



Original Article

Technology addiction in the modern age: Depression, anxiety, and stress among nursing students

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Abstract

Objectives: This study aimed to examine the levels of technology addiction, depression, anxiety, and stress among nursing students in relation to certain variables.

Methods: This analytical cross-sectional study included 251 nursing students. Data were collected using the Personal Data Form, the Technology Addiction Scale (TAS), and the Depression, Anxiety, and Stress Scale (DASS).

Results: The average daily internet usage time of the students was 3.24 ± 0.8 hours. The most common reason for connecting to the internet was to use social media applications (91.6%). The mean TAS score of the students was 49.07 ± 13.96 , the mean DASS score for depression was 14.17 ± 4.99 , for anxiety was 12.92 ± 3.95 , and for stress was 14.73 ± 5.01 . Male students' use of online games and websites was higher than female students ($p=0.017$, $t=5.776$). First-year students had significantly higher mean scores on the TAS ($p=0.001$, $F=5.494$) and the stress scale ($p=0.001$, $t=8.755$) compared to other grades.

Conclusion: Based on these findings, it is recommended that universities implement preventive and educational programs to enhance mental health and reduce technology addiction.

Keywords: Anxiety; depression; nursing students; stress; technology addiction

Addiction is defined as the continued use of a substance or engagement in a behavior despite its psychological, physical, or social harms, the inability to quit despite the desire to do so, and difficulty controlling the urge to engage in the behavior.^[1] Although technology-related addictions are not yet fully recognized as formal diagnostic categories in the DSM-5, the manual emphasizes the need for further research in this area.^[2] Concepts such as internet addiction, social media addiction, and smartphone addiction are frequently discussed within the broader framework of technology addiction and continue to attract growing scientific attention.^[3]

Rapid technological advancements have profoundly influenced many professional fields, including healthcare. In nursing practice, the use of digital systems for documentation, patient education, communication, and simulation-based

training has become an integral component of care delivery and education.^[4-6] Consequently, nursing students are required to engage extensively with technological devices throughout both their academic and clinical training.

Today, nursing education is shaped not only by intensive academic workload and demanding clinical experiences but also by the pervasive presence of digital technologies.^[7,8] While technology facilitates access to information and enhances learning opportunities, excessive or uncontrolled use may lead to problematic patterns. Technology addiction has increasingly been reported among university students, including nursing students.^[9,10] Excessive engagement with technological devices and digital platforms may reduce study time, impair academic performance, and negatively influence psychological health.^[11]

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Previous studies have identified several individual and family-related risk factors associated with problematic technology use, including male gender, living alone, weak family relationships, perceived lack of familial support, low socioeconomic status, insecure attachment patterns, and increased time spent online.^[12–14] Furthermore, problematic technology use has been associated with higher levels of depression, anxiety, and stress in university populations.

Given the demanding and emotionally intensive nature of nursing education, the coexistence of technology addiction and psychological distress may pose additional risks for students' mental health. However, studies specifically examining the relationship between technology addiction and depression, anxiety, and stress among nursing students remain limited. Therefore, investigating these relationships is essential to better understand the psychological implications of technology addiction in this population and to inform preventive and supportive interventions within nursing education.

Problematic technology use among nursing students may negatively affect psychological functioning and adaptive capacities. A cross-sectional study reported that higher levels of technology addiction were associated with lower life satisfaction and reduced psychological flexibility in nursing students, suggesting potential vulnerability in coping with academic and clinical stressors Aslan et al.^[15] In addition, an intervention study demonstrated that training on technology addiction significantly improved students' perspectives and reduced addiction levels, indicating that technology addiction is both prevalent and modifiable in this population. These findings underscore the importance of examining the relationship between technology addiction and depression, anxiety, and stress among nursing students. Given that nursing education requires effective emotional regulation, clinical judgment, and adaptive coping in stressful environments, technology addiction may indirectly compromise students' academic engagement and professional development.

Accordingly, the present study aimed to examine technology addiction and levels of depression, anxiety, and stress among nursing students and to investigate the relationships between these variables.

The study sought to answer the following research questions:

1. What are the technology addiction levels and depression, anxiety, and stress among nursing students?
2. What are the variables affecting technology addiction levels?
3. What are the variables affecting depression, anxiety, and stress levels?
4. Is there a relationship between technology addiction and depression, anxiety, and stress levels?

What is presently known on this subject?

- Excessive technology use has been associated with increased levels of depression, anxiety, and stress, and university students are considered a particularly vulnerable group.

What does this article add to the existing knowledge?

- This study contributes by examining technology addiction and mental health indicators specifically among nursing students, highlighting the influence of gender and year of study on these relationships.

What are the implications for practice?

- The findings provide evidence to support the development of preventive and educational programs in universities to reduce technology addiction and promote students' mental health.

Materials and Method

Aim and Type of the Study

This cross-sectional analytical study aimed to examine the levels of technology addiction, depression, anxiety, and stress among nursing students in relation to personal and academic variables.

Population and Sample of the Study

The study population consisted of 480 nursing students enrolled in the Faculty of Health Sciences at a state university during the 2024–2025 academic year. The minimum required sample size was calculated as 214 students using G*Power with a 95% confidence level and a 5% margin of error. The study aimed to reach the entire population, and all students were invited to participate. A total of 251 students participated in the study. Data were collected between January and February 2025.

Data Collection Tools

The data were collected using questions on participants' descriptive characteristics (such as age, gender, year of study, place of internet access, purpose, device used, and daily internet usage time), the Technology Addiction Scale, and the Depression, Anxiety, and Stress Scale.

- Technology Addiction Scale (TAS): It was developed based on Young's Internet Addiction Test criteria and Griffiths' (2005) six-component model of addiction. The Turkish validity and reliability analysis of the scale was conducted by Aydın, and the scale consists of 24 items and 4 dimensions. The sub-dimensions of the scale are using social networking, instant messaging, playing online games, and using websites. The total score of the Technology Addiction Scale ranges from a minimum of 24 to a maximum of 120. The interpretation of the overall scale scores is as follows: 0–24 points indicate "Not addicted," 25–48 points "Low-level addicted," 49–72 points "Moderately addicted," 73–96 points "Highly addicted," and 97–120 points "Fully addicted." The Cronbach's alpha values of the scale are 0.79, 0.81, 0.90, and 0.86, respectively.^[16] In this study, the Cronbach's alpha values of the scale were 0.72, 0.78, 0.89, and 0.87, respectively.

Table 1. Students' TAS and DASS-21 values

Characteristics	Mean±SD	Min-Max
TAS Total	49.07±13.96	25-82
TAS Sub-Dimensions		
Social Networking	13.43±4.57	6-26
Instant Messaging	12.50±5.04	6-30
Online Gaming	9.46±5.05	6-26
Website Usage	13.66±6.03	6-30
DASS-21 Sub-Dimensions		
Depression	14.17±4.99	7-28
Anxiety	12.92±3.95	7-25
Stress	14.47±4.37	8-27

TAS: Technology Addiction Scale, DASS: Depression, Anxiety, Stress Scale, SD: Standard deviation.

- Depression, Anxiety, Stress Scale (DASS-21): The Turkish reliability and validity study of the scale developed by Lovibond and Lovibond was conducted by Yılmaz, Boz, and Arslan in 2017.^[17] The DASS-21 has three sub-dimensions: depression, anxiety, and stress; each dimension has seven questions. The scale is a 4-point Likert-type scale. Items 3, 5, 10, 13, 16, 17, and 21 measure depression; items 2, 4, 7, 9, 15, 19, and 20 measure anxiety; and items 1, 6, 8, 11, 12, 14, and 18 measure stress. The total score for each subscale ranges from a minimum of 0 to a maximum of 21. The normal value range is 0-9 points for depression, 0-7 points for anxiety, and 0-14 points for stress. Mild depression score is 10-13, anxiety score is 8-9, stress score is 15-18; moderate depression score is 14-20, anxiety score is 10-14, stress score is 15-18; severe depression score is 21-27, anxiety score is 15-19, stress score is 26-33; very severe depression score is 28 and above, anxiety score is 20 and above, stress score is 34 and above. The Cronbach's alpha coefficients of the Turkish version of the scale are 0.82 for depression, 0.81 for anxiety, and 0.76 for stress. The internal consistency reliabilities are 0.90 for depression, 0.86 for anxiety, and 0.88 for stress. For this study, the Cronbach's alpha coefficients are 0.86 for depression, 0.72 for anxiety, and 0.62 for stress.

Ethical Aspects of the Study

Ethical approval for this study was obtained from the Ethics Committee of the Graduate Education Institute at Çanakkale Onsekiz Mart University (Approval No: 2024-YÖNP-5475; Date: 09 January 2025). Written permission to conduct the study was obtained from the Department of Nursing, Faculty of Health Sciences, Çanakkale Onsekiz Mart University. All participants were informed about the purpose of the study and the data collection tools, and written informed consent was obtained from those who agreed to participate. The study was conducted in accordance with the Declaration of Helsinki.

Limitations of the Study

The cross-sectional design prevents causal interpretation of the findings. Data were collected through self-report measures, which may be subject to response bias. Additionally, the study was conducted at a single institution, which may limit the generalizability of the results to other student populations.

Data Analysis Method

The data obtained in this study were analyzed using SPSS 23 software. Skewness and kurtosis values, along with the Kolmogorov-Smirnov test, were used to determine the normality of the data distribution. Descriptive statistics, independent samples t-test for paired groups, one-way ANOVA for groups of three or more, and Pearson correlation analysis were used to examine the relationships between variables. The statistical significance limit value was accepted as $p < 0.05$.

Results

The mean age of the participants was 20.74 years; most were female (84.1%) and had a GPA between 2.00 and 2.99. Overall, students demonstrated moderate levels of technology addiction, depression, and anxiety, while stress levels were within normal limits (Table 1).

Gender, grade level, GPA, and internet-use characteristics were significantly associated with specific subdimensions of technology addiction. Male students reported higher levels of online game playing, whereas female students scored higher on website usage. First-year students demonstrated higher website use, while second-year students showed higher social networking levels. In addition, instant messaging differed significantly according to GPA (Table 2).

Daily internet use duration and place of internet access were also significantly associated with several technology addiction subdimensions. Students accessing the internet primarily at the faculty had higher instant messaging scores, whereas those connecting from home or dormitories had higher social networking, online gaming, and website usage levels (Table 3).

When personal and academic variables were examined in relation to psychological outcomes, only grade level and GPA were significantly associated with depression. First-year students and those with lower GPAs reported higher depression levels (Table 4). Most students reported social media as their primary reason for internet use, with an average daily usage time of 2–4 hours and mobile devices being the most common access tool (Table 5).

Finally, correlation analysis revealed a significant positive relationship between technology addiction and both depression and stress, whereas no significant association was found with anxiety (Table 6).

Table 2. Comparison of TAS sub-dimensions' means based on students' personal and academic variables

Variables		TAS Sub-Dimensions			
		Social Networking (Mean±SD)	Instant Messaging (Mean±SD)	Online gaming (Mean±SD)	Website Usage (Mean±SD)
Gender	Female (n=211)	13.65±4.62	12.72±5.06	8.59±4.54	13.91±6.19
	Male (n=40)	12.27±4.18	11.32±4.80	14.07±5.15	12,37±5.03
	t	2.616	0.024	5.776	5.722
	p	0.107	0.877	0.017*	0.017*
Grade	First grade (n=74)	13.74±5.17	12.9±5.25	10.70±6.72	15.75±5.70
	Second grade (n=54)	14.81±3.51	12.72±4.26	9.27±4.96	14.68±5.51
	Third grade (n=70)	13.14±4.43	11.91±5.66	8.42±3.54	12.08±5.94
	Fourth grade (n=53)	12.0±4.49	12.47±4.66	9.30±3.72	11.79±6.11
	F	3.692	0.528	2.549	7.280
	p	0.013*	0.663	0.056	0.000*
GPA	1-1.99 (n=10)	13.70±5.65	8.9±2.18	10.40±2.50	15.90±7.06
	2-2.99 (n=185)	13.43±4.76	13.1±5.12	9.78±5.34	13.96±6.01
	3-4 (n=56)	13.41±3.74	10.96±4.57	8.23±4.19	12.26±5.75
	F	0.017	7.090	2.239	2.445
	p	0.983	0001*	0.109	0.089

*: p>0.05 significance level, t: Independent Groups T-Test, F: One-Way Analysis of Variance (ANOVA), n: number, SD: standard deviation.

Table 3. Comparison of TAS sub-dimensions' means based on variables related to students' internet usage

Variables		TAS sub-dimensions			
		Social Networking (Mean±SD)	Instant Messaging (Mean±SD)	Online Gaming (Mean±SD)	Website Usage (Mean±SD)
Internet Connection Purpose	Social Media (n=231)	13.37±4.50	12.54±4.98	9.45±5.04	13.69±6.06
	Non-Social Media (n=20)	14.15±5.48	12.00±5.83	9.60±5.35	13.35±5.84
	t	3.755	1.685	0.314	0.168
	p	0.054*	0.195	0.576	0.682
Daily Average Internet Usage Time	0-2 hours (n=51)	10.17±3.79	9.78±4.50	9.31±4.68	11.50±5.91
	2-4 hours (n=123)	13.24±3.94	12.62±4.41	9.33±4.83	13.22±5.80
	4-6 hours (n=61)	15.60±4.64	14.21±6.12	10.62±6.06	15.85±5.77
	6 hours and above (n=16)	17.06±4.32	13.75±3.04	6.56±1.03	6.56±1.64
	F	20.481	8.291	2.935	5.905
	p	0.000*	0.000*	0.034*	0.001*
Internet Connection Location	Home or dormitory (n=58)	14.41±5.05	13.44±5.31	10.24±5.21	16.60±6.10
	Faculty (n=10)	13.50±6.73	15.30±7.48	9.30±5.47	13.60±7.19
	Mobile (n=183)	13.12±4.26	12.05±4.73	9.22±4.98	12.73±5.67
	F	1.754	3.339	0.887	9.652
	p	0.175	0.037	0.413	0.000

*: p>0.05 significance level, t: Independent Groups T-Test, F: One-Way Analysis of Variance (ANOVA), n: number, SD: standard deviation.

Discussion

Although the present study primarily examined technology addiction in relation to students' daily digital behaviors, these findings should be interpreted within the broader context of nursing education. Nursing education increasingly integrates

digital learning platforms, simulation technologies, and on-line resources. Therefore, students' patterns of technology use in their private lives may indirectly influence their academic engagement, concentration, and professional development. From this perspective, technology addiction is not merely a

Table 4. Comparison of DASS-21 sub-dimensions' means based on students' personal and academic variables

		DASS-21 sub-dimensions		
Variables		Depression (Mean±SD)	Anxiety (Mean±SD)	Stress (Mean±SD)
Gender	Female (n=211)	13.89±4.79	12.89±3.90	14.79±5.17
	Male (n=40)	15.67±5.77	13.12±4.24	14.45±4.11
	t	1.822	0.093	0.437
	p	0.178	0.760	0.509
Grade	First grade (n=74)	16.54±5.11	13.62±4.75	15.66±4.45
	Second grade (n=54)	13.20±4.78	11.88±3.30	15.27±6.47
	Third grade (n=70)	12.88±4.53	13.12±3.53	13.84±4.83
	Fourth grade (n=53)	13.58±4.58	12.75±3.69	14.07±4.03
	F	8.755	2.127	2.124
	p	0.000*	0.097	0.098
GPA	1-1.99 (n=10)	15.20±3.42	13.80±2.09	16.40±4.85
	2-2.99 (n=185)	14.94±5.16	13.11±4.26	14.83±5.40
	3-4 (n=56)	11.48±3.57	12.14±2.93	14.10±3.45
	F	11.389	1.572	1.028
	p	0.000*	0.210	0.359

*: p>0.05 significance level, t: Independent Groups T-Test, F: One-Way Analysis of Variance (ANOVA), n: number, SD: standard deviation.

Table 5. Comparison of DASS-21 sub-dimensions' means based on the variables related to students' internet usage

		DASS-21 Sub-Dimensions		
Variables		Depression (Mean±SD)	Anxiety (Mean±SD)	Stress (Mean±SD)
Internet connection purpose	Social Media (n=231)	14.10±4.98	12.84±3.88	14.78±5.06
	Non-Social Media (n=20)	15.05±5.22	13.90±4.65	14.20±4.49
	t	0.020	1.546	0.309
	p	0.889	0.215	0.579
Daily average internet usage time	0-2 hours (n=51)	14.09±4.62	12.82±4.49	13.72±3.87
	2-4 hours (n=123)	14.08±4.82	12.54±3.41	14.52±4.26
	4-6 hours (n=61)	13.57±5.02	14.04±4.12	14.86±4.97
	6 hours and above (n=16)	17.50±6.42	11.93±4.72	19.12±9.90
	F	2.730	2.409	5.101
	p	0.045*	0.068	0.002*
Internet connection location	Home or Dormitory (n=58)	14.50±5.64	13.20±4.28	16.15±6.60
	Faculty (n=10)	14.20±5.99	14.30±6.37	15.20±6.01
	Mobile (n=183)	14.07±4.74	12.76±3.67	14.26±4.26
	F	0.157	0.902	3.236
p	0.855	0.407	0.041*	

*: p>0.05 significance level, t: Independent Groups T-Test, F: One-Way Analysis of Variance (ANOVA), n: number, SD: standard deviation.

personal lifestyle issue but a factor that may shape learning behaviors, academic performance, and professional readiness. In this study, nursing students demonstrated moderate levels of technology addiction. While moderate levels may appear non-critical, they may represent a transitional stage toward

problematic digital engagement, particularly in a population that is already heavily exposed to digital environments. Previous studies similarly report moderate addiction levels among nursing students,^[6,15,18] and Zhang et al.^[19] emphasized that nursing students are at risk of uncontrolled internet use. Ac-

Table 6. Relationships between TAS and DASS-21 sub-dimensions

DASS-21	TAS	
	p	r
Depression	0.007	0.624
Anxiety	0.179	-0.342
Stress	0.000	0.772

According to data from the Turkish Statistical Institute, the 16–24 age group has the highest internet usage rate in Türkiye.^[20] Since most nursing students fall within this age range, their developmental vulnerability combined with academic demands may increase the risk of problematic digital behaviors. In the context of nursing education, even moderate addiction levels may negatively affect attention span, time management, and academic productivity.

Technology addiction differed significantly according to personal and academic variables. Male students reported higher levels of online gaming, whereas female students reported higher website and social media use. Previous studies support these gender-based behavioral differences.^[21–24] From an educational perspective, these subdimensions may have different academic implications. For example, excessive online gaming may interfere with structured study time, while excessive social media use may fragment attention and reduce sustained academic focus. Thus, technology addiction should be evaluated not only in terms of frequency but also in terms of its qualitative patterns and their potential academic consequences.

Daily internet use duration was another important factor. Most students reported using the internet for 2–4 hours or more per day. Recommendations within Türkiye's Fight Against Addiction program, coordinated by Yeşilay, suggest limiting screen exposure to 120 minutes per day for individuals over the age of 12.^[25] Exceeding this duration may weaken self-regulation skills and promote habitual use. For nursing students, prolonged screen time outside academic purposes may reduce effective study time and impair sleep quality, indirectly affecting academic performance and clinical preparedness.

The relationship between internet use duration and psychological outcomes is particularly important. In this study, longer internet use was associated with higher depression and stress levels. Previous research similarly indicates that prolonged internet exposure increases depression and stress among students.^[26] In nursing education, where emotional resilience and interpersonal communication skills are essential, increased psychological distress may negatively influence both academic success and clinical performance. Technology addiction may therefore function both as a mal-

adaptive coping strategy and as a factor that reinforces psychological vulnerability.

Consistent with previous research, depression levels differed according to grade level and GPA. First-year students exhibited higher depression levels, possibly due to adaptation challenges. Moreover, students with lower GPAs had significantly higher depression scores.^[27–30] These findings are particularly relevant to nursing education. Academic achievement in nursing is closely linked to clinical competence and patient safety. If technology addiction contributes to decreased academic performance through distraction, time mismanagement, or sleep disturbance, it may indirectly affect professional competence. Therefore, technology addiction should be considered within academic counseling and student support systems.

Students primarily used the internet for social media and accessed it mostly via mobile devices.^[31–33] Mobile accessibility increases continuous connectivity and habitual checking behaviors. Differences according to the place of connection suggest that unstructured environments such as home or dormitories may allow more uncontrolled website use, which was also associated with higher stress levels. This contextual pattern highlights that environmental regulation and digital self-discipline may be important areas for educational intervention.

Finally, technology addiction showed a positive correlation with depression and stress. Previous studies indicate that depression and anxiety are both risk factors and consequences of technology addiction.^[34–38] This bidirectional relationship suggests that psychological vulnerability and problematic technology use may reinforce one another. For nursing students, who are expected to develop therapeutic communication skills and emotional regulation abilities, this interaction may have both academic and professional implications.

Conclusion

This study provides empirical evidence that technology addiction among nursing students is associated with psychological distress and academic indicators. By evaluating overall technology addiction together with its specific subdimensions and GPA, the findings offer a multidimensional perspective that contributes to a relatively limited body of research in this population. The results highlight the need to address technology addiction not only as a behavioral concern but also as a mental health and educational issue within nursing programs.

Furthermore, the present findings establish a foundation for future longitudinal and interventional studies aimed at clarifying the causal direction between technology addiction, depression, and stress, and at developing targeted prevention and intervention strategies for nursing students.

Ethics Committee Approval: The study was approved by the Çanakkale Onsekiz Mart University Ethics Committee (no: 2024-YÖNP-5475, date: 09/01/2025).

Informed Consent: Written informed consent was obtained from the participants who agreed to participate.

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