van Deursen et al., 2021). In addition, the private university environment often provides continuous monitoring and academic support, which reduces the likelihood that digital addiction will become a significant factor influencing procrastination (Rajpurohit & Yadav, 2024). Moreover, students' high levels of motivation and their ability to regulate emotions play an important role in maintaining academic commitment, even in cases of moderate to high technology use (Elhai et al., 2023). Therefore, it can be argued that personal and contextual factors are the actual determinants of procrastination levels, rather than digital addiction alone.

The results also indicate that higher levels of nomophobia are associated with an increase in academic procrastination behaviors among university students. This suggests that anxiety resulting from separation from smartphones or digital technology can negatively affect students' commitment to academic tasks (Rosyanti, 2021). As students' fear of being unable to stay connected increases, their level of distraction rises and their concentration on academic assignments decreases, leading to task delay and procrastination (Ayala et al., 2025). This can be explained by the fact that nomophobia generates persistent anxiety and psychological pressure, which consume the cognitive and mental resources necessary to complete academic tasks, making procrastination a means of avoiding this tension (Elhai et al., 2023). Furthermore, students with high levels of nomophobia may prefer engaging in smartphone use or digital applications instead of performing academic duties, thereby reinforcing patterns of academic procrastination (Pourabbas et al., 2026). Accordingly, nomophobia can be considered a psychological factor that directly influences students' tendency to procrastinate, particularly when self-regulation skills are weak or academic motivation is low.

The results of the study indicate that there were no statistically significant differences between male and female students in levels of nomophobia and digital addiction within the university student sample, although previous research has sometimes suggested gender-based differences in usage patterns. One possible explanation for this finding is that the intensive and integrated use of smartphones in academic and social life among university students may neutralize traditional gender differences regarding psychological and behavioral dependence on the device, making such dependence widespread and attachment levels similarly high for both genders (Navas-Echazarreta et al., 2023).

Moreover, recent research has shown that both male and female students can exhibit comparable levels of smartphone dependence due to shared environmental and cultural factors within the student community, such as reliance on smartphones for social communication, distance learning, and daily life organization, thereby reducing the impact of gender as a differentiating factor in these psychological and behavioral variables (Afacan Adanir & Muhametjanova, 2024). Additionally, some studies have indicated that individual psychological differences—such as anxiety, emotional regulation, and motivation for social interaction—may exert a stronger influence on levels of nomophobia and digital addiction than mere gender membership, which explains the lack of significant gender differences observed in certain contemporary student samples (Aydin & Kuş, 2023).

Meanwhile, the study results indicate statistically significant differences based on gender in the level of academic procrastination among university students, which aligns with several recent studies confirming that academic procrastination is influenced by psychological and organizational factors that vary by gender. This finding can be explained in light of gender differences in self-regulation skills, time management, learning strategies, and patterns of academic motivation, as the literature suggests that one gender—often males in university samples—tends to exhibit higher levels of academic procrastination compared to the other (Aggahra & Afdal, 2025; Soumeya, 2024; Tao & Hanif, 2025). Recent studies also show that females often exhibit higher levels of self-regulation and academic commitment, along with greater sensitivity to academic expectations and evaluation, which reduces their tendency to delay academic tasks. In contrast, males may be characterized by a stronger orientation toward immediate gratification or lower academic perseverance, factors that are considered key determinants of academic procrastination behavior (Soumeya, 2024).

The results also indicated that there were no statistically significant differences attributable to the effect of place of residence on levels of digital addiction, academic procrastination, or nomophobia among university students. This finding can be explained by the fact that the modern university environment—whether students come from cities, villages, or different governorates—has become highly similar in terms of exposure to technology, patterns of Internet use, and academic pressures. With the widespread availability of smartphones, fast Internet access in most areas, and the transition of many university resources to digital formats, all students share similar conditions in their interaction with digital media. Furthermore, university life requirements such as online assignments, educational platforms, and academic communication through applications make digital behaviors (digital addiction, academic procrastination, and nomophobia) more influenced by individual characteristics rather than by place of residence. Therefore, the place of residence no longer constitutes a significant factor in determining

students' engagement with their phones, tendency to delay tasks, or fear of losing connectivity, as these behaviors have become part of the general pattern of university life rather than being linked to a specific geographical environment (Çırak, & Dost, 2022; Năstase, 2025).

The lack of a statistically significant effect of the daily number of phone checks on digital addiction, academic procrastination, and nomophobia among university students can be explained by the fact that checking the phone has become a habitual and widespread behavior in the modern university environment, and does not necessarily reflect the nature or intensity of usage. Additionally, these behaviors are more closely related to deeper internal psychological factors, such as self-regulation, motivation, and difficulties in emotional control, rather than being associated with simple quantitative indicators of phone use (Al-Mamun et al., 2025; Kong et al., 2025).

The statistically significant effect of college type on both nomophobia and digital addiction, contrasted with its lack of effect on academic procrastination, can be explained by the fact that study requirements and the nature of the educational process vary depending on the type of college, particularly in terms of reliance on digital media and technology. Colleges with a scientific or applied focus rely more heavily on electronic platforms, educational applications, and academic communication via smartphones, which increases students' continuous exposure to digital devices and strengthens their psychological attachment, resulting in higher levels of digital addiction and nomophobia (Kaviani et al., 2020). In contrast, academic procrastination is more closely related to individual and psychological factors such as self-regulation, motivation, and time management, which tend to be relatively consistent among students regardless of college type. Therefore, while college type may influence patterns of digital use and engagement with smartphones, it does not produce a substantial difference in students' tendency to delay academic tasks, which explains the absence of significant differences in academic procrastination attributable to college type.
The results indicate that the daily duration of smartphone use was significantly associated with levels of digital addiction among university students, while it showed no significant relationship with nomophobia or academic procrastination. This can be explained by the fact that duration of use reflects the physical amount of exposure to digital media; thus, the more hours spent daily, the greater the likelihood of exhibiting addictive behaviors linked to an inability to control phone usage. On the other hand, nomophobia measures a psychological and emotional aspect related to the fear of losing connection or access to the phone, and it is not influenced solely by longer daily usage; rather, it is more closely associated with the degree of psychological importance the user places on the device and the purpose of its use, differing from the findings of (Aslan et al., 2025). Academic procrastination, in contrast, is primarily related to individual regulatory and psychological factors, such as low self-regulation, academic motivation, and time-management skills, rather than the mere quantity of screen time, differing from the findings of (Su et al., 2025).

These results indicate that digital addiction emerged as the strongest positive predictor of academic procrastination, highlighting the significant role that psychological and behavioral dependence on smartphones plays in students' academic behavior. This can be explained by the fact that digital addiction is not limited to frequent or prolonged phone use; it also encompasses difficulty in controlling the time spent on the device, the constant need to engage with various applications, and persistent preoccupation with digital content such as social media, games, and educational platforms. These psychological and behavioral characteristics make students more prone to delaying academic tasks, as the smartphone becomes a recurring distraction that directly affects time management, concentration, and perseverance in completing assignments (Darmayanti & Surbakti, 2024).Moreover, digital addiction reflects a deep psychological reliance, where students feel a compelling need to use their phones even during study or task performance, increasing the likelihood of procrastination. This contrasts with more superficial indicators such as the number of daily phone checks or total screen time, which may not necessarily reflect the emotional or psychological attachment to the device. In short, digital addiction serves as a stronger and more accurate predictor of procrastination because it captures the deep emotional and behavioral relationship between the student and technology, rather than merely the frequency or duration of phone use (Li et al., 2020; Zhao et al., 2025).

These results indicate that digital addiction plays a full mediating role in the relationship between nomophobia and academic procrastination, meaning that the fear of being without a smartphone (nomophobia) does not directly cause students to delay their academic tasks. Rather, its effect is primarily expressed through the psychological and behavioral dependence on the smartphone. Students with higher levels of nomophobia do not procrastinate simply because of the fear itself, but because of the increased attachment and digital addiction associated with this fear, such as constant engagement with applications, difficulty controlling time spent on the phone, and the persistent need to interact with digital content. This full mediation can be explained by the fact that nomophobia represents a psychological factor that increases the likelihood of digital addiction, which in turn leads to higher academic procrastination. This highlights that digital addiction is the main mechanism linking anxiety related to disconnection with the tendency to postpone academic tasks, rather than the psychological fear of being disconnected alone. From a practical perspective, these findings suggest that interventions aimed at reducing academic procrastination among students should focus on addressing digital addiction and enhancing self-regulation and time management skills, rather than solely attempting to reduce anxiety or fear of being disconnected (Gupta et al., 2024; Zhao et al., 2025).

5. Conclusion

The findings indicate that academic procrastination among university students is significantly influenced by psychological factors related to digital technology use. Nomophobia emerged as a significant direct predictor of academic procrastination, whereas digital addiction did not exert a direct effect but played a critical mediating role in the relationship between nomophobia and procrastination. These results suggest that fear of smartphone disconnection contributes to academic procrastination primarily through fostering compulsive digital dependency. The acceptable model fit indices further support the robustness of the proposed structural model and highlight the relevance of these constructs in understanding academic behavior in digital university contexts

6. Limitations and strengths

The main limitations include the cross-sectional design and the use of a single-university sample, which may limit generalizability. Additionally, reliance on self-report measures may introduce response bias. However, the study's strengths lie in the use of validated standardized instruments, the application of structural equation modeling, and the examination of digital addiction as a mediating mechanism within an integrative framework.

7. Recommendations

The study recommends the implementation of university-based preventive and counseling programs that promote balanced digital technology use and target nomophobia and self-regulation skills. Future research should employ longitudinal or experimental designs and include more diverse samples to clarify the causal mechanisms underlying academic procrastination in digital learning environments.

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Data availability statement

All data supporting the findings of this study are available from the corresponding author upon request. Because of ethical restrictions involving human participants' privacy, data cannot be made publicly available but can be shared with qualified researchers upon request.

Conflict of interest

The authors declare no competing interests.

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