Problematic Technology Use in University Students: Example of a Foundation University

Mehmet Can Aktan [iD]
Başkent University, Turkey

Elif Gökçearslan [iD]
Ankara University, Turkey

To cite this article:

Problematic Technology Use in University Students: Example of a Foundation University

Mehmet Can Aktan, Elif Gökçearslan

Article Info	Abstract
	This study, which focuses on the use of problematic technology in university students, focuses on the dimensions of the relationship university students establish with technology, and aims to reach a holistic and deep understanding of the negative and destructive effects and consequences of this relationship. The research designed in quantitative design is based on the relational screening model. Within the scope of the research, it was aimed to look at the technology usage habits of the participants. For this purpose; Personal Information Form, Technology Addiction Scale and Technological Addiction Scale were used. The sample of demographic information obtained from university students at a foundation university consists of 392 participants, 340 (86.7%) female and 52 (13.3%) male students. Participants' technology usage characteristics, time spent with technology, thoughts about the COVID-19 process and addiction levels were revealed within the scope of the findings. Considering that deprivation, difficulty in control, impaired functionality and social exclusion are indicators of problematic technology use, it is seen that the time spent on technological components and usage habits are predictors of problematic use. The results have been discussed in the light of the current literature.

Introduction

> *"A new technology sometimes creates more than it destroys,*
> *destroys more than what it creates.*
> *However, this never happens in one direction."*
>
> Neil Postman

As of the 21st century, the period we are in is called the "information age", and the speed of accessing information has increased dizzyingly with the scope of information. The phenomenon of network society encompasses much larger masses and population groups in parallel with the changes in technology compared to the previous century. Especially in the last few decades, individuals of all age groups have become more familiar with technology and have begun to spend much more time with it. In today's world, where every country is highly affected by the current technological transformations, 59% of the global population (4.6 billion people) is in the position of active internet users. The number of internet users in Turkey, 74% of the total population (62 million people) correspond

(We Are Social & Hootsuite, 2021; We Are Social & Hootsuite, 2020). The development and spread of information technologies, if used appropriately, undoubtedly brings with it many positive features such as fast access to information, entertainment, and establishing large social networks. On the other hand, it is inevitable that the problematic or misuse of technology will produce some harmful and destructive effects. Technology addiction emerges as a psychopathological issue for the generation Z, who can grasp and use technology and its components much more easily than previous generations. Therefore, technology that has developed on a global scale has brought a potential that can turn into a global pathological danger. Concepts such as problematic technology use, technology abuse, excessive internet use, pathological internet use, and virtual addiction have become a subject of focus on areas such as psychiatry, psychology, educational sciences, social work, and child development.

When the international literature is examined, we come across studies conducted with students in country examples from different continents. Chou & Hsiao (2000) examined the relationship between problematic and addicted internet use and perceived pleasure experience among Taiwanese college students. Nalwa & Anand (2003) investigated internet addiction in school age children aged 16-18 in India. Cao & Linyan (2007) discussed the prevalence and psychological characteristics of internet addiction among Chinese adolescents. Yen, et al. (2007) investigated the effects of familial factors on Taiwanese adolescents' experiences of internet addiction and substance use. Ghassemzade, Shahraray, & Moradi (2008) tried to measure the prevalence of internet addiction by comparing two groups with and without internet addiction in their study conducted in Iranian high schools. In the case of Greece, Siomos, et al. (2008) investigated internet addiction among Greek adolescent students. Lam et al. (2009) examined factors associated with internet addiction in adolescents through Chinese high school students. Xiuqin, et al. (2010) discussed mental health, personality, and parenting styles in adolescents with Internet addiction disorder. Waldo (2014) investigated the variables that predict internet addiction among adolescents in his study. When the literature is examined, it is seen that there is a need for studies that will examine university students' internet addiction or problematic internet usage patterns at the level of university students.

Technology and New Media in the 21st Century: Opportunities and Threats

The technology, which has been developing step by step since the existence of humanity, has gained a great power with the introduction of the internet into our lives by gaining great momentum in the last fifty years. In the 21st century, which is also known as the Millennium Age, technology and its various components have been the harbinger of serious transformations in both public and social life of humanity. Mass media such as newspapers, magazines and televisions, which were previously referred to and used under the name of traditional media, began to be replaced by the internet and social media applications as a whole within "new media". The concept of new media undoubtedly represents a systemic transformation with postmodernist effects. The social, economic and cultural effects that transform traditional media into new media are expressed by Lister et al. (2009): Transition from modernism to postmodernism; the intensifying process of globalization; the replacement of the industrial age in the West with the information age; displacement of established and centralized geopolitical orders. New media, which we cannot think of independently of digitalization, is defined as *"environments that cannot be created or used without the processing power of computers"* (Dilmen, 2007). It is stated that the three basic

features of the new media that direct the technology of the 21st century are "interaction, demassification and asynchronous" (Geray, 2003; cited in Aydoğan & Kırık, 2012). In addition to these, one of the most fundamental elements that distinguishes new media from traditional media is that individuals who are traditional media users are in a passive position, while they are in an active position with the new media. Individuals who used to be consumers in the past have now begun to have the opportunity to become a 'content producer'. With the transformation of technology and therefore the media, this situation brings new opportunities and threats with it.

One of the greatest opportunities provided by 21st century technology is access to information. Since the last quarter of the 20th century, with the widespread use of computers and the discovery of the "network that surrounds the world (worldwide web)", the mass use of the internet has been a critical turning point. Being at the crossroads of globalization and developing information technologies, the internet has made it possible to exchange information across borders with a single click. Nowadays, it is possible to access millions of data in seconds thanks to search engines via internet connection. Another innovation brought by the millennium age to the information society is 'social media', a subset of new media. Social media and social software; *"they are tools that increase our ability to share, collaborate and act collectively outside the framework of traditional institutions and organizations"* (Shirky, 2008; cited in Fuchs, 2014).

Although today's digital technology offers many unique opportunities to the users, the 'other side' of technology has some risks and threats. The unpredictable and sometimes uncontrollable dialectical nature of technology may expose users to new dangers as well as to opportunities. One of the main dangers posed by today's information technologies is 'personal security'. Technology and the anonymity that the internet provides to the user can pave the way for the uncontrolled use of technological components. Similarly, many web pages require access to personal information for access permission (identity information, bank or credit card information, telephone number, address, etc.), which may allow personal data to be misused. The 'cyber security problem' clearly reveals the need for digital law for the use and processing of personal data in the 21st century. Another threat posed by information technologies can be defined as 'digital violence'. Digital violence, which can also be expressed as cyberbullying, can be defined as "deliberate and disturbing behaviors of a person or group by using information and communication tools towards the person he/she chooses as a target" (Özmen, 2018). Cyberbullying has taken its place in the literature as a current issue that can produce much more severe and destructive consequences than face-to-face bullying.

The "problematic technology use", which is the subject of this study, is another of the threats posed by the 21st century technology and it has some global consequences. Problematic technology use is defined as: *"The use of technology by a person of any age, negatively affects her/his physical, psychological, social and mental functioning and still cannot stop using it"* (Turkish Green Crescent Society, 2015). In cases where problematic technology use turns into technology addiction; sub-dimensions such as "social network addiction, instant messaging addiction, online game addiction, web site addiction" may emerge. Problematic use and addiction of technology can cause psychopathological effects such as depression, loneliness, impulsivity, low academic achievement on children, adolescents and adults, and cause psychosocial problems. At the same time, it should be noted that "internet gaming disorder" has been included in DSM-V as a diagnostic criterion and has been

included in ICD-11 as 'disorder' by the World Health Organization (American Psychiatric Association, 2013; World Health Organization, 2019). Therefore, technology that has developed on a global scale has brought with it a potential that can turn into a global pathological danger.

Another subheading in the context of the dangers posed by technology is other current problems that arise in human-technology interaction. In parallel with the increase and diversification of the interaction between individual and technology, there are some actual problems that affect daily life more and more and appear as reflections of problematic technology use. These can be briefly expressed as follows (Savcı, 2019): Phubbing; phantom search/tremor/notification syndrome; fear of missing out (FoMo); cyber slacking; digital technology craving; cyberchondria; online antisocial behavior; social media jealousy; envy of others online; netlessphobia; online self-presentation anxiety; sharenting/extreme sharenting; juvenile Youtuber problem; cyber suicides.

Generation Z and Their Relationship with Technology

As the science of sociology preaches as a fundamental argument, the so-called human organism is a social being. This sociality also brings with it the phenomenon of 'living in its environment'. The element of socialization constitutes the basic life principles of modern people and reflects the essence of generational work. The concept of generation can be defined as *"an expression that will enable the characteristic features of the age group raised in a certain period to be distinguished from other age groups"* (Taş & Kaçar, 2019). In fact, it is known that scientific studies about generations started with Auguste Comte (Taş, Demirdöğmez, & Küçükoğlu, 2017). As of today, the multi-generation classifications such as X, Y, Z, which we consider in sociological context, are based on the studies of Mannheim (1970) and Strauss & Howe (1991). In this context, the generation categories of American origin and dating back to the 20th century can be briefly expressed as follows (Gürbüz, 2015):

- ➢ The Silent Zone (1927-1945)
- ➢ Baby Boom Belt (1946-1965)
- ➢ Generation X (1966-1979)
- ➢ Generation Y (1980-1995)
- ➢ Generation Z (1996 and later)

Although it is called the millennium generation for those born in 2000 and later (according to some sources, 1995 and after), the concept of "i-generation" was introduced by Jean M. Twenge. Twenge mentioned this generation and its characteristics in her book "iGen". Including the reasons for using this name in her book dated 2017, she drew attention to the effects of 'individualization' regarding the name of this generation, which is generally thought to be associated with the letter *"i"* of the iPhone. She also stated that she was inspired by 'income inequality', which creates deep insecurity in the i-generation (Twenge, 2017). It is stated that there are 10 basic trends of the Z/digital generation with a general name, and the i-generation in Twenge's words (Twenge, 2017): Growing up slowly (spillover of childhood into adolescence); internet (time spent on the phone); not being side by side (reduced face-to-face social interaction); insecurity (sharp increase in mental health problems); irreligion (decline in religion); isolation (emphasis on security and decline in participatory citizenship); income insecurity

(new attitudes towards work); undefined (new attitudes towards sexuality, relationships and having children); inclusiveness (debates on affirmation, equality and freedom of expression) and independence (political views). Generation Z, which is an important generation in the focus and spread of the digital age, reflects the technology and internet-based life in a concrete way. Particularly, the widespread use of technology and smart phones in infancy and childhood periods of children born after 2012 -given the opening and widespread use of social media platforms- sharply differentiates the relationship of Generation Z with technology from other generations.

In the context of Generation Z's relationship with new media and social media as a subcomponent of it, Figure 1 and Figure 2 reveal important indicators (We Are Social & Hootsuite, 2022):
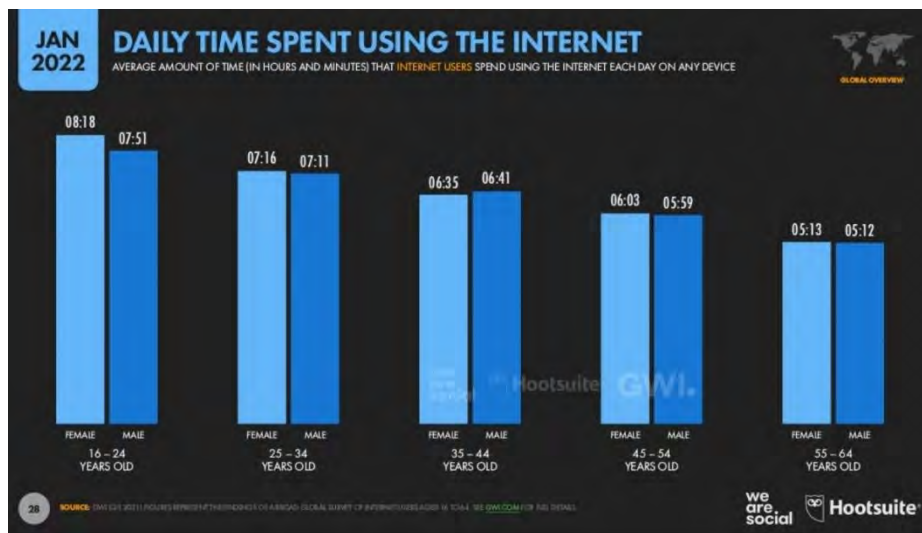
Figure 1. Daily Time Spent using the Internet
(https://datareportal.com/reports/digital-2022-global-overview-report)
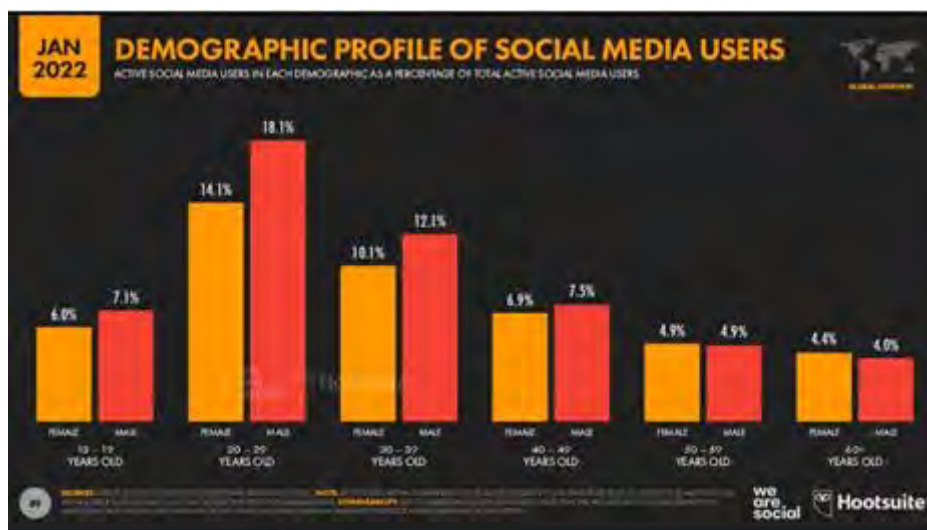
Figure 2. Demographic Profile of Social Media Users
(https://datareportal.com/reports/digital-2022-global-overview-report)

As can be seen from Figure 1; the age group in the 16-64 age range with the highest daily time spent using the

internet at the global level, it is between the ages of 16-24 with 8 hours and 18 minutes for female and 7 hours 51 minutes for male. These statistics are a concrete indicator of the close relationship between the generation Z and the university students, who are the subject of this study, with technology. It is possible to see a similar table in instant messaging applications and online digital games.

Method

This study, which focuses on the use of problematic technology in university students, focuses on the dimensions of the relationship university students establish with technology, and aims to reach a holistic and deep understanding of the negative and destructive effects and consequences of this relationship. The research designed in quantitative design is based on the relational screening model. Relational screening model is a research model that aims to determine the degree of variation between two or more variables (Karasar, 2016).

Within the scope of the research, it was aimed to look at the technology usage habits of the participants. Based on the measurement tools, it was aimed to examine whether these habits are at the level of addiction (low-moderate-high etc. according to the scale score) and to reveal their sub-dimensions (deprivation-control difficulty-impairment in functionality-social exclusion).

The questions tried to be answered within the scope of goals and objectives can be specified as follows:

- What is the relationship of students with technology and the level of time they spend with technology components?
- What are the students' technology addiction levels and what sub-dimensions are they characterized by?
- Does the level of scale scores change according to students' sociodemographic and technology usage characteristics?
- Do students' level of technology addiction and sub-dimensions of problematic technology use patterns differ according to their gender, time spent on technological applications and so on?

Measurement Tools

In the study, "the personal information form" developed by the researchers, "the technology addiction scale" and "the technological addiction scale" were used as measurement tools.

Personal Information Form

It was prepared by researchers to determine the personal characteristics and technology usage habits of the participants and consists of 30 questions.

Technology Addiction Scale (TAC)

It is a scale that includes a total of 36 Likert-type expressions, defining possible behaviors related to the use of

social networks, instant messaging applications, online games and websites. The scale consists of four sub-dimensions; social networking, instant messaging, online gaming, and websites. The scoring of the scale consists of five categories from low to high; not addicted, low-level addicted, moderately addicted, high-level addicted and fully addicted (Aydın, 2017).

Technological Addiction Scale

It is a scale including 32 Likert-type expressions in which possible behaviors related to withdrawal, control difficulty, impairment in functionality and social exclusion are defined. The scale consists of four sub-dimensions; deprivation, difficulty in control, impaired functionality and social exclusion. There is no separate scoring category for sub-dimensions (Güçlü, 2015).

Ethics committee approval was obtained from Başkent University Social and Humanities and Art Research Board for this study (Ref: 17162298.600-468). Informed consent was obtained from the participants for the study.

Participants

The study sample of demographic information obtained from university students studying at a foundation university consists of 392 participants, 340 (86.7%) female and 52 (13.3%) male students. Data on the personal characteristics of the participants are given in Table 1 and 2.

Table 1. 1. Personal Characteristics of the Participants

		n	**%**
Gender	Male	340	86.7
	Female	52	13.3
Age	18-22	372	94.9
	23-27	15	3.8
	28-32	5	1.3
Department	Nutrition and Dietetics	53	13.5
	Physiotherapy and Rehabilitation	48	12.2
	Nursing	19	4.8
	Audiology	93	23.7
	Social Work	138	35.2
	Health Management	32	8.2
	Sport Sciences	9	2.3
Class	1.class	100	25.5
	2.class	85	21.7
	3.class	90	23.0
	4.class	117	29.8

Table 2. Personal Characteristics of the Participants

		n	%
Academic Success	2.00 and below	5	1.3
	2.00 – 2.99	172	43.9
	3.00 – 3.99	180	45.9
	4.00 and above	2	0.5
Monthly Income	2000₺ and below	9	2.3
	2001₺ - 5000₺	114	29.1
	5001₺ – 7500₺	123	31.4
	7501₺ and above	146	37.2
Mother Education Status	Illiterate	3	0.8
	Primary school	60	15.3
	Secondary school	69	17.6
	High school	129	32.9
	University	118	30.1
	Postgraduate	13	3.3
Father Education Status	Illiterate	36	9.2
	Primary school	56	14.3
	Secondary school	150	38.3
	High school	135	34.4
	University	15	3.8

Results and Discussion

Technology usage characteristics of the participants are given in Table 3 and 4.

Table 3. Technology Usage Characteristics of the Participants

		n	%
Owned technological tools	Mobile phone	392	100.0
	Tablet	185	47.2
	Personal computer	377	96.2
	Television	342	87.2
Do you have an internet connection in your home?	No	6	1.5
	Yes	386	98.5
Where do you usually connect to the internet?	Home	340	98.6
	School	49	14.2
	Internet cafe	9	2.6
	Other	62	18.0
What technological means do you usually connect to the internet?	Smart phone	381	45.3
	Tablet	78	9.3
	Personal computer	349	41.5
	Other	33	3.9

According to participants' considerations about the time they devote to technological components; 2.6% of the participants spent very little time with technology, 2% spent less time with technology, 32.9% spent acceptable time with technology, 46.7% spent a lot of time with technology and 15.8% stated that they spent a lot of time with technology.

Table 4. Technology Usage Characteristics of the Participants

		n	**%**
For what purposes do you usually use the internet?	Research	372	18.6
	Surfing	248	12.4
	Entertainment	325	16.2
	Shopping	306	15.3
	Playing games	108	5.4
	Chat	316	15.8
	Following social media	329	16.4
Average time per day on websites?	Less than 1 hour	19	4.8
	1-2 hours	125	31.9
	3-4 hours	141	36.0
	5-6 hours	82	20.9
	7 hours and over	25	6.4
Do you have a social media account?	Yes	355	90.6
	No	37	9.4
Social networking sites used?	Facebook	67	6.6
	Instagram	354	35.0
	YouTube	309	30.6
	Twitter	211	20.9
	TikTok	0	0
	Other	70	6.9
Average time per day on social networks?	Less than 1 hour	21	5.4
	1-2 hours	125	31.9
	3-4 hours	151	38.5
	5-6 hours	54	13.8
	7 hours and over	17	4.3
Are you using an instant messaging program?	Yes	312	79.6
	No	80	20.4
Which of the instant messaging programs do you use?	WhatsApp	340	58.8
	Facebook Messenger	17	2.9
	Skype	29	5.0
	Snapchat	133	23.0
	WeChat	1	0.2
	Hangouts	4	0.7
	Other	54	9.3
Average time per day in instant messaging programs?	Less than 1 hour	63	16.1
	1-2 hours	145	37.0

		n	%
	3-4 hours	90	23.0
	5-6 hours	27	6.9
	7 hours and over	17	4.3
Do you play online digital games?	Yes	146	37.2
	No	246	62.8
Which types of online games do you play?	Action / Adventure	73	20.8
	Puzzle / Intelligence	59	16.8
	Sports / Racing	38	10.8
	Simulation	34	9.7
	War / Fighting	54	15.4
	Strategy	66	18.8
	Other	27	7.7
Average time per day in online games?	Less than 1 hour	80	20.4
	1-2 hours	56	14.3
	3-4 hours	17	4.3
	5-6 hours	1	0.3
	7 hours and over	2	0.5
Average time spent on all social networks, instant messaging apps, online games, and other websites?	Less than 1 hour	23	5.9
	1-2 hours	48	12.2
	3-4 hours	133	33.9
	5-6 hours	132	33.7
	7 hours and over	56	14.3
Considerations about the time you devote to technological components	I spend very little time with technology.	10	2.6
	I spend little time with technology.	8	2.0
	I spend acceptable time with technology.	129	32.9
	I spend a little too much time with technology.	183	46.7
	I spend too much time with technology.	62	15.8

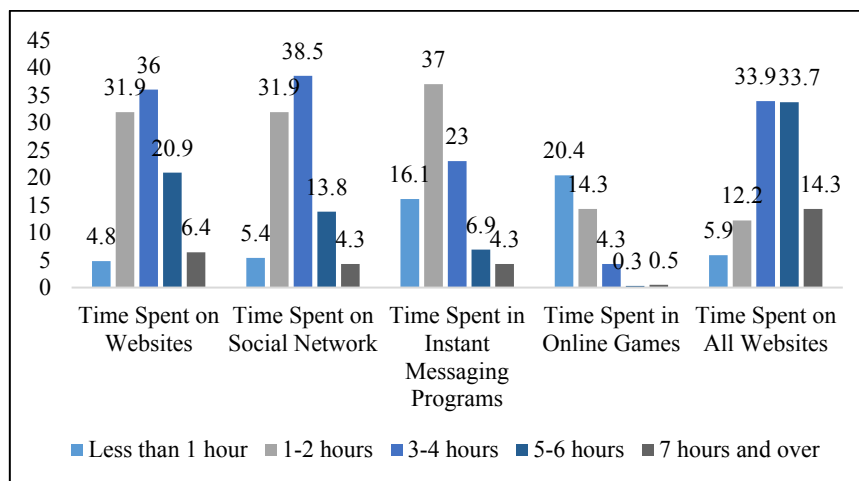Participants' time spent with technology is shown in Figure 3.

Figure 3. Participants' Time Spent with Technology

The opinions of the participants about the COVID-19 process are given in Table 3.

Table 3. Participants' Opinions on the COVID-19 Process

		n	%
To what extent have your technology usage habits changed during the COVID-19 pandemic?	My use of technology has decreased even more.	6	1,.5
	My use of technology has not changed.	47	12.0
	My use of technology has increased even more.	339	86.5
How much has your need for technology and its components changed during the COVID-19 pandemic?	My need for technology has decreased.	4	1.0
	My need for technology has not changed.	61	15.6
	My need for technology has increased.	327	83.4
In which technology category did you spend/wanted to spend more time during the COVID-19 pandemic process?	Social media platforms	321	81.9
	Instant messaging applications	235	59.9
	Digital/online games	108	27.6
	Websites	146	37.2
	Other	45	11.5
To what extent are you satisfied with the transition to online / distance education in schools due to the COVID-19 pandemic?	I am not happy at all	53	13.5
	I am not satisfied	57	14.5
	I am indecisive	123	31.4
	I am glad	87	22.2
	I am very pleased	72	18.4

Addiction levels of the participants are given in Table 4.

Table 4. Addiction Levels of the Participants

Addiction Level	Using Social Network	Instant Messaging	Playing Online Games	Using Web Sites	Technological Addiction
Not Addicted	19 %4.8	17 %4.3	248 %63.3	61 %15.6	1 %0.3
Low-level Addicted	165 %42.1	178 %45.4	86 %21.9	160 %40.8	225 %57.4
Moderately Addicted	157 %40.1	139 %35.5	32 %8.2	115 %29.3	146 %37.2
High-level Addicted	49 %12.5	50 %12.8	19 %4.8	47 %12	19 %4.8
Fully Addicted	2 %0.5	8 %2	7 %1.8	9 %2.3	1 %0.3

There is a statistically significant difference in the attitudes of social networking (p: 0.001), instant messaging (p: 0.000), using websites (p: 0.003), deprivation (p: 0.000), control difficulties (p: 0.000), impaired functionality (p: 0.008) and social exclusion (p: 0.030), according to the total time that participants spend on technological applications per day (p<0.05). According to the results of the "Tukey multiple comparison test" conducted to

determine which groups the difference is:

- Participants who spend a total of 7 hours or more per day on technological applications have higher "social networking attitudes" than those who spend 1-2 hours (p: 0.001) and 3-4 hours (p: 0.007).

- The "instant messaging attitudes" of the participants who spend 5-6 hours a day on technological applications are higher than the participants who spend 1-2 hours (p: 0.002) and 3-4 hours (p: 0.000).

- Participants who spend 5-6 hours a day on technological applications have a higher attitude to "use websites" than those who spend 1-2 hours (p: 0.006) and 3-4 hours (p: 0.039).

- "Deprivation attitudes" of the participants who spend 5-6 hours a day on technological applications are higher than the participants who spend less than 1 hour (p: 0027), 1-2 hours (p: 0,000) and 3-4 hours (p: 0.017).

- Participants who spend a total of 7 hours or more per day on technological applications have higher "control difficulties attitudes" than those who spend 1-2 hours (p: 0,000) and 3-4 hours (p: 0.012).

- Participants who spend a total of 7 hours or more per day on technological applications have higher attitudes of "impaired functionality" compared to participants who spend 1-2 hours (p: 0.007) and 3-4 hours (p: 0.046).

- "Social exclusion attitudes" of the participants who spend a total of 7 hours or more per day on technological applications are higher than those who spend 1-2 hours (p: 0.026) and 3-4 hours (p: 0.031).

There is a statistically significant difference in the attitudes of deprivation (p: 0.000), control difficulty (p: 0.000), impaired functionality (p: 0.000) and social exclusion (0.002) according to the technology usage habits of the participants (p <0.05). According to the results of the "Tukey multiple comparison test" conducted to determine which groups the difference is:

- "Deprivation attitudes" of the participants who spend more time with technology are higher than the participants who spend less time with technology (p: 0.035) and acceptable time with technology (p: 0.001).

- "Control difficulty attitudes" of the participants who spend a lot of time with technology are higher than the participants who spend very little time with technology (p: 0.009), less time with technology (p: 0.003), acceptable time with technology (p: 0.000) and more time with technology (p: 0.000).

- "Impaired functionality attitudes" of the participants who spend a lot of time with technology are higher than the participants who spend acceptable time with technology (p: 0.003).

- "Social exclusion attitudes" of the participants who spend a lot of time with technology are higher than the participants who spend acceptable time with technology (p: 0.025).

There is a statistically significant difference in the attitudes of deprivation (p: 0.000), control difficulty (p: 0.000), impaired functionality (p: 0.000) and social exclusion (p: 0.000) according to the technological addiction levels of the participants (p <0.05).). According to the results of the "Tukey multiple comparison test" conducted to determine which groups the difference is; it was found that highly addicted and fully addicted participants had higher levels of deprivation, difficulty in control, impaired functionality and social exclusion compared to other participants. As the level of addiction increases, their deprivation, difficulty in control, impaired functionality and socialization increase.

Conclusion

In this study, which focuses on technology usage habits and problematic technology usage patterns in university students, university students representing the generation Z constitute the subjects of the study. The fact that all of the students participating in the study have smart phones is a finding that is compatible with the literature stating that the generation Z met mobile phones at an early age (Twenge, 2017; Savcı, 2019). It is seen that students use the internet for different purposes, from research to surfing, entertainment to shopping. The time the participants spend with the technology and its components is an important parameter in terms of the outcomes of this study, and it is seen that this period intensifies between 3-4 hours and 5-6 hours (33%). However, with a rate of 14%, 7 hours and more usage is also remarkable. Considering the global data (We Are Social & Hootsuite, 2021), the fact that the internet usage time on mobile phones is 3 hours 39 minutes a day, but most students exceed this period, increases the risk of problematic internet use.

Another point that draws attention in terms of the findings of the study is the opinions of the participants about the COVID-19 process. 83% of the students stated that their need for technology increased in this process, and 86% of them stated that the use of technology increased. Another risk factor related to the problematic use of technology is the increased use of technology in the COVID-19 process. It is observed that the transition to distance education in this process creates satisfaction, dissatisfaction and indecision for students.

Another important finding in the study is the results regarding the addiction levels of the participants. In terms of technological addiction scores, more than half of the students (n=225) are observed to be low-level addicted. This group is followed by students with moderately addicted score (n=146). In line with these findings, it can be stated that more than half of the participants are at risk in terms of problematic technology use. In the studies of Ayaz (2016) and Teke (2019), it was observed that there was no significant difference between female and male students' internet addiction levels by gender. On the other hand, there are many studies showing that online game addiction is higher in boys compared to girls (Griffiths & Hunt, 1998; Hauge & Gentile, 2003; Horzum, 2011).

The results of this study also show that gender may be a predictor of technology addiction. It is observed that there is a statistically significant difference in the sub-dimensions of online gaming, functional impairment and social exclusion according to the gender of the participants (p <0.05). Accordingly, male students' addiction to online gaming, impaired functionality, and social exclusion were higher than female students.

Another result, which is important for the study, is that there is a statistically significant difference in the attitudes of social networking, instant messaging, using websites, deprivation, difficulty in control, impairment in functionality and social exclusion according to the total time that participants spend on technological applications per day (p <0.05). Similarly, there is a statistically significant difference in deprivation, control difficulties, impaired functionality and social exclusion attitudes according to the technological usage habits of the participants (p <0.05). These results are consistent with other studies (Güçlü, 2015; Aydın, 2017; Filiz, 2020) showing that there is a significant difference in addiction levels and sub-dimensions of the total time spent by university students in technological applications. Considering that deprivation, difficulty in control, impaired functionality and social

exclusion are indicators of problematic technology use, it can be argued that the time spent on technological components and usage habits are predictors of problematic use.

Recommendations

The continuation of the COVID-19 pandemic during the course of the study poses the biggest limitation in terms of the study. This situation created an obstacle to face-to-face access to students due to the distance of university education. It is thought that this situation negatively affected the participation in the study. The sample group of the study is represented by students studying at a foundation university. It may be possible to make a comparison on the results by carrying out a similar study on the students at the public university. Participants in this study were limited to students of health sciences faculty. The boundaries of such studies can be expanded by considering students from different faculties and departments. In addition, it is beneficial to consider in terms of the results that the time spent with technology is much more intense than usual in a period when individuals are locked away at home due to quarantine procedures in the COVID-19 process.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). (E. Köroğlu, Trans.) Ankara: Physicians Publications Association.

Ayaz, B. (2016). *The relationship to psychosocial variables of technology addiction in adolescents*. (Unpublished master's thesis). İstanbul Gelişim University, İstanbul.

Aydın, F. (2017). *Student views about relating to the problems in the class environment created by technology addiction*. (Unpublished master's thesis). Ankara University, Ankara.

Aydoğan, F., & Kırık, A. (2012). New media as alternative media. *Journal of Akdeniz University Faculty of Communication,* (18), 58-69. Retrieved from https://dergipark.org.tr/tr/download/article-file/788651.

Cao, F., & Linyan, S. (2007). Internet addiction among Chinese adolescents. *Child: Care, Health and Development, 33*(3), 275-281.

Chou, C., & Hsiao, M. C. (2000). Internet addiction, usage, gratification, and pleasure experience: The Taiwan college students' case. *Computers & Education, 35*(1), 65-80.

Dilmen, N. E. (2007). Internet diaries-blogs and their reflections on journalism in the framework of the new media concept. *Turkish Review of Communication Studies, 12*(12), 113-122. Retrieved from https://dergipark.org.tr/tr/download/article-file/2936.

Filiz, N. (2020). *Investigation of teachers' technology addiction and relationship between problem solving and decision making skills: Kastamonu example*. (Unpublished master's thesis). Kastamonu University, Kastamonu.

Fuchs, C. (2014). *Social media: A critical introduction* (2nd ed.). London: Sage Publications.

Ghassemzade, L., Shahraray, M., & Moradi, A. (2008). Prevalence of internet addiction and comparison of internet addicts and non-addicts in Iranian high schools. *CyberPsychology & Behavior, 11*(6), 731-733.

Griffiths, M. D., & Hunt, N. (1998). Computer game "addiction" in adolescence? A brief report. *Psychological Reports*, 82, 475-480.

Güçlü, G. (2015). *As a life-long learning material technology addiction and reflection to the life*. (Unpublished master's thesis). Cumhuriyet University, Sivas.

Gürbüz, S. (2015). Generational differences: A myth or reality? *The Journal of Human and Work, 2*(1), 39-57. https://doi.org/10.18394/iid.80342.

Hauge, M. R., & Gentile, D. A. (2003, April). *Video game addiction among adolescents: Associations with academic performance and aggression*. Society for Research in Child Development Conference.

Horzum, M. B. (2011). Examining computer game addiction level of primary school students in terms of different variables. *Education and Science, 36*(139), 56-68.

Karasar, N. (2016). *Scientific research method* (31th ed.). Ankara: Nobel Academic Publishing.

Lam, L. T., Peng, Z. W., Mai, J. C., & Jing, J. (2009). Factors associated with internet addiction among adolescents. *Cyberpsychology & Behavior, 12*(5), 551-555.

Lister, M., Dovey, J., Giddings, S., Grant, I., & Kelly, K. (2009). *New media: A critical introduction* (2nd ed.). New York: Routledge.

Mannheim, K. (1970). The problem of generations. *Psychoanalytic Review, 57*(3), 378-404.

Nalwa, K., & Anand, A. P. (2003). Internet addiction in students: A cause of concern. *Cyberpsychology & Behavior, 6*(6), 653-656.

Özmen, Ş. Y. (2018). An evaluation on digital violence, cyber bullying and social media literacy. *Journal of International Social Research, 11*(61), 958-966. http://dx.doi.org/10.17719/jisr.2018.2989.

Savcı, M. (2019). *Current problems in human technology interaction*. (M. Savcı, M. Ercengiz, & F. Aysan, Eds.) Ankara: Pegem Academy.

Siomos, K. E., Dafouli, E. D., Braimiotis, D. A., Mouzas, O. D., & Angelopoulos, N. V. (2008). Internet addiction among Greek adolescent students. *CyberPsychology & Behavior, 11*(6), 653-657.

Strauss, W., & Neil, H. (1991). *Generations: The history of America's future*. New York: William Morrow.

Taş, H. Y., & Kaçar, S. (2019). Expectations of businessmen by investigation of the situation and behavior of X, Y and Z. *OPUS International Journal of Society Researches, 11*(18), 643-675. https://doi.org/10.26466/opus.554751.

Taş, H. Y., Demirdöğmez, M., & Küçükoğlu, M. (2017). Possible effects of future architects' Z generation on business life. *OPUS International Journal of Society Researches, 7*(13), 1031-1048. https://doi.org/10.26466/opus.370345.

Teke, A. K. (2019). *Analyzing subcategories of technology addiction of ceit students*. (Unpublished master's thesis). Marmara University, İstanbul.

Turkish Green Crescent Society. (2015). *Responsible use of the internet and technology addiction workshop report*. İstanbul: Turkish Green Crescent Society Publications.

Twenge, J. M. (2017). *I-Gen: Why today's super-connected kids are growing up less rebellious, more tolerant, less happy--and completely unprepared for adulthood--and what that means for the rest of us*. New York: Simon and Schuster.

Waldo, A. D. (2014). *Correlates of internet addiction among adolescents*. (Unpublished doctoral dissertation). Baguio City, Philippines.

We Are Social & Hootsuite. (2020). *Digital 2020: Turkey*. Retrieved March 2022, from https://www.slideshare.net/DataReportal/digital-2020-turkey-january-2020-v01.

We Are Social & Hootsuite. (2021). *Digital 2021: Global Overview Report*. Retrieved March 2022, from https://www.slideshare.net/DataReportal/digital-2021-global-overview-report-january-2021-v03.

We Are Social & Hootsuite. (2022). *Digital 2022: Global Overview Report*. Retrieved March 2022, from https://datareportal.com/reports/digital-2022-global-overview-report.

World Health Organization. (2019). *Disorders caused by substance use or addictive behaviors*. ICD-11: International Classification of Diseases. Retrieved March 2021, from https://icd.who.int/browse11/l-m/en.

Xiuqin, H., Huimin, Z., Mengchen, L., Jinan, W., Ying, Z., & Ran, T. (2010). Mental health, personality, and parental rearing styles of adolescents with internet addiction disorder. *Cyberpsychology, Behavior, and Social Networking, 13*(4), 401-406.

Yen, J. Y., Yen, C. F., Chen, C. C., Chen, S. H., & Ko, C. H. (2007). Family factors of internet addiction and substance use experience in Taiwanese adolescents. *CyberPsychology & Behavior, 10*(3), 323-329.

Author Information

Mehmet Can Aktan

https://orcid.org/0000-0002-5064-4766

Başkent University

Faculty of Health Sciences

Department of Social Work

Ankara, Turkey

Contact e-mail: *mcanaktan@gmail.com*

Elif Gökçearslan

https://orcid.org/0000-0001-8627-5985

Ankara University

Faculty of Health Sciences

Department of Social Work

Ankara, Turkey