



Asya Studies

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Unravelling the Complex Nexus Between Technology Addiction, Cyber Victimization, Cyber Bullying, and Self-Esteem among Young People: A Multifaceted Study

Gençlerde Teknoloji Bağımlılığı, Siber Mağduriyet, Siber Zorbalık ve Benlik Saygısı Arasındaki Karmaşık Bağlantının Çözümü: Çok Yönlü Bir Çalışma

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Abstract

This study examined the complex relationships between technology addiction, cyberbullying, cyber victimization, and self-esteem among young individuals. The sample consisted of 335 undergraduate students—mostly female—from universities in Konya with diverse socioeconomic backgrounds. The study analyzed descriptive factors such as time spent on social media, websites, digital applications, and online gaming and assessed their predictive power through correlation and hierarchical regression analyses. Findings revealed that self-esteem did not directly predict cyberbullying, while online gaming addiction and cyber victimization emerged as more significant predictors. Students with habitual gaming behavior exhibited higher technology addiction scores. Additionally, male participants showed significantly higher mean scores for both cyberbullying and cyber victimization, whereas female participants had significantly higher mean scores for self-esteem. Those who regularly played games or used social media also reported higher levels of cyberbullying and victimization. Importantly, the study found that cyber victimization significantly mediated the relationship between self-esteem and technology addiction, suggesting that addressing cyber victimization may indirectly enhance self-esteem and reduce technology dependency. The study's limitations include its descriptive nature and the absence of measures related to coping mechanisms and stress levels. The study emphasizes the need for more comprehensive analyses to understand the longitudinal characteristics of these phenomena across different age groups.

Keywords: Technology Addiction, Self-Esteem, Cyber-Bullying, Cyber Victimization

Öz

Çalışma, gençler arasında teknoloji bağımlılığı, siber zorbalık, siber kurbanlık ve öz saygı arasındaki karmaşık ilişkileri incelemiştir. Örnekleme, Konya'daki üniversitelerden farklı sosyoekonomik düzeylere sahip, çoğunluğu kadın olan 335 lisans öğrencisinden oluşmuştur. Sosyal medya, web sayfaları, dijital uygulamalar ve çevrimiçi oyunlarda geçirilen zaman gibi tanımlayıcı faktörleri incelemiş ve bu faktörlerin öngörücü gücünü korelasyon ve hiyerarşik regresyon analizleri aracılığıyla değerlendirmiştir. Bulgular, öz saygının doğrudan siber zorbalığı tahmin etmediğini, çevrimiçi oyun bağımlılığı ve siber kurbanlığın daha önemli tahmin ediciler olduğunu ortaya koymaktadır. Sürekli oyun oynama alışkanlığına sahip öğrencilerin teknoloji bağımlılığı puanları daha yüksek gözlemlenmiştir. Ayrıca, erkekler siber zorbalık ve siber kurbanlık için daha yüksek ortalama puanlar gösterirken, kadınların öz saygı için anlamlı derecede daha yüksek ortalama puanları olduğu tespit edilmiştir. Sürekli oyun oynayanlar ve sosyal medya kullanıcıları, siber zorbalık ve siber kurbanlık için daha yüksek ortalama puanlar sergilemiştir. Son olarak, siber kurbanlık, öz saygı ile teknoloji bağımlılığı arasındaki ilişkiyi anlamlı bir şekilde aracılık etmektedir; bu da siber kurbanlığın ele alınmasının öz saygıyı dolaylı olarak artırabileceği ve teknoloji bağımlılığını azaltabileceğini önermektedir. Çalışmanın sınırlılıkları arasında çalışmanın tanımlayıcı doğası ve başa çıkma mekanizmaları ile stres seviyeleri için ölçümlerin eksikliği yer almaktadır. Çalışma, bu olguların farklı yaş grupları arasındaki uzunlamasına özelliklerini anlamak için daha kapsamlı analizlere ihtiyaç duyulduğunu vurgulamaktadır.

Anahtar Kelimeler: Teknoloji Bağımlılığı, Benlik Saygısı, Siber Zorbalık, Siber Mağduriyet

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INTRODUCTION

The ubiquitous presence of technology has transformed modern life, impacting interpersonal relationships, lifestyles, and communication through instant messaging and seamless information exchange (Abele et al., 2018). While this has led to numerous benefits, including enhanced learning and increased access to information, it has also fostered a tendency toward technology addiction (TA) (Kuem et al., 2021; Kuss & Griffiths, 2011). TA poses significant physical, psychological, and social risks, particularly among young individuals (Young, 1998). Research reveals detrimental consequences like fatigue, academic disengagement, loneliness, depression, stress, anxiety, and cyberbullying (Sert et al., 2019; McKenna & Bargh, 2000; Mamun et al., 2019; Hou et al., 2019; Boer et al., 2021; De Jesus-Costa et al., 2023). Technology addiction can lead to a range of psychological issues—including elevated stress, heightened anxiety, and increased feelings of social disconnection—which may, in turn, make individuals more vulnerable to both experiencing and perpetrating online aggression. Those subjected to various forms of cyberbullying, such as digital harassment or exposure of private information (doxxing), often report diminished self-worth, intense stress, and even suicidal ideation (Uysal & Haspolat, 2024; Ortega-Barón et al., 2017).

Understanding the complex nature of TA requires delving deeper into specific technology types like smartphones and tablets, analysing individual preferences and usage patterns (Smith et al., 2021; Andrade & Matias, 2022; Romero-López et al., 2021; Chamarro et al., 2020). Research indicates that individuals' engagement with social media platforms, frequent use of messaging applications, digital gaming, exposure to online video content, and general internet browsing habits are significantly associated with technology addiction (TA) (Moreno et al., 2021; Yang et al., 2021; Liang et al., 2023). In particular, the personalized content offered by social media algorithms further reinforces this interaction. Kim's (2014) study shows that the sense of social connection and the "flow" experience reported by users on mobile messaging platforms play a crucial role in turning usage behaviors into habitual, automatic routines. Within this context, Aagaard (2021) argues that individuals' relationship with technology is often better understood as habitual rather than addictive and that these habits can be reshaped through awareness and intentional intervention. Deciphering these predictors can illuminate the underlying mechanisms and develop effective interventions and preventive measures. Several factors significantly influence TA, including individual characteristics like self-esteem, as well as familial and environmental influences like parenting styles, living conditions, and developmental stages (Mun & Lee, 2023; Tian et al., 2021; Boer et al., 2020; Setiadi et al., 2019). Research highlights the crucial role of parents in shaping children's self-esteem and subsequent internet usage patterns (Mun & Lee, 2023). Additionally, studies emphasize the protective role of emotion-focused coping mechanisms in mitigating TA (Fowler et al., 2020).

Understanding these nuanced influences is crucial for developing effective interventions and preventive strategies. While self-esteem may not directly predict addiction, studies suggest it may offer protection against negative consequences (Oppong et al., 2022; Cuadrado-Gordillo & Fernández-Antelo, 2020). Platforms' autonomy in crafting personal narratives might explain why self-esteem is not a primary predictor (Tian et al., 2021). Addressing this multifaceted

issue demands a nuanced approach, considering the various factors influencing technology use behaviours.

Self-Esteem and Cyberbullying

Self-esteem, a dynamic construct encompassing self-evaluation and worth awareness, is significantly shaped by life experiences, cultural norms, and social interactions (Aslan, 1992; Kinch, 1963; Rogers, 1961; Bracken, 1996; Rosenberg, 1986). Individuals with high self-esteem demonstrate confidence and readily acknowledge their strengths, while those with low self-esteem struggle with self-expression and experience negative emotions (Donnellan et al., 2005; Skaalvik & Hagtvet, 1990; Sfeir et al., 2023).

Technology integration introduces a double-edged sword for learners. Online identity creation can foster self-expression and openness (Gonzalez & Hancock, 2011; Marriott & Buchanan, 2014), potentially boosting self-esteem. However, research suggests concerning trends, such as young people mimicking and transferring learned violence from digital environments to real life (Pena et al., 2018). Additionally, the accessibility of violent games is linked to increased aggression and anger (Lemercier-Dugarin et al., 2021; Anderson & Dill, 2000). The digital landscape's anonymity can also foster unethical behaviours like cyberbullying, where individuals inflict harm anonymously (Postmes & Spears, 1998). This cyberbullying manifests in various forms, causing significant mental health consequences for victims, including introversion, isolation, anxiety, feelings of insecurity, and lowered self-esteem (Calvete, 2008; Beran & Li, 2005; Estévez et al., 2019; Ademiluyi & Park, 2022; Twenge, 2020; Worsley, 2019; Martínez-Monteagudo et al., 2020). While technology offers opportunities for self-expression and exploration, it also carries risks like desensitization to violence, negative behaviour transfer, and cyberbullying, potentially impacting self-esteem.

Individuals' behaviors in the digital world are shaped by a multilayered and interactive set of personal, relational, and environmental factors. In this context, the variables used in the current study were determined based on Bronfenbrenner's Ecological Systems Theory (1979) and the risk and protective factors model. This approach emphasizes that behaviors (e.g., technology use) emerge through the interaction of individual, interpersonal, and contextual elements. The microsystem and mesosystem comprise close influencers such as family members, peers, and teachers—actors that significantly shape one's digital experiences (Escario et al., 2023; Liu & Wu, 2023). Similarly, peer interactions in digital spaces—such as social media engagement—can influence self-esteem and social skills, highlighting the importance of intimate online connections (Patel & Quan-Haase, 2022). Moreover, emotional attachment to school can function as a protective factor against the negative consequences of cyberbullying (e.g., depression and low self-esteem) (Lucas-Molina et al., 2021), while school alienation can amplify these effects (Gan et al., 2022). Demographic factors like gender and income point to broader contextual (macrosystem) influences (Zhan et al., 2015; Truzoli et al., 2024), while behavioral indicators such as social media use, time spent online, and digital gaming reflect the level of a person's online engagement (Baladaniya, 2023; Bokase, 2023). Cyberbullying and cyber victimization, which encompass psychosocial processes such as anxiety, stress, and vulnerability, fall within the mesosystem, representing the individual's relational experiences in the digital environment (Abudusufuer et al., 2022; Strohmeier & Gradingier, 2022). Within this

framework, the study's variables were evaluated in terms of individual characteristics and as part of a multilayered structure that aims to understand how individuals interact with the digital ecosystem and the psychosocial consequences of these interactions.

The primary objective of this study is to elucidate the prevalence of TA, self-esteem, cyberbullying, and cyberbullying victimization (CV) among university students in Turkey. The following hypotheses are proposed, drawing upon the central research question and findings from previous studies:

(a) Significant differences exist between TA, cyberbullying, victimization, and self-esteem across dimensions of online engagement, including the online environment, membership in social networking sites, types of visited websites, preferred instant messaging applications, types of games played, and time spent online.

(b) A positive correlation exists between TA and both cyberbullying and victimization.

(c) Self-esteem is significantly associated with TA, cyberbullying, and victimization, with lower self-esteem potentially increasing vulnerability to victimization and TA.

(d) A statistically significant predictive relationship is expected from cyberbullying and victimization to technology addiction.

METHOD

Research Model

This study employs a cross-sectional design using quantitative analysis methods, including descriptive statistics, independent-sample t-tests, one-way ANOVA, hierarchical regression, and mediation analyses, to test the hypothesized relationships. This research model aims to provide insights into the interconnected dynamics of technology addiction, cyberbullying, cyber victimization, and self-esteem, ultimately contributing to the understanding of these phenomena among young people in the digital age. The model illustrated in Figure 1 was tested to clarify the relationships between the variables.

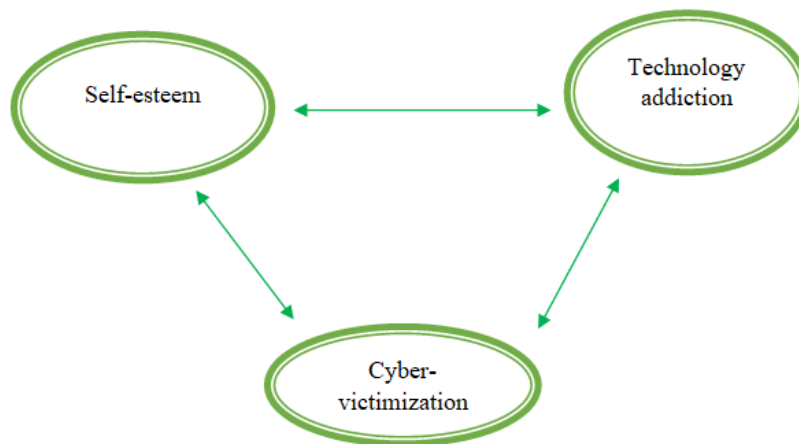


Figure 1: Hypothesized Model

Study Sample

This study surveyed 335 undergraduate students from diverse universities in Konya during the 2022-2023 academic year. Participants were recruited through convenience sampling via online surveys distributed through student groups. As a primary criterion for inclusion in the study, participants were required to be undergraduate students currently enrolled at a university in Konya. To ensure developmental consistency in patterns of technology use, individuals aged between 18 and 30 were selected. The study was conducted with voluntary participants and administered online; therefore, participants were expected to have internet access and basic digital literacy skills. Only fully completed questionnaires were included in the final analysis.

The sample was predominantly female (90.1%) and included students from various disciplines, with social work (34.2%) and child development (21.4%) being the most common. The majority were third-year students (27.5%) and accessed the internet primarily through smartphones (98.5%) and laptops (69.5%). Socioeconomic levels were diverse, with 39.7% reporting average, 32.8% reporting high, and 27.5% reporting low.

Data Collection Tools

Data collection for this study employed three well-established instruments: the Technology Addiction Scale (TAS), the Revised Cyberbullying Inventory-II (RCBI-II), and the Self-Esteem Scale (SES). Additionally, a researcher-developed personal information form was incorporated into the survey to gather sociodemographic data. Detailed information regarding the personal information form and measurement tools is provided below.

Personal Information Form

This form gathers data on demographics and internet usage patterns using descriptive and multiple-choice questions. It covers details like age, gender, education, income, devices used for internet access, internet access environment, applications used, website visit purposes, website types visited, social media presence, gaming habits, specific social media platforms used, game genres played, and instant messaging app usage. This information aims to understand participants' online engagement and its potential relationship to TA, self-esteem, cyberbullying, and victimization (Karaca, 2019).

Technology Addiction Scale (TAS)

The TAS comprises four subscales: the Social Network Addiction Scale (SNAS), the Instant Messaging Addiction Scale (IMAS), the Online Gaming Addiction Scale (OGAS), and the Website Addiction Scale (WAS). The TAS was developed based on items from measurement tools created by Young (1998) and Griffiths (2005), and its adaptation for Turkish usage was conducted by Aydın (2017). Subscales demonstrate strong internal consistency (Cronbach's alpha: SNAS=.70, IMAS=.75, OGAS=.89, WAS=.85) (Aydın, 2017; Emre et al., 2019). Scores within the range of 0-24 are categorized as "not addicted," 25-48 as "low-level addicted," 49-72 as "moderately addicted," 73-96 as "quite addicted," and 97-120 as "fully addicted."

Revised Cyber Bullying Inventory (RCBI-II)

The RCBI-II, developed by Erdur-Baker (2010), underwent a revision resulting in its second version, which comprises ten items and two scoring columns (Topcu & Erdur-Baker, 2010; Topcu, 2014). The lowest possible score is 10, and the highest score is 40. Individuals with high scores indicate engagement in cyberbullying and being a victim of cyberbullying. The Cronbach's Alpha coefficient for the Cyberbullying form is .82, and for the Cyberbullying Victimization form, it is .75 (Topcu & Erdur-Baker, 2010).

Rosenberg Self-Esteem Scale (SES)

The SES, a single-dimensional instrument comprising ten items, assesses an individual's overall self-esteem (Rosenberg, 1965). The Turkish adaptation, developed by Çuhadaroğlu (1986), includes positively worded items (1, 2, 4, 6, 7) and negatively worded items (3, 5, 8, 9, 10) (Tokuş, 2010). The Cronbach's Alpha coefficient for the Turkish adaptation is .88 (Özgüngör, 2014).

Data Analysis

Data analysis was performed using SPSS (version 22). Normality tests confirmed that the data followed a normal distribution (Tabachnick & Fidell, 2013; Kline, 2011; Aminu & Shariff, 2014). Descriptive statistics (frequencies, percentages) were calculated to determine cutoff scores for the technology addiction scale and its subscales. Independent-sample t-tests compared mean scores across various factors (gender, social media membership, gaming habits, internet access environment, social media sites joined, internet pages visited, instant messaging applications, gaming genres). One-way ANOVA compared mean scores of time spent online and social media with the measurement tool scores. Post-hoc tests (Tukey's or Tamhane's T2) were conducted based on Levene's test results for variance equality. Three hierarchical regression analyses were performed, each with Durbin-Watson, tolerance, VIF, condition index, and Cook's Distance assessments. Hayes' (2013) Process Macro procedure assessed direct and indirect effects using the bootstrap method (Macedo et al., 2017). This method evaluated mediation relationships, where the presence of an indirect effect was indicated by a confidence interval (CI) not including "0" and a difference between direct effects different from "0." Bootstrap CIs were calculated using the bias-corrected (BC) method and resampled 5000 times for each analysis (Hayes, 2013).

Ethics Committee Approval

Committee Name : the KTO Karatay University Human Research Ethics Committee

Decision Date : April 11, 2023

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FINDINGS

The study found that over half of the participants (52.8%) had low-level TA, and 39.7% had moderate addiction. Only 6.3% displayed high-level TA, and a small group (1.2%) was non-addicted (Table 1).

Male students were found to have significantly higher online gaming addiction scores compared to female students (Table 2), which may point to a potential gender-related pattern. Social media membership was not significantly associated with TA levels. However, students who reported continuous gaming habits also had higher TA scores, indicating a significant correlation between regular gaming activity and technology addiction levels. Cyberbullying and cyber victimization (CV) were reported at low levels. Cyberbullying scores averaged 12.19, and CV scores averaged 13.44, suggesting minimal prevalence among the student population.

Table 1: Distribution of Cutoff Scores for TA and Its Subdimensions

Variables*	Completely addicted (%)	Quite addicted (%)	Moderately addicted (%)	Low addicted (%)	Not addicted (%)
TA	0	6.3	39.7	52.8	1.2
SNAS	2.1	9	39.4	46	3.6
IMAS	0.9	10.7	36.1	45.1	7.2
OGAS	1.5	7.2	13.7	26.9	50.7
WAS	1.5	13.1	34.6	38.2	12.5

*TA: Technology Addiction; SNAS: the Social Network Addiction Scale; IMAS: the Instant Messaging Addiction Scale; OGAS: the Online Gaming Addiction Scale; WAS: the Website Addiction Scale

The analysis of variance revealed statistically significant differences in mean scores for cyberbullying (1.45 ± 0.40) and cyber victimization (CV) (1.58 ± 0.54), with higher scores observed among male students. In contrast, female students reported significantly higher self-esteem scores (2.02 ± 0.55). Additionally, students who reported continuous gaming habits had higher mean scores in cyberbullying (1.28 ± 0.38), and those with social media membership were found to have higher CV scores (1.36 ± 0.44) (Table 2). These findings suggest correlational patterns between gender, gaming behavior, and online experiences, rather than causal relationships.

Participants primarily accessed the internet from their homes or dormitories (93.4%) or via mobile devices (80.3%). A smaller proportion used faculty/school facilities (40%) or internet cafes (3.6%). Regarding social media applications, Instagram (92.8%), YouTube (77.6%), and X (Twitter) (67.8%) had the highest rates of usage and subscription. Other platforms such as LinkedIn, TikTok, Google Plus, Tumblr, Reddit, and MySpace were used less frequently. In terms of internet content engagement, the most common activities included online shopping (74.6%), following online series/music/movies (58.2%), and seeking beauty-related information (26.6%). Reading blogs (29.6%), following fashion trends (27.5%), and using search engines (25.1%) were also popular among participants. When comparing the mean scores across these variables, students who reported accessing the internet from faculty or school settings had higher average scores in technology addiction (2.11 ± 0.65), social media addiction (2.29 ± 0.80), and instant messaging addiction (2.22 ± 0.80) (Table 3).

Students who accessed the internet through the faculty or school network reported higher mean scores for cyberbullying (1.27 ± 0.36) and cyber victimization (CV) (1.42 ± 0.49) compared to those using other access methods. In terms of platform usage, X users had elevated mean scores for cyberbullying (1.24 ± 0.33) and CV (1.38 ± 0.44), while Facebook users reported

higher scores in online gaming addiction (1.76 ± 0.96) and lower self-esteem (1.88 ± 0.55). Regarding internet page usage, students who engaged in online shopping (1.37 ± 0.44), followed online music/series/movies (1.39 ± 0.46), or searched for beauty-related information (1.43 ± 0.51) tended to report higher CV scores. Moreover, following online music, series, and movies was associated with higher self-esteem scores (2.05 ± 0.58). Visiting beauty-related websites correlated with elevated instant messaging addiction (2.29 ± 0.74) and CV (1.43 ± 0.51) scores. Finally, students who reported using search engines demonstrated higher average scores for web page addiction (2.34 ± 0.88) and self-esteem (2.11 ± 0.59). These findings suggest potential associations between specific online behaviors and psychological or behavioral tendencies, without implying any causal direction.

Table 2: Independent Sample T-test Analysis of TA with Sociodemographic Variables

Variables	Gender (N)		Social Network Membership						Online Gaming			
	Female (302)	Male (33)	t Test		Member (314)	Not Member (21)	t Test		Yes (113)	No (222)	t Test	
	Mean ± SD	Mean ± SD	t	p	Mean ± SD	Mean ± SD	t	p	Mean ± SD	Mean ± SD	t	p
TA	1.99±.59	2.16±.71	-1.557	.121	2.00±.61	2.11±.54	-.820	.413	2.16±.61	1.93±.59	3.346*	.001
SNAS	2.16±.72	2.27±.88	-.883	.406	2.16±.74	2.37±.56	-1.300	.195	2.29±.75	2.11±.72	2.287*	.023
IMAS	2.11±.75	2.16±.91	-.315	.753	2.10±.77	2.34±.88	-1.385	.167	2.11±.82	2.12±.75	-.173	.863
OGAS	1.74±.82	2.56±.92	-4.046*	.000	1.57±.86	1.53±.82	.212	.833	2.05±.98	1.33±.67	7.024*	.000
WAS	2.17±.86	2.09±.90	.556	.578	2.16±.87	2.20±.86	-.179	.858	2.20±.87	2.15±.87	.503	.615
CB	1.19±.29	1.45±.40	-3.575*	.001	1.22±.32	1.17±.19	.784	.434	1.28±.38	1.19±.28	2.334*	.010
CV	1.32±.41	1.58±.54	-2.749*	.009	1.36±.44	1.16±.22	3.736*	.001	1.40±.50	1.32±.39	1.488	.139
SE	2.02±.55	1.77±.52	2.407*	.017	2.00±.56	1.91±.56	.707	.480	2.02±.60	1.98±.53	.624	.533

Note: * indicates significance at the $p < 0.05$ level

Table 3: Comparison of Means for TA, Internet Connection Environment, Membership in Social Network Sites, and Types of Regularly Visited Internet Sites

Internet Connection Environment					Social Media Platforms Joined			Types of Visited Websites						
					Instagram	YouTube	X	Facebook	Shopping	Music/Serie/ Movie	Blog	Fashion	Beauty	Search engines
TA	Yes (Y)	2.11±.65	2.00±.61	2.01±.61	2.02±.61	2.01±.61	1.99±.57	2.03±.59	2.00±.60	2.05±.60	2.00±.57	2.07±.63	2.05±.60	2.11±.64
	No (N)	1.94±.57	2.02±.59	1.97±.57	1.84±.53	2.00±.61	2.03±.68	2.00±.65	1.99±.62	1.94±.60	2.01±.62	1.98±.60	1.99±.61	1.97±.59
	t	-2.588*	.071	-.290	-1.362	-.169	.485	-.472	-.200	-1.657	.199	-1.126	-.886	-1.746
	p	.010	.943	.772	.174	.866	.628	.637	.842	.098	.843	.261	.376	.082
SNAS	Y	2.29±.80	2.18±.74	2.18±.75	2.18±.73	2.16±.74	2.15±.69	2.19±.76	2.17±.73	2.22±.76	2.11±.69	2.18±.76	2.20±.71	2.25±.79
	N	2.09±.68	2.13±.73	2.11±.56	2.09±.78	2.20±.70	2.21±.82	2.16±.73	2.17±.76	2.11±.70	2.20±.75	2.17±.73	2.16±.74	2.14±.71
	t	-2.397*	-.466	-.433	-.563	.320	.595	-.281	.042	-1.390	.950	-.174	-.402	-1.188
	p	.017	.641	.665	.574	.749	.553	.779	.967	.166	.343	.862	.688	.236
IMAS	Y	2.22±.80	2.11±.79	2.12±.77	2.13±.77	2.11±.76	2.10±.77	2.01±.82	2.15±.77	2.16±.74	2.09±.65	2.28±.79	2.29±.74	2.20±.79
	N	2.05±.74	2.14±.70	2.09±.79	1.99±.73	2.12±.81	2.15±.76	2.16±.75	2.01±.75	2.06±.81	2.13±.82	2.06±.75	2.05±.77	2.09±.76
	t	-1.975*	.235	-.161	-.861	.074	.545	1.575	-1.509	-1.147	.458	-2.342	-2.534	-1.156
	p	.049	.815	.872	.390	.941	.586	.116	.132	.252	.647	.020	.012	.248
OGAS	Y	1.66±.96	1.58±.86	1.57±.86	1.59±.88	1.58±.89	1.56±.84	1.76±.96	1.53±.83	1.60±.88	1.56±.88	1.54±.87	1.50±.82	1.63±.87
	N	1.51±.78	1.52±.86	1.64±.82	1.36±.55	1.54±.73	1.59±.89	1.50±.80	1.67±.92	1.53±.84	1.57±.85	1.58±.87	1.59±.87	1.55±.85
	t	-1.473	-.500	.374	-1.825	-.396	.307	-2.388*	1.275	-.708	.085	.421	.851	-.676
	p	.142	.617	.709	.077	.693	.759	.010	.203	.480	.932	.674	.395	.499

Table 3: Comparison of Means for TA, Internet Connection Environment, Membership in Social Network Sites, and Types of Regularly Visited Internet Sites (Continued)

Internet Connection Environment				Social Media Platforms Joined				Types of Visited Websites						
		Faculty	Mobile Phone	Home/dormitory	Instagram	YouTube	X	Facebook	Shopping	Music/Serie/Movie	Blog	Fashion	Beauty	Search engines
WAS	Y	2.28±.97	2.15±.88	2.17±.87	2.18±.87	2.18±.88	2.16±.84	2.16±.89	2.18±.86	2.24±.90	2.22±.81	2.27±.92	2.22±.91	2.34±.88
	N	2.09±.79	2.25±.82	2.05±.84	1.94±.85	2.13±.84	2.17±.92	2.17±.86	2.12±.88	2.07±.81	2.14±.89	2.13±.84	2.14±.85	2.11±.85
	t	-1.835	.882	-.672	-1.340	-.417	.127	.057	-.518	-1.734	-.704	-1.356	-.749	-2.181
	p	.068	.379	.502	.181	.677	.899	.955	.605	.084	.482	.176	.454	.030
CB	Y	1.27±.36	1.23±.33	1.22±.32	1.22±.32	1.23±.32	1.24±.33	1.23±.30	1.22±.31	1.24±.32	1.18±.25	1.23±.35	1.22±.33	1.24±.31
	N	1.18±.28	1.17±.25	1.33±.29	1.17±.22	1.20±.31	1.17±.29	1.22±.32	1.20±.34	1.20±.31	1.24±.34	1.22±.30	1.22±.31	1.21±.32
	t	-2.544*	-1.436	.485	-.742	-.723	-2.368*	-.456	-.809	-1.357	1.326	-.235	-.185	-.835
	p	.009	.152	.628	.459	.470	.018	.649	.419	.176	.186	.814	.853	.405
CV	Y	1.42±.49	1.36±.44	1.34±.43	1.35±.44	1.36±.44	1.38±.44	1.39±.45	1.37±.44	1.39±.46	1.29±.37	1.41±.51	1.43±.51	1.38±.42
	N	1.30±.39	1.26±.41	1.33±.53	1.28±.44	1.28±.40	1.26±.41	1.33±.43	1.27±.42	1.29±.38	1.29±.37	1.32±.40	1.31±.40	1.33±.44
	t	-2.344*	-1.947	-.182	-.845	-1.587	-2.761*	-1.383	-2.149*	-2.361*	1.257	-1.628	-2.091*	-1.236
	p	.020	.054	.856	.399	.113	.006	.168	.032	.019	.243	.104	.037	.217
SE	Y	2.03±.56	2.01±.58	1.99±.56	2.00±.56	1.98±.57	1.99±.57	1.88±.55	2.00±.57	2.05±.58	1.94±.55	2.02±.60	2.01±.63	2.11±.59
	N	1.97±.56	1.93±.47	1.91±.54	1.94±.54	2.04±.51	2.01±.54	2.04±.55	1.97±.53	1.91±.52	2.02±.56	1.98±.54	1.99±.53	1.96±.54
	t	-1.073	-.993	-.729	-.466	.832	.288	2.424*	-.426	-2.362*	1.224	-.452	-.341	-2.161*
	p	.284	.322	.467	.641	.406	.774	.016	.671	.019	.222	.652	.733	.031

Table 4: Comparison of Means for Instant Messaging Applications Used According to TA

Used Instant Messaging Apps		Types of Online Games						
		Whatsapp	Snapchat	Telegram	Puzzle	Action	Racing	Strategy
TA	Y	2.00±.61	2.03±.58	1.98±.65	2.00±.58	2.29±.65	2.18±.68	2.10±.54
	N	2.18±.57	1.99±.63	2.02±.58	2.01±.62	1.96±.59	1.99±.60	1.99±.61
	t	.917	-.564	.682	.104	-.3.669**	-1.631	-1.099
	p	.360	.573	.496	.917	.000	.104	.273
SNAS	Y	2.17±.74	2.16±.74	2.15±.81	2.16±.74	2.48±.80	2.33±.76	2.24±.76
	N	2.12±.68	2.18±.73	2.19±.69	2.18±.73	2.12±.71	2.16±.73	2.16±.73
	t	-.240	.360	.454	.186	-3.267	-1.198	-.656
	p	.810	.719	.650	.853	.001	.232	.512
IMAS	Y	2.11±.77	2.16±.76	2.13±.85	2.16±.83	2.24±.80	2.20±.75	2.08±.76
	N	2.40±.73	2.08±.78	2.11±.72	2.10±.75	2.09±.75	2.11±.77	2.12±.77
	t	1.184	-.951	-.212	-.582	-1.266	-.578	.355
	p	.237	.342	.832	.561	.207	.564	.723
OGAS	Y	1.56±.86	1.61±.87	1.51±.86	1.59±.83	2.21±.85	2.05±1.08	2.03±.87
	N	2.02±.86	1.54±.85	1.61±.86	1.56±.87	1.46±.80	1.53±.82	1.50±.84
	t	1.675	-.753	.979	-.236	-5.430	-2.525	-3.883
	p	.095	.452	.328	.814	.000	.017	.000
WAS	Y	2.17±.87	2.18±.87	2.12±.92	2.09±.82	2.23±.92	2.16±.87	2.05±.82
	N	2.18±.83	2.15±.87	2.19±.83	2.19±.88	2.16±.86	2.17±.87	2.18±.87
	t	0.65	.939	.743	.884	-.539	.068	.934
	p	.948	.770	.458	.377	.590	.946	.351
CB	Y	1.22±.32	1.23±.32	1.21±.33	1.17±.25	1.32±.36	1.19±.22	1.33±.36
	N	1.32±.39	1.21±.31	1.23±.31	1.24±.33	1.20±.31	1.22±.33	1.20±.31
	t	1.077	-.922	.574	1.823	-2.577*	.322	-2.804*
	p	.282	.357	.566	.070	.010	.747	.005
CV	Y	1.34±.44	1.41±.47	1.36±.45	1.31±.41	1.48±.50	1.42±.51	1.46±.46
	N	1.38±.44	1.29±.40	1.33±.43	1.36±.44	1.32±.42	1.34±.43	1.33±.43
	t	.310	-2.633*	-.674	.863	-2.172*	-.951	-2.083*
	p	.757	.009	.501	.389	.034	.342	.038
SE	Y	1.99±.56	1.96±.55	2.00±.59	2.05±.62	2.06±.59	2.04±.51	1.88±.65
	N	1.98±.49	2.02±.56	1.99±.54	1.97±.54	1.98±.55	1.99±.56	2.01±.65
	t	-.074	.973	-.181	-1.041	-.952	-.525	1.436
	p	.941	.331	.856	.299	.342	.600	.152

Most students (93.7%) reported being members of at least one social media platform, and nearly all (99.1%) regularly used instant messaging applications. Additionally, 37.7% of the students indicated that they played video games, and 89% stated that they frequently browsed the internet. Among these users, students who used Snapchat tended to report higher mean scores of cyber victimization (CV) compared to non-users, suggesting a possible association between Snapchat usage and CV levels (Table 4).

Participants who reported a preference for action games also tended to score higher in measures of technology addiction (TA), social media addiction, online gaming addiction, cyberbullying, and cyber victimization (CV) (Table 4). Similarly, those who preferred racing and strategy games reported elevated levels of cyberbullying and CV. In terms of daily digital media usage, the majority of participants indicated spending 1–2 hours on instant messaging applications (45.4%), 3–4 hours on social media platforms (49.3%), and 1–2 hours browsing the

internet (44.2%). Furthermore, social media users who reported spending 5 or more hours per day on these platforms tended to exhibit higher mean scores in TA and website addiction, suggesting a potential association between extended usage time and these outcomes (Table 5).

In addition, social media users who reported spending three or more hours per day on these platforms exhibited higher mean scores of cyberbullying. Similarly, students who reported spending 3–4 hours per day browsing the internet showed elevated scores in technology addiction, social media addiction, and website addiction (Table 6). These findings suggest potential associations between extended internet and social media use and increased vulnerability to problematic online behaviors.

Table 5: ANOVA Results for the Time Spent on Internet Pages and social media and TA and Its Sub-dimensions

Time	TA		SNAS		IMAS		OGAS	
	Social	Int	Social	Int	Social	Int	Social	Int
<1	1.78±.64	1.88±.61	1.75±.62	2.03±.69	1.92±.57	2.03±.80	1.69±.81	1.50±.83
1-2	1.90±.69	2.03±.56	1.95±.76	2.19±.72	2.02±.79	2.13±.74	1.64±.96	1.58±.86
3-4	1.93±.56	2.16±.67	2.13±.68	2.37±.85	2.05±.72	2.24±.79	1.48±.78	1.64±.95
5-6	2.18±.61	2.24±.50	2.39±.71	2.30±.43	2.28±.85	2.23±.77	1.63±.90	1.77±.70
≥7	2.34±.45	0	2.49±.85	0	2.44±.71	0	1.78±.97	0
F	5.081	3.655	5.191	3.049	2.652	1.087	1.127	.548
p	.001	.013	.000	.029	.033	.355	.344	.650
Time	WAS		CB		CV		SE	
	Social	Int	Social	Int	Social	Int	Social	Int
<1	1.78±.75	1.95±.84	1.02±.04	1.21±.33	1.03±.05	1.32±.42	1.83±.31	1.92±.59
1-2	2.00±.84	2.21±.80	1.16±.29	1.23±.32	1.35±.42	1.37±.46	1.86±.58	2.05±.55
3-4	2.05±.81	2.40±1.00	1.21±.30	1.21±.29	1.31±.40	1.28±.30	1.99±.53	1.99±.48
5-6	2.43±.92	2.65±.76	1.26±.30	1.29±.30	1.38±.45	1.65±.74	2.13±.57	2.01±.71
≥7	2.66±.86	0	1.36±.49	0	1.51±.62	0	2.01±.60	0
F	5.644	5.182	2.967	.301	2.126	1.643	2.162	1.239
p	.000	.002	.020	.824	.077	.179	.073	.295

Table 6: Post-Hoc Multiple Comparisons for Significant Differences Based on Time Spent on the Internet and Social Media

Social (I)	Social (J)	TA		SNAS		IMAS		WAS		CB**	
		(I-J)	p	(I-J)	p	(I-J)	p	(I-J)	p	(I-J)	p
a	b	-.11696	.990	-.20098	.965	-.10049	.998	-.22712	.970	-.04733*	.005
	c	-.14331	.978	-.38434	.697	-.12980	.994	-.27677	.934	-.06645*	.000
	d	-.39742	.512	-.64048	.222	-.35952	.802	-.65556	.360	-.08147*	.000
	e	-.55823	.230	-.74359	.150	-.51923	.560	-.88248	.144	-.10518*	.003
b	a	.11969	.990	.20098	.965	.10049	.998	.22712	.970	.04733*	.005
	c	-.02362	.999	-.18336	.389	-.02931	.999	-.04964	.994	-.01912	.768
	d	-.27773*	.048	-.43950*	.003	-.25903	.270	-.42843*	.025	-.03415	.262
	e	-.43854*	.012	-.54261*	.010	-.41874	.122	-.65535*	.007	-.05786	.298
c	a	.14331	.978	.38434	.697	.12980	.994	.27677	.934	.06645*	.000
	b	.02362	.999	.18336	.389	.02931	.999	.04964	.994	.01912	.768
	d	-.25411	.023	-.25613	.092	-.22973	.217	-.37879*	.015	-.01502	.958
	e	-.41492	.009	-.35925	.124	-.38943	.112	-.60571*	.007	-.03873	.766
d	a	.39742	.512	.64048	.222	.35952	.802	.65556	.360	.08147*	.000
	b	.27773*	.048	.43950*	.003	.25903	.207	.42843*	.025	.03415	.262
	c	.25411*	.023	.25613	.092	.22973	.217	.37879*	.015	.01502	.958
	e	-.16081	.761	-.10311	.971	-.15971	.892	-.22692	.768	-.02371	.992
e	a	.55823	.230	.74359	.150	.51923	.560	.88248	.144	.10518*	.003
	b	.43854*	.012	.54261	.010	.41874	.122	.65535*	.007	.05786	.298
	c	.41492*	.009	.35925	.124	.38943	.112	.60571*	.007	.03873	.766
	d	.16081	.761	.10311	.971	.15971	.892	.22692	.768	.02371	.992

Table 6: Post-Hoc Multiple Comparisons for Significant Differences Based on Time Spent on the Internet and Social Media (Continued)

Int (I)	Int (J)	TA		SNAS		WAS	
		(I-J)	p	(I-J)	p	(I-J)	p
a	b	-.14620	.201	-.15613	.307	-.25564	.074
	c	-.28321*	.016	-.33803*	.019	-.44843*	.006
	d	-.35751	.270	-.26581	.684	-.69843	.063
b	a	.14620	.201	.15613	.307	.25564	.074
	c	-.13701	.442	-.18191	.361	-.19279	.451
	d	-.21132	.702	-.10968	.967	-.44279	.384
c	a	.28321*	.016	.33803*	.019	.44843*	.006
	b	.13701	.442	.18191	.361	.19279	.451
	d	-.07431	.984	.07222	.991	-.25000	.825
d	a	.35751	.270	.26581	.684	.69843	.063
	b	.21132	.702	.10968	.967	.44279	.384
	c	.07431	.984	-.07222	.991	.25000	.825

Table 7: Relationship Analysis Between TA, Its Sub-Dimensions, Cyberbullying, CV, and Self-Esteem

		TA	SNAS	IMAS	OGAS	WAS
CB	r	.218**	.144**	.142**	.212**	.151**
	p	.000	.008	.009	.000	.006
CV	r	.194**	.136*	.174**	.163**	.113*
	p	.000	.013	.001	.003	.039
SE	r	.284**	.291**	.171**	.123*	.274**
	p	.000	.000	.002	.024	.000
SNAS	r	.814**	1	.513**	.375**	.605**
	p	.000		.000	.000	.000
IMAS	r	.727**		1	.271**	.444**
	p	.000			.000	.000
OGAS	r	.671**			1	.329**
	p	.000				.000
WAS	r	.798**				1
	p	.000				

*The relationship is significant at the .05 level (2-tailed); ** The relationship is significant at the .01 level (2-tailed)

Examination of Table 7 indicates that TA is positively correlated with cyberbullying, CV, and social media addiction. Although these correlations are statistically significant, the strength of association between TA and cyberbullying, CV, and self-esteem remains weak. In contrast, stronger positive correlations are observed among the sub-dimensions of TA, including social media addiction, instant messaging addiction, and online gaming addiction. These results suggest that while TA is related to experiences of online aggression and psychosocial variables, its components are more closely interlinked with one another than with external behavioral or emotional outcomes.

Analyses confirmed suitability for hierarchical regression. Durbin-Watson (1.873) and tolerance values (.459-.990) indicated good model fit and low multicollinearity. VIF (1.006-2.180) and condition index values remained below thresholds, and Cook's Distance was small. This confirmed no multicollinearity, allowing for subsequent hierarchical regression analysis.

Table 8: Hierarchical Regression Analysis for TA

Predictor	B	S. E.	Beta	t	Sig.
Block 1 ($R^2=.043$; $\Delta R^2= .028$; Change: $R^2=.043$; $F(2.956)=2.956$; $p<.05$)					
Gender	.107	.113	.053	.945	.345
Income	.006	.035	.000	.002	.999
Membership	.151	.135	.060	1.113	.267
Online Gaming	-.22	.071	-.173	-3.114	.002
Visiting Web Sites	-.107	.104	-.055	-1.025	.306
Block 2 ($R^2=.098$; $\Delta R^2= .079$; Change: $R^2=.055$; $F(5.079)=9.982$; $p<.001$)					
Gender	.168	.112	.083	1.509	.132
Income	-.006	.034	-.009	-.167	.867
Membership	.139	.133	.056	1.046	.296
Online Gaming	-.200	.070	-.156	-2.878	.004
Visiting Web Sites	-.004	.104	-.002	-.034	.973
Internet- Time	.081	.043	.107	1.893	.059
Social-Time	.127	.039	.184	3.230	.001

Table 8: Hierarchical Regression Analysis for TA (Continued)

Block 3 ($R^2=.121$; $\Delta R^2= .099$; Change: $R^2=.023$; $F(5.609)= 8.504$; $p<.001$)					
Gender	.111	.112	.055	.994	.321
Income	-.007	.034	-.011	-.209	.835
Membership	.173	.132	.069	1.317	.189
Online Gaming	-.194	.069	-.152	-2.822	.005
Visiting Web Sites	.025	.104	.013	.256	.806
Internet- Time	.082	.042	.108	1.926	.055
Social-Time	.114	.039	.166	2.927	.004
CV	.219	.157	.157	2.916	.004
Predictor	B	S. E.	Beta	t	Sig.
Block 4 ($R^2=.125$; $\Delta R^2= .101$; Change: $R^2=.004$; $F(5.176)=1.625$; $p<.001$)					
Gender	.086	.114	.042	.757	.449
Income	-.007	.034	-.011	-.216	.829
Membership	.160	.132	.064	1.216	.225
Online Gaming	-.188	.069	-.147	-2.728	.007
Visiting Web Sites	.026	.104	.013	.247	.805
Internet-Time	.085	.043	.112	2.007	.046
Social-Time	.106	.039	.154	2.679	.008
CV	.127	.104	.091	1.216	.225
CB	.186	.146	.098	1.275	.203
Block 5 ($R^2=.186$; $\Delta R^2= .161$; Change: $R^2=.061$; $F(7.407)=24.169$; $p<.001$)					
Gender	.165	.11	.081	1.491	.137
Income	.005	.033	.009	.167	.867
Membership	.186	.127	.075	1.461	.145
Online Gaming	-.171	.067	-.133	-2.561	.011
Visiting Web Sites	.027	.100	.014	.271	.786
Internet- Time	.081	.041	.106	1.962	.051
Social-Time	.092	.038	.134	2.398	.017
CV	.098	.101	.071	.976	.330
CB	.154	.141	.080	1.087	.278
SE	.276	.056	.254	4.916	.000

Hierarchical regression analysis identified several significant predictors of Technology Addiction (TA). As shown in Table 8, the initial model included gender, income level, social media membership status, and online gaming habits. This first step was statistically significant ($\Delta R^2 = .040$, $F = 2.956$, $p < .05$). In the second step, daily time spent on internet pages and social networks was added, resulting in an increased model fit ($R^2 = .098$, $F = 9.982$, $p < .001$). In the third step, cyber victimization (CV) scores were included, further enhancing the model's explanatory power ($R^2 = .121$, $F = 8.504$, $p < .001$). The addition of cyberbullying in the fourth step led to only a marginal increase in explained variance ($R^2 = .125$, $F = 1.625$), and cyberbullying did not emerge as a significant predictor of TA. However, its inclusion reduced the significance of CV, suggesting a potential mediating or overlapping effect. In the final step, self-esteem was introduced, yielding a notable improvement in model fit ($\Delta R^2 = .060$, total $R^2 = .186$, $F = 24.169$, $p < .001$). Overall, online gaming, time spent on social media, cyber victimization, and self-esteem significantly predicted levels of TA, whereas cyberbullying did not demonstrate a direct predictive effect. The full model accounted for approximately 19% of the variance in TA, indicating a moderate explanatory power.

The study also analysed hierarchical regression to examine whether the selected variables could predict CV. Durbin-Watson (1.907) and tolerance values (.526-.944) indicated good model fit and low multicollinearity. VIF (1.059-1.901) and condition index values remained below thresholds, and Cook's Distance was small. This confirmed no multicollinearity, allowing for further analysis.

Table 9: Hierarchical Regression Analysis for CV

Predictor	B	S. E.	Beta	t	Sig.
Block 1 ($R^2=.045$; $\Delta R^2= .034$; Change: $R^2=.045$; $F(3.897)=3.897$; $p<.01$)					
SNAS	.015	.043	.025	.336	.737
IMAS	.073	.036	.128	2.004	.046
OGAS	.060	.030	.118	2.003	.046
WAS	.001	.035	.002	.035	.972
Block 2 ($R^2=.515$; $\Delta R^2= .507$; Change: $R^2=.470$; $F(318.303)=69.776$; $p<.001$)					
SNAS	.010	.031	.016	.308	.758
IMAS	.048	.026	.084	1.835	.067
OGAS	-.002	.022	-.003	-.074	.941
WAS	-.020	.025	-.040	-.797	.426
CB	.966	.054	.705	17.481	.000
Block 3 ($R^2=.516$; $\Delta R^2= .507$; Change: $R^2=.001$; $F(.842)=58.259$; $p<.001$)					
SNAS	.005	.031	.009	.166	.868
IMAS	.048	.026	.084	1.837	.067
OGAS	-.001	.022	-.003	-.063	.950
WAS	-.023	.025	-.045	-.904	.367
CB	.963	.054	.703	17.753	.000
SE	.029	.032	.037	.918	.360

The hierarchical regression analysis conducted to identify predictors of cyber victimization (CV) revealed that the initial model, including background variables, was statistically significant, accounting for 4.5% of the variance in CV ($\Delta R^2 = .045$, $F = 3.897$, $p < .05$). In the subsequent step, cyberbullying was added to the model, resulting in a substantial increase in explained variance ($R^2 = .515$, $F = 69.776$, $p < .001$), indicating its strong predictive value. In the final step, self-esteem was introduced. While the overall model remained significant, the contribution of self-esteem to the variance in CV was minimal ($\Delta R^2 = .001$, final $R^2 = .516$, $F = 58.259$). Among the variables examined, instant messaging addiction, online gaming addiction, and cyberbullying emerged as significant predictors of CV. Students exhibiting higher levels of these technology-related behaviors reported increased experiences of victimization in digital contexts. Although self-esteem did not directly predict CV, its inclusion in the model slightly affected the total variance, suggesting a possible moderating or indirect role. Collectively, the final model explained approximately 51.6% of the variance in cyber victimization, indicating a strong overall explanatory capacity.

The last hierarchical regression analysis confirmed suitability for predicting cyberbullying. Durbin-Watson (1.859) and tolerance values (.526-.955) indicated good model fit and low multicollinearity. VIF (1.047-1.901) and condition index values remained below thresholds, and Cook's Distance was small. This confirmed no multicollinearity, allowing for further analysis.

Table 10: Hierarchical Regression Analysis for Cyberbullying

Predictor	B	S. E.	Beta	t	Sig.
Block 1 ($R^2=.056$; $\Delta R^2= .045$; Change: $R^2=.056$; $F(4.901)=4.901$; $p<.01$)					
SNAS	.005	.032	.012	.165	.869
IMAS	.026	.026	.063	.987	.324
OGAS	.063	.022	.171	2.933	.004
WAS	.022	.025	.060	.863	.389
Block 2 ($R^2=.520$; $\Delta R^2= .513$; Change: $R^2=.464$; $F(71.351)=318.303$; $p<.001$)					
SNAS	-.002	.023	-.005	-.099	.921
IMAS	-.011	.019	-.027	-.583	.560
OGAS	.033	.016	.089	2.128	.034
WAS	.021	.018	.058	1.174	.241
CV	.509	.029	.697	17.841	.000
Block 3 ($R^2=.520$; $\Delta R^2= .511$; Change: $R^2=.000$; $F(59.282)=.012$; $p<.001$)					
SNAS	-.003	.023	-.006	-.114	.909
IMAS	-.011	.019	-.027	-.581	.562
OGAS	.033	.016	.089	2.126	.034
WAS	.021	.018	.057	1.149	.251
CV	.509	.029	.697	17.753	.000
SE	.003	.023	.004	.110	.913

The hierarchical regression analysis revealed statistically significant associations between the examined variables. In the first step, demographic variables explained approximately 6% of the variance in cyberbullying ($\Delta R^2 = .06$, $F = 4.901$, $p < .05$). In the second step, the inclusion of cyber victimization (CV) substantially increased the variance explained to 52% ($R^2 = .520$, $F = 318.303$, $p < .001$). In the final step, self-esteem was included in the model, which remained statistically significant; however, its contribution to the explained variance was minimal. Although these results demonstrate meaningful associations among the variables, it is important to interpret them with caution due to the study's cross-sectional design. The observed relationships between self-esteem, cyber victimization, and cyberbullying should not be interpreted as causal or predictive. Instead, they should be understood as correlational. Therefore, this study emphasizes associations rather than directional effects, and future longitudinal research is needed to determine the temporal sequence and potential causal mechanisms.

The model showed that self-esteem was not significantly associated with cyberbullying when controlling for other variables. In contrast, online gaming addiction and cyber victimization (CV) demonstrated stronger associations with cyberbullying. These findings suggest that individuals reporting higher levels of online gaming addiction and experiences of cyber victimization also tend to report higher cyberbullying scores. While self-esteem may still play an indirect role, its direct association with cyberbullying appears to be limited in this sample.

The study examined the positive relationship between self-esteem and TA. To further understand this relationship, the analysis explored potential mediating variables. Table 11 presents the statistically significant results of the mediation effect of CV on the relationship between self-esteem and TA. This effect was explicitly investigated for the CV sub-dimension,

as illustrated in Figure 1. Utilizing Model 4 of the Process models, the analysis confirmed the mediation effect.

Table 11: Results of the Mediation Model of CV in the Relationship between Self-Esteem and TA

Model 1	β /Effect	S.E.	t	p	LLCI	ULCI
Constant	1.164	.088	13.240	.000	.841	1.408
SE (x)	.288	.057	5.078	.000	.177	.400
CV (M)	.228	.073	3.137	.002	.085	.371
Direct Effect	.288	.057	5.078	.000	.177	.400
	Effect	BootSE	BootLLCI		BootULCI	
Indirect Effect	.021	.013	.001		.049	
Model Summary	R	R ²	F		p	
	.28	.81	29.221		.000	

Table 11 demonstrates a statistically significant mediating association of cyber victimization (CV) in the relationship between self-esteem and technology addiction (TA). The Sobel test ($p = 0.04$) supports this mediation effect. Even when CV is included in the model, the association between self-esteem and TA remains significant (coefficient = 1.390, $p = 0.000$), suggesting a partial mediation. The indirect effect of self-esteem on TA through CV is also significant (LLCI = 0.001, ULCI = 0.049), indicating that CV may function as a meaningful linking variable between self-esteem and TA. Although not a full mediator, CV appears to partially explain the observed relationship. These findings imply that experiences of cyber victimization may be relevant when exploring how self-esteem is associated with technology addiction.

CONCLUSION, DISCUSSION AND RECOMMENDATIONS

This study explored the complex associations between technology use and psychosocial factors, with a focus on cyberbullying, cyber victimization (CV), and self-esteem. Demographic characteristics (such as gender and income), levels of social media engagement, and online activities (including game playing, website visits, and time spent online) were analyzed. The study also examined how various forms of technology-related behaviors (e.g., social media, instant messaging, online gaming, and web use) relate to technology addiction (TA), cyberbullying, and CV. Findings suggest that CV is significantly associated with the relationship between self-esteem and TA, indicating a potential mediating role. Individuals who report more continuous gaming, higher time spent on social networks, and lower self-esteem also tend to report higher levels of TA. Playing continuous games aligns with existing research, suggesting their appeal lies in mastery, positive reinforcement, and social comparison opportunities (Finserås et al., 2021).

Among the variables examined, CV was most strongly associated with TA. Cyberbullying and victimization are interconnected and exacerbated by factors like social comparisons, stress, and self-definition struggles online (Baldry et al., 2015; Alotaibi & Mukred, 2022; Lubis & Handayani, 2022; Sun et al., 2022; Maurya et al., 2022; Cañas et al., 2020). Male students experienced higher levels of both cyberbullying and victimization. This

may be linked to their increased involvement in gaming culture, which can normalize aggressive online behaviour (Çimke & Cerit, 2021; Su et al., 2020; Ding et al., 2020). Social networking membership was associated with increased CV. This suggests that social media platforms play a complex role in young people's lives, potentially facilitating intense technology use and interactions (Geng et al., 2022; Moon & Mello, 2021; Longobardi et al., 2020). High self-esteem was linked to better regulation and control of online identities, greater autonomy in shaping online experiences, and self-directed technology engagement. CV partially mediated the relationship between self-esteem and TA. This suggests that when victimization undermines self-worth, technology can be used to rebuild it. However, due to this study's cross-sectional nature, it is impossible to determine a causal or temporal direction. The mediation analysis reflects associations at a single point in time; therefore, it should be considered that low self-esteem may not necessarily increase TA through CV—instead, TA and CV might reduce self-esteem. Low self-esteem may render individuals more vulnerable to technology addiction and experiences of cyber victimization, while, conversely, excessive technology use and repeated victimization can also adversely affect self-esteem. This reciprocal relationship has been highlighted across various studies conducted in different periods and sample groups, such as those by Tanseer et al. (2024), Fernandes et al. (2021), You et al. (2019), and Patchin & Hinduja (2010).

This analysis explores young people's digital preferences and associated risks. Afolabi et al. (2022) highlight how easy school internet access, often lacking restrictions, can fuel social media and instant messaging addiction. This parallels observations of higher addiction, bullying, and victimization on open platforms like X and Facebook, potentially due to their openness and emphasis on self-expression through various media. While entertainment remains a key motivator, young people explore diverse interests online, including makeup, personal care, and education (Caner et al., 2022; Asibong et al., 2020). This aligns with our study's findings but suggests potential risks lurking in seemingly innocuous online spaces. Shopping and beauty information online can expose young people to cyberbullying and victimization disguised as product recommendations or targeted ads. These often exploit insecurities about physical appearance and beauty standards. This highlights the need to move beyond simplistic ideas of "problematic" online spaces and acknowledge the hidden dangers lurking even in seemingly harmless platforms.

This study finds that students favouring action and racing games exhibit higher levels of TA, cyberbullying, and victimization. This aligns with the research of Raouf et al. (2022) and Huang et al. (2021). The fast-paced action, competition, and potential anonymity inherent in these genres foster a more aggressive online environment and dependence on the games as a virtual escape. Stavropoulos et al. (2019) suggest that players' emotional, physical, and even identity connections with game characters can translate into aggressive online behaviour. This raises concerns about these games potentially blurring the lines between virtual and real-world aggression. This study observed a correlation between increased time spent on social media and the internet with TA and cyberbullying. This aligns with Kuem's (2021) research on personalized user experiences leading to "seductive loops" that blur the line between healthy engagement and dependence. Additionally, exceeding the study's threshold of three hours for

online activity, as supported by research from Sert et al. (2019), Setiadi et al. (2019), Alqassim et al. (2022), and Caner et al. (2022), might warrant further attention and intervention.

The findings of this study offer several practical implications for disciplines such as social work, psychology, public health, and sociology. From a social work perspective, combating cyberbullying should not be limited to enhancing individual resilience; rather, it must be addressed as a systemic issue requiring multi-level interventions. (1) Fighting cyberbullying through stricter regulations, promoting digital citizenship, and strengthening peer support networks align with social workers' preventive and advocacy roles. These efforts can indirectly reduce technology dependence and enhance self-esteem. (2) Among the core responsibilities of social work practice is equipping youth with tools to build a healthy self-concept. Workshops supported by psychoeducation and strengths-based approaches can empower young individuals to cope with digital risks through positive self-talk, critical thinking, and online identity formation. (3) Social workers also play a crucial role in family-based interventions, supporting parents in shaping their children's digital habits by fostering open communication, setting boundaries on screen time, and collaboratively developing online safety plans. (4) Educational initiatives that promote responsible technology use and raise awareness of social media-related risks align with social work's commitment to community-based education and empowerment. Encouraging inclusive and developmentally supportive alternative activities ensures more balanced and beneficial engagement with technology. (5) Finally, a multi-stakeholder collaboration involving schools, families, mental health professionals, social workers, and technology companies is very important. Social work professionals are uniquely positioned to lead efforts in developing intervention programs, conducting community outreach, and advocating for policies that strengthen cyberbullying prevention frameworks and promote youth's digital well-being.

This study illuminated the complex interplay between TA, self-esteem, and cyber victimization among adolescents. While opening doors for targeted interventions, it also acknowledges limitations. While the university student sample provided valuable insights, incorporating variables like parenting style, socioeconomic status, and presence of trauma could offer a richer tapestry. Future studies could delve deeper into family dynamics and sociocultural backgrounds, utilizing concrete measurements informed by qualitative findings. The lack of assessment of adolescents' coping mechanisms and stress management strategies hinders the ability to grasp individual dynamics influencing cyberbullying and victimization fully. Furthermore, it should be acknowledged that mediation analyses in cross-sectional studies do not establish temporal causality due to the absence of time sequencing. Therefore, it is also possible that self-esteem is influenced by cyber victimization and TA rather than the other way around. In addition, unmeasured confounding variables may have influenced the observed relationships. Factors such as psychological conditions (e.g., depression, anxiety), personality traits (e.g., neuroticism, impulsivity), and environmental or individual-level variables (e.g., level of social support and coping strategies) may have significantly shaped the outcomes. The lack of control for such variables makes it difficult to determine whether the relationships between TA, cyberbullying, and self-esteem are direct or influenced by these external factors. Therefore, future research should aim to control for these variables and employ longitudinal designs to establish clearer causal links. Although significant gender differences were found in terms of

cyberbullying, cyber victimization, and online gaming addiction, the low number of male participants in the sample limits the reliability of these findings. Future studies should aim for a more balanced gender distribution to enhance the generalizability of results. Future studies should prioritize measuring these variables to provide a more comprehensive and personalized understanding. The study's focus on current usage patterns and digital preferences overlooks the potential evolution of TA and cyberbullying behaviors over time. Future studies are encouraged to: (1) Compare variables across age groups to identify developmental trajectories. (2) Develop models incorporating coping mechanisms to understand better how individuals manage stress and navigate online risks. By addressing these limitations and exploring the proposed future directions, research can unlock a more comprehensive understanding of TA and cyberbullying among adolescents. This knowledge can then be translated into interventions that empower young people to navigate the digital world with resilience and confidence.

Authorship Contribution

In this study, the first, second, and third authors contributed to the development of the theoretical perspective and research model; the first, second, third, and fourth authors contributed to the formation of the methodological framework and analysis phase; all authors were involved in the data collection process; the first, second, fifth, sixth, seventh, and eighth authors contributed to the literature review and discussion; and the first author conducted the final proofreading of the study. Accordingly, the contributions to the completion of the article, including the submission process to the journal, are 25% for the first author, 20% for the second author, 15% for the third author, and 10% for the other authors.

Ethics Committee Statement

Committee Name : KTO Karatay University Human Research Ethics Committee

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