



THE IMPACTS OF THE COVID-19 PANDEMIC: A STUDY ON AWARENESS OF DIGITAL GAMING ADDICTION AMONG UNIVERSITY STUDENTSⁱ

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Abstract:

This study was conducted to determine the levels of awareness of digital game addiction amongst university students during the COVID-19 pandemic. The study sample comprised 324 students enrolled in various departments at Istanbul Topkapı University, Fenerbahçe University, Istanbul Rumeli University and Istanbul Nişantaşı University. Data were collected using a Personal Information Form and the Digital Gaming Addiction Awareness Scale (DOBİFÖ), developed by Tekkurşun Demir and Cicioğlu (2020). SPSS 25.0 software was used for data analysis. The data were analysed using the independent samples t-test and one-way ANOVA. According to the findings, male students' levels of internal and overall awareness were found to be significantly higher than those of female students; similarly, participants aged 21–24 and those aged 25 and over had significantly higher levels than those in the 17–20 age group. It was determined that whether participants had contracted COVID-19 or not did result in a significant difference in their levels of awareness. With regard to the variable of the preferred device for gaming, it was concluded that students using mobile phones had significantly higher levels of total awareness compared to those using computers or game consoles. Furthermore, it was found that students whose gaming time increased or decreased during the pandemic had significantly higher levels of internal, external and total awareness compared to those whose gaming time remained unchanged.

ⁱ COVID-19 PANDEMI SÜRECİNİN ETKİLERİ: ÜNİVERSİTE ÖĞRENCİLERİNDE DİJİTAL OYUN BAĞIMLILIĞI FARKINDALIĞI ÜZERİNE BİR ARAŞTIRMA

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Özet:

Bu araştırma, COVID-19 pandemisi sürecinde üniversite öğrencilerinin dijital oyun bağımlılığına yönelik farkındalık düzeylerini belirlemek amacıyla gerçekleştirilmiştir. Araştırmanın çalışma grubunu İstanbul Topkapı Üniversitesi, Fenerbahçe Üniversitesi, İstanbul Rumeli Üniversitesi ve İstanbul Nişantaşı Üniversitesinin farklı bölümlerinde öğrenim gören 324 öğrenci oluşturmuştur. Çalışma verileri Kişisel Bilgi Formu ile Tekkurşun Demir ve Cicioğlu (2020) tarafından geliştirilen Dijital Oyun Bağımlılığına İlişkin Farkındalık Ölçeği (DOBİFÖ) aracılığıyla elde edilmiştir. Verilerin analizinde ise SPSS 25.0 paket programı kullanılmıştır. Veriler bağımsız örneklem t testi ve tek yönlü ANOVA ile değerlendirilmiştir. Elde edilen bulgulara göre erkek öğrencilerin içsel ve toplam farkındalık düzeylerinin kadın öğrencilere göre; 21–24 yaş ve 25 yaş ve üzeri katılımcıların ise 17–20 yaş grubuna göre anlamlı derecede daha yüksek olduğu belirlenmiştir. Katılımcıların COVID-19 geçirme durumlarının farkındalık düzeyleri üzerinde anlamlı bir farklılık oluşturmadığı tespit edilmiştir. Oyun oynamak için tercih edilen araç değişkeninde cep telefonu kullanan öğrencilerin toplam farkındalık düzeylerinin bilgisayar ve oyun konsolu kullanan öğrencilere göre anlamlı düzeyde daha yüksek olduğu sonucuna ulaşılmıştır. Ayrıca pandemi sürecinde oyun oynama süresi artan ve azalan öğrencilerin içsel, dışsal ve toplam farkındalık düzeylerinin, oyun süresi değişmeyen öğrencilere kıyasla anlamlı düzeyde daha yüksek olduğu saptanmıştır.

Anahtar kelimeler: Covid-19, üniversite, öğrenci, dijital oyun, bağımlılık

1. Introduction

The first cases of COVID-19 were reported in December 2019 in the city of Wuhan, China; the disease presented with respiratory symptoms such as fever, cough and shortness of breath and in some cases resulted in death due to the development of pneumonia. With its high transmissibility, COVID-19 spread rapidly within China before reaching other countries, evolving into a pandemic with global implications (Ministry of Health, 2020). As a result of the virus's rapid spread across different countries, there was a marked increase in the number of cases and deaths; consequently, on 11 March 2020, the World Health Organisation (WHO) declared the COVID-19 outbreak a pandemic (Arslan & Karagül, 2020). In order to limit the spread of the COVID-19 pandemic, various restrictive measures were implemented in many countries, and individuals were encouraged to stay at home as much as possible.

Technological advancements and modern living conditions have reduced the need for physical activity in people's daily lives. The widespread availability of transport, the increased use of technological devices in daily activities, and the decline in physical activities outside the home have paved the way for people to adopt a more sedentary lifestyle. This situation can have various effects not only on physical health but also on

individuals' psychological and social lives. In particular, the social isolation and movement restrictions implemented during the COVID-19 pandemic have limited individuals' daily physical activities, leading to a further increase in the amount of time spent being inactive. The decline in physical activity and the rise in sedentary behaviour are currently regarded as a significant public health issue. Transformations in modern lifestyles and changes in the socio-cultural structure are cited as key factors contributing to a reduced need for physical activity in people's daily lives (Bozkuş *et al.*, 2013).

Research indicates that the use of digital technologies has increased as a means of alleviating the anxiety and uncertainty caused by changing living conditions during the pandemic. It is noted that behaviours such as watching TV programmes and videos, using social media, browsing the internet and playing digital games were carried out more frequently compared to the pre-pandemic period, and that these behaviours carry a risk of addiction in some cases (Gao *et al.*, 2020; Király *et al.*, 2020). Furthermore, the proliferation of digital services—such as online shopping, designed to support economic continuity whilst enabling people to stay at home—is also considered among the factors driving the increase in technology use (Akgün *et al.*, 2020). During this period, information and communication technologies have, on the one hand, facilitated communication, shopping and the fulfilment of various daily needs under conditions of social isolation, whilst on the other hand, they have become a risk factor in terms of behavioural addiction as a result of uncontrolled and intensive use. A marked increase in media consumption within the home has been observed during the pandemic. According to data from a study conducted internationally by Statista, 67 per cent of individuals stated that they followed more news content compared to before the pandemic, whilst 45 per cent reported spending more time on instant messaging apps, 44 per cent on social media platforms and 36 per cent on digital games (cited in Göker and Turan, 2020). Lockdown restrictions and social isolation measures have led to an increase in the use of online entertainment and communication tools, linked to the rise in the amount of time individuals spent at home. In particular, there has been a marked rise in interest in social media platforms and digital games during this period. Indeed, data published by the US-based telecommunications company Verizon reported an increase of approximately 75 per cent in internet traffic related to online gaming activities and digital games during the pandemic (King *et al.*, 2020).

Addiction can be defined as a strong and difficult-to-control inclination towards a particular person, object or behaviour, despite the individual being aware that it may cause them physical or psychological harm (Batu & Aydın, 2020). In the past, addiction was primarily addressed in terms of two fundamental dimensions: physical and psychological addiction. Although behaviours previously classified as addictions were largely limited to alcohol and drug use, the scope of the concept of addiction has expanded in recent times. Indeed, it is evident that various behaviours, such as exercise, internet use, gambling and sexual behaviours, can also be assessed within the context of addiction (Tekkurşun Demir *et al.*, 2018). However, the current literature demonstrates that addiction is not limited solely to substance use.

Digital gaming addiction, which is regarded as one of the types of behavioural addiction, is characterised by an individual's difficulty in controlling their digital gaming behaviour and by this behaviour having a negative impact on their daily life. This condition can lead to changes in an individual's emotions and thoughts, whilst also giving rise to various adverse consequences for their social relationships, academic life and daily responsibilities (Irmak & Erdoğan, 2016). Play activities, which young people used to engage in predominantly in open spaces and face-to-face, have increasingly shifted to digital environments alongside technological developments. Today, digital games played via computers, mobile phones and similar technological devices have taken a significant place amongst young people's leisure activities. Digital games encompass not only those played via computer software according to specific rules and objectives, but also those that enable players located in different places to come together in the same virtual environment via online networks (Günay, 2011).

Easier access to technological devices and the widespread popularity of digital games can pave the way for excessive and uncontrolled use of games among young people, bringing the concept of gaming addiction to the fore (Irmak & Erdoğan, 2015). The literature indicates that gaming addiction is associated with various negative consequences for the psychological and social lives of young individuals. Research indicates that young people with gaming addiction experience loneliness (Wack & Tantleff-Dunn, 2009), low life satisfaction and high social anxiety (Lee & Stapinski, 2012; Yen *et al.*, 2012), low self-esteem (Lemenager *et al.*, 2013) and a high risk of anxiety and depression (Mentzoni *et al.*, 2011). Furthermore, a link has been noted between gaming addiction and aggressive behaviour (Demirtaş-Mardan & Ferligül-Çakılcı, 2014).

Spending excessive amounts of time on digital games can lead young people to withdraw from social life and spend more time in virtual environments rather than engaging in face-to-face communication (Kuzu *et al.*, 2008). Furthermore, difficulties in controlling gaming behaviour can lead to the postponement of daily responsibilities and a negative impact on academic achievement (Savcı & Aysan, 2017). Furthermore, it has been suggested that the desire to make progress or achieve economic gains in some digital games may lead individuals to increase their gaming time, causing them to experience various psychological difficulties (Dursun & Çapan, 2018). These findings indicate that the uncontrolled use of digital games is a situation that warrants attention in terms of young people's psychological, social and academic lives.

When played in a controlled and mindful manner, digital games can contribute to the development of various skills, such as problem-solving, logical thinking, hand-eye coordination, motor skills and decision-making (Granic *et al.*, 2014). However, a lack of control over gaming time can increase the risk of digital game addiction. A study conducted by Çavuş, Ayhan and Tuncer (2016) also indicated that a significant proportion of students are at risk of gaming addiction. For this reason, raising awareness of digital gaming addiction is important in enabling individuals to assess their gaming behaviour and recognise excessive gaming (Tekkurşun Demir & Cicioğlu, 2020).

The primary aim of this study is to determine university students' levels of awareness regarding digital gaming addiction during the COVID-19 pandemic. In this regard, the study aims to reveal students' awareness of the potential risks and consequences of digital gaming addiction. It is anticipated that the study will contribute to the assessment of awareness levels regarding digital gaming addiction among university students and to future research.

The secondary objectives of the research are as follows:

- 1) Is there a significant difference between university students' gender and their levels of awareness of digital gaming addiction (internal awareness, external awareness and total awareness)?
- 2) Is there a significant difference between university students' age groups and their levels of awareness of digital game addiction?
- 3) Is there a significant difference between university students' awareness levels of digital game addiction and whether they have contracted COVID-19?
- 4) Is there a significant difference between university students' use of devices (computer, mobile phone, game console) for playing digital games during the pandemic and their levels of awareness of digital game addiction?
- 5) Is there a significant difference between university students' changes in the duration of their digital gaming during the pandemic (increased, decreased, remained the same) and their levels of awareness of digital gaming addiction?

2. Method

This section will provide information on the research model, the study group, data collection tools, data analysis and research ethics.

2.1 Research Model

A descriptive survey design was employed in this study. This design is used in studies that aim to collect data to identify the characteristics of a specific group under investigation and to determine the current situation based on the data collected (Fraenkel *et al.*, 2012). This study was conducted in accordance with the principles of the Declaration of Helsinki, having obtained approval from the ethics committee and informed consent

2.2 Study Group

The research was carried out during the spring semester of the 2020–2021 academic year, whilst the COVID-19 pandemic was ongoing. The population of the study comprised students enrolled at universities in Istanbul, whilst the sample consisted of 324 students studying in various departments at Istanbul Topkapı University, Fenerbahçe University, Istanbul Rumeli University and Istanbul Nişantaşı University.

Due to the pandemic, data were collected via an online questionnaire, which was distributed to students at the specified universities via digital communication channels.

Convenience sampling was used to select the sample. This method relies on the researcher reaching participants who are more easily accessible under the prevailing conditions (Yıldırım & Şimşek, 2013).

The inclusion criteria for the study were as follows:

- voluntarily participating in the study and having played at least one digital game via a mobile phone, computer or game console during the COVID-19 pandemic.

2.3 Data Collection Tools

The data collection tools used in the study were the Socio-demographic Information Form and the Digital Game Addiction Awareness Scale (DOBİFÖ).

2.3.1 Socio-demographic Information Form

The personal information form, developed by the researcher taking relevant literature into account, comprised a total of five items. These were, in order: gender, age, history of COVID-19 infection, the device used to play digital games during the pandemic, and any changes in the duration of digital gaming during the pandemic.

2.3.2 Digital Game Addiction Awareness Scale (DOBİFÖ)

The Digital Game Addiction Awareness Scale (DOBİFÖ), for which a validity and reliability study in Turkish was conducted by Tekkurşun Demir and Cicioğlu (2020), consists of a total of 12 items. The scale comprises two sub-dimensions: 'Internal Awareness' and 'External Awareness'. Items are rated on a 5-point Likert-type scale ranging from '1 = I strongly disagree' to '5 = I strongly agree'. Internal awareness is assessed via items 1–5, whilst external awareness is assessed via items 6–12. Furthermore, item 11 is reverse-coded and included in the scoring. In this study, the Cronbach's alpha coefficients calculated for the scale's sub-dimensions were 0.83 for Internal Awareness and 0.84 for External Awareness. The Cronbach's alpha coefficient for the scale as a whole was calculated as 0.94. A Cronbach's alpha coefficient of 0.70 or above is considered sufficient for test reliability (Büyüköztürk, 2012).

2.3.3 Data Collection

The data were collected by the researcher from students at a university during the spring term of the 2020–2021 academic year. Verbal consent was obtained from the participants during the data collection phase.

2.3.4 Data Analysis

The SPSS 25.0 software package was used to analyse the data. Descriptive statistical methods, including frequency, percentage, mean and standard deviation, were employed in the evaluation of the data. Accordingly, it was assumed that the data followed a normal distribution (Tabachnick & Fidell, 2013). The independent samples t-test was used to compare two independent groups, whilst one-way analysis of variance (ANOVA) was used to compare more than two independent groups. Where a significant difference was

found in the one-way ANOVA results, Tukey's post-hoc test was applied to determine which groups were responsible for the difference. The level of statistical significance was set at $p < 0.05$. In this context, the normality of the scale scores was assessed by examining the skewness and kurtosis values; it was determined that the skewness value was -0.182 and the kurtosis value was 0.153 , with both values falling within the range of -1.5 to $+1.5$. The homogeneity of variances across the groups was examined using the Levene test; the analysis revealed that the p-value ($p = 0.632$) was greater than 0.05 .

3. Findings

The distribution of the data obtained regarding the demographic variables of the students participating in the study—namely, gender, age, history of COVID-19 infection, the device used to play digital games during the pandemic, and changes in the duration of digital gaming during the pandemic—is presented in Table 1.

Table 1: Frequency and Percentage Distributions of Demographic Information for Study Participants

Variable	Frequency (n)	Percentage (%)
Gender		
Female	119	36.7
Male	205	63.3
Age		
17–20	173	54.0
21–24	107	32.4
25 and over	44	13.6
COVID-19 infection status		
Yes	113	34.0
No	211	66.0
Devices used for playing digital games during the pandemic		
Computer	103	33.3
Mobile phone	182	56.2
Games console	39	10.5
Changes in the amount of time spent playing digital games during the pandemic		
Increased	214	66.0
Decreased	29	9.3
Remained unchanged	81	24.7
Total	324	100.0

Looking at the demographic characteristics, 63.3 per cent of the 324 participants in the study were male, and 36.7 per cent were female. In terms of age distribution, the 17–20 age group accounted for 54.0 per cent; this was followed by the 21–24 age group at 32.4 per cent, whilst the proportion of participants aged 25 and over stood at 13.6 per cent. 66.0 per cent of participants had not contracted COVID-19. During the pandemic, mobile phones (56.2 per cent) were the most commonly used device for playing digital games, followed by computers (33.3 per cent) and game consoles (10.5 per cent). 66.0 per cent of

participants reported that their gaming time had increased during the pandemic, 24.7 per cent said it had remained the same, and 9.3 per cent stated that it had decreased.

Table 2: Results of the t-test conducted according to the gender of the students participating in the study

Scale and Sub-dimensions	Female (N=119)		Male (N=205)		P
	Mean	Std.	Mean	Std.	
Internal Awareness	3.710	0.939	4.100	0.565	,000*
External Awareness	4.124	1,009	4.157	0.638	,768
Total DOBİFO	3,786	1,074	4,029	0.678	,042*

*: p<0.05

Table 2 presents the results of the independent samples t-test comparing the total scores and subscale scores on the Digital Game Addiction Awareness Scale (DOBİFÖ) of the students participating in the study according to the gender variable. In the Internal Awareness sub-dimension, a statistically significant difference was found in favour of male students ($\bar{X} = 4.100$) compared to female students ($\bar{X} = 3.710$) ($p < 0.05$). In the External Awareness sub-dimension, however, no statistically significant difference was found between the mean scores of female ($\bar{X} = 4.124$) and male ($\bar{X} = 4.157$) students ($p > 0.05$). As for the total DOBİFÖ score, it was found that the average score for male students ($\bar{X} = 4.029$) was statistically significantly higher than that of female students ($\bar{X} = 3.786$) ($p < 0.05$).

Table 3: Results of the one-way analysis of variance (ANOVA) regarding the age variable of the students participating in the study

Scale and Sub-dimensions	17–20 ¹ (N=173)		21–24 ² (N=107)		25 and over ³ (N=44)		F	P	Tukey
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.			
Internal Awareness	3.677	0.863	4.102	0.736	4,397	0.123	11,685	,000*	3 > 1, 2 > 1
External Awareness	4.056	0.975	4.244	0.740	4.297	0.319	1.583	,207	
Total DOBİFO	3,709	1,034	4,107	0.758	4.297	0.319	6,954	,001*	3 > 1, 2 > 1

*: p<0.05

Table 3 presents the results of a one-way analysis of variance (ANOVA) comparing the total scores and subscale scores on the Digital Game Addiction Awareness Scale (DOBİFÖ) of the students participating in the study, according to the age variable. The results of the analysis indicate that, for the Internal Awareness subscale, the levels of internal awareness among participants in the 21–24 age group ($\bar{X} = 4.102$) and those aged 25 and over ($\bar{X} = 4.397$) were significantly higher than those of participants in the 17–20 age group ($\bar{X} = 3.677$). As for the total DOBİFO score, the total scores of participants aged

21–24 ($X = 4.107$) and those aged 25 and over ($X = 4.297$) were significantly higher than those of participants in the 17–20 age group ($X = 3.709$).

Table 4: Results of the t-test conducted according to whether the students participating in the study had contracted COVID-19

Scale and Sub-dimensions	Yes (N=113)		No (N=211)		P
	Mean	Std.	Mean	Std.	
Internal Awareness	3.810	0.775	3.625	1.087	,064
External Awareness	4.178	0.798	3,871	1,244	,059
Total DOBİFO	3,912	0.884	3,735	1,231	,318

*: $p < 0.05$

Table 4 presents the results of the independent samples t-test comparing the total scores and subscale scores on the Digital Game Addiction Awareness Scale (DOBİFÖ) among students participating in the study, categorised by whether they had contracted COVID-19. The analysis revealed no statistically significant difference in the Internal Awareness subscale between students who had contracted COVID-19 ($X = 3.810$) and those who had not ($X = 3.625$) ($p > 0.05$). Similarly, in the External Awareness sub-dimension, no statistically significant difference was found between the mean scores of students who had contracted COVID-19 ($X = 4.178$) and those who had not ($X = 3.871$) ($p > 0.05$). Similarly, no statistically significant difference was found between the mean DOBİFÖ total scores of students who had contracted COVID-19 ($X = 3.912$) and those who had not ($X = 3.735$) ($p > 0.05$).

Table 5: Results of the one-way analysis of variance (ANOVA) regarding the devices used by students participating in the study to play digital games during the pandemic

Scale and Sub-dimensions	Computer 1 (N=103)		Mobile Phone 2 (N=182)		Game console 3 (N=39)		F	P	Tukey
	Mean	Std.	Mean	Std.	Mean	Std.			
Internal Awareness	3.389	0.848	3.488	0.836	3,511	0.953	0.274	,760	
External Awareness	3.463	1.012	3.769	0.814	3,185	0.953	4,377	,013*	2 > 1, 2 > 3
Total DOBİFO	4.048	0.859	4,245	0.534	3,644	1,046	4,498	,002*	2 > 1, 2 > 3

*: $p < 0.05$

Table 5 presents the results of a one-way analysis of variance (ANOVA) comparing the total scores and subscale scores on the Digital Game Addiction Awareness Scale (DOBİFÖ) of the students participating in the study, according to the variable of the devices they used to play digital games during the pandemic. The results of the analysis showed that, in the Internal Awareness sub-dimension, there was no statistically significant difference between the mean scores of the groups using a computer ($X = 3.389$), a mobile phone ($X = 3.488$) and a game console ($X = 3.511$) ($F = 0.274$; $p > 0.05$). In the

External Awareness sub-dimension, however, a statistically significant difference was found depending on the type of device used ($F = 4.377$; $p < 0.05$). With regard to external awareness, the levels of external awareness among participants who used a mobile phone to play digital games ($X = 3.769$) were significantly higher than those of participants who used a computer ($X = 3.463$) and those who used a game console ($X = 3.185$). A statistically significant difference was identified in the DOBİFÖ total score according to the device used ($F = 4.498$; $p < 0.05$). According to the results of the Tukey test, the mean DOBİFÖ total scores of participants who use mobile phones to play digital games ($X = 4.245$) are significantly higher than the mean scores of participants who use computers ($X = 4.048$) and those who use game consoles ($X = 3.644$).

Table 6: Results of the one-way analysis of variance (ANOVA) regarding changes in the duration of digital gaming among students participating in the study during the pandemic

Scale and Sub-dimensions	Increased ¹ (N=214)		Decreased ² (N=29)		Remained the same ³ (N=81)		F	P	Tukey
	Mean	Ss.	Mean	Ss.	Mean	Ss.			
Internal Awareness	4.333	0.507	4.189	0.813	3,669	1,059	3.249	,013*	1 > 2, 1 > 3
External Awareness	4,486	0.466	4.432	0.528	3,828	1,117	5.454	,000*	1 > 2, 1 > 3
Total DOBİFO	4,249	0.632	4,036	0.652	3,473	1,002	9,704	,000*	1 > 2, 1 > 3

*: $p < 0.05$

Table 6 presents the results of a one-way analysis of variance (ANOVA) comparing the total scores and subscale scores of the Digital Game Addiction Awareness Scale (DOBİFÖ) among students participating in the study, based on changes in their digital gaming time during the pandemic. The analysis revealed a statistically significant difference in the 'Internal Awareness' sub-dimension based on changes in gaming duration ($F = 3.249$; $p < 0.05$). For internal awareness, the levels of participants who stated that their gaming time 'increased' during the pandemic ($X = 4.333$) and those who stated it 'decreased' ($X = 4.189$) were significantly higher than those of participants who stated their gaming time 'remained unchanged' ($X = 3.669$) levels of internal awareness. A statistically significant difference was identified in the External Awareness sub-dimension based on changes in gaming duration ($F = 5.454$; $p < 0.05$). For external awareness, the levels of external awareness among participants who stated that their gaming duration "increased" ($X = 4.486$) and those who stated it "decreased" ($X = 4.432$) during the pandemic were significantly higher than those of participants who stated that their gaming duration "remained unchanged" ($X = 3.828$) levels of external awareness. A statistically significant difference was found in the DOBİFÖ total score according to the change in gaming duration ($F = 9.704$; $p < 0.05$). For the DOBİFÖ total score, the DOBİFÖ total levels of participants who stated that their gaming duration "increased" ($X = 4.249$) and those who stated it "decreased" ($X = 4.036$) were significantly higher than the total

DOBIFÖ levels of participants who reported that their gaming time had 'remained the same' ($X = 3.473$).

4. Discussion

The aim of this study was to determine university students' levels of awareness regarding digital game addiction during the COVID-19 pandemic.

The findings revealed that the majority of participants were male, aged between 17 and 20, and had not contracted COVID-19; that mobile phones were the most commonly used device for playing digital games; and that the vast majority of participants reported an increase in their gaming time during the pandemic. With regard to the gender variable, it was determined that male students' levels of internal and total awareness were significantly higher than those of female students. With regard to the age variable, it was found that the levels of internal and total awareness among the 21–24 and 25 and over age groups were significantly higher than those of the 17–20 age group. It was found that whether or not participants had contracted COVID-19 did not result in a significant difference in their levels of internal, external and total awareness. With regard to the device used for gaming, it was observed that students using mobile phones had significantly higher levels of total awareness than those using computers or game consoles. Furthermore, it was found that students whose gaming time increased or decreased during the pandemic had significantly higher levels of internal awareness, external awareness and total awareness compared to those whose gaming time remained unchanged. Our study found that male students' levels of internal awareness and overall awareness were higher than those of female students. Whilst studies directly examining awareness of digital game addiction are limited in the literature, there are studies demonstrating that digital game addiction and gaming behaviour differ according to gender. A study conducted by Horzum (2011) on primary school pupils reported that male pupils' levels of digital game addiction were significantly higher than those of female pupils. In his study examining the factors influencing computer game addiction among primary school pupils, Erboy (2010) demonstrated that the gender variable is a determining factor in gaming behaviour and that male pupils exhibit higher tendencies towards addiction. In their research examining preferences for digital games, Pala and Erdem (2011) found a strong correlation between gender and the frequency of gaming as well as levels of addiction. Similarly, in their study evaluating the gaming habits of children and their families, Akçay and Özcebe (2012) noted that boys showed greater interest in digital games and were at higher risk. In his master's thesis conducted on primary school pupils, Burak (2013) demonstrated that computer games and levels of addiction were more pronounced among male pupils. Kneer and colleagues (2014), in their research based on interviews with players and counsellors, examined levels of awareness regarding risk factors for digital game addiction and emphasised that male players demonstrated more intense engagement in gaming processes. Taş, Eker and Anlı

(2014), in their study examining levels of gaming addiction amongst secondary school pupils, reported that male pupils' addiction scores were significantly higher.

Çavuş, Ayhan and Tuncer (2016), in their field study of university students, concluded that male students' gaming durations and risks of gaming addiction were higher than those of female students. Similarly, in their study of a university sample, Arslan and Bardakçı (2020) found that male students' average scores across all sub-dimensions were markedly higher than those of female students. In the literature, this phenomenon is explained by the fact that video games are predominantly designed with a male target audience in mind. Indeed, even when strong female characters are included in games, it is argued that the overly sexualised portrayal of these characters drives female users away from the digital gaming environment rather than attracting them to the game (Lopez-Fernandez *et al.*, 2019). In our study, it was found that the levels of internal and total awareness among the 21–24 and 25 and over age groups were higher than those of the 17–20 age group. There are also studies in the literature that differ from this finding. For example, Ünübol *et al.* (2020), in contrast to the findings of our study, reported that levels of digital gaming addiction decreased with increasing age. It is conceivable that this discrepancy may stem from the use of different measurement tools to assess distinct constructs, such as addiction and awareness, as well as from differences in sample characteristics.

The study found that having had COVID-19 did not result in a significant difference in awareness levels. No similar or contrary findings have been reported in the literature. Therefore, it is considered that further research is needed to investigate the relationship between having had COVID-19 and awareness of digital game addiction. It was observed that, according to the variable of the device used for gaming, students using mobile phones and computers had higher overall awareness levels than those using game consoles.

In our study, it was determined that the levels of internal awareness, external awareness and total awareness among students whose digital gaming time increased or decreased during the pandemic were significantly higher than those of students whose gaming time remained unchanged. This finding is consistent with findings in the literature regarding changes in digital gaming behaviour during the pandemic. Indeed, Balhara *et al.* (2020) reported changes in university students' gaming behaviour during the pandemic. Similarly, Oflu *et al.* (2020) found that screen time and digital gaming time among children and young people increased during the lockdown. King *et al.* (2020), meanwhile, reported a marked increase in online gaming activities during the COVID-19 lockdown period. Indeed, according to Verizon data, there was a 75 per cent increase in online gaming activities when stay-at-home measures began, whilst in Italy, there was a 70 per cent rise in internet traffic associated with Fortnite (King *et al.*, 2020). In this context, the finding that students who reported changes in their gaming time had higher awareness scores can be considered a noteworthy finding in terms of examining the relationship between changes in gaming behaviour during the pandemic and awareness of digital gaming addiction.

In conclusion, as individuals spent more time at home during the COVID-19 pandemic, the role of digital technologies and digital games in daily life has increased. This process has highlighted the importance not only of the controlled and mindful use of digital games but also of individuals' participation in physical activity and the maintenance of social interactions. In this regard, it is thought that increasing the number of activities at universities where students can socialise and remain physically active could contribute to a more mindful and controlled use of digital games.

5. Recommendations

It is recommended that social, cultural and sporting activities on university campuses be organised in a more varied manner to raise students' awareness of digital gaming addiction and to help them make more effective use of their free time.

It is recommended that awareness-raising initiatives be carried out, taking into account gaming duration, the devices used and gaming habits, in order to assess the role of digital gaming in students' daily lives.

It is recommended that longitudinal and qualitative studies be carried out to examine in greater detail the impact of exceptional periods, such as the COVID-19 pandemic, on digital gaming behaviour and awareness.

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Conflict of Interest Statement

The authors declare no conflicts of interest.

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