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The effect of cyberloafing behaviors on smartphone addiction in university students: The mediating role of fear of missing out

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Highlights

- Cyberloafing behavior affects one's smartphone addiction through fear of missing out
- Taking interventions to reduce one's fear of missing out can reduce smartphone addiction, which is a negative consequence of cyberloafing behavior
- Educators should avoid using activities that will reinforce students' fear of missing out when using technology in educational environments

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Abstract

With the increase in smartphone use, smartphone addiction has gained immense popularity and there has been a lot of research into smartphone addiction. Nonetheless, research examining the complex relationships between cyberloafing and smartphone addiction is still insufficient. Thus, the present study aims to establish the mediating role of fear of missing out, which is a cognitive and emotional process, in the effect of university students' level of cyberloafing upon their smartphone addiction level. The study group of the research is represented by 338 students receiving formation training in the faculty of education, at a state university. For the purpose of data collection, the Smartphone Addiction Scale - Short version, the Cyberloafing Scale, and the Fear of Missing Out Scale were used. The model was tested using structural equation modeling and bootstrapping. Structural equation modeling results provide evidence of indirect effects of cyberloafing on smartphone addiction partial mediated by fear of missing out. According to the Bootstrapping method, fear of missing out has an indirectly significant role in the relationship between cyberloafing and smartphone addiction. The findings emphasized the role of fear of missing out in explaining the relationship between cyberloafing and smartphone addiction. The study concludes by discussing relevant conclusions in the literature, and putting forth several recommendations based on these conclusions.

1. Introduction

Undoubtedly, information and communication technologies have become an inherent part of modern life (Dereli & Sahin Izmirli, 2022; Oberst et al., 2017). Smartphones, in particular, offer such opportunities as entertainment, leisure and socialization as well as communication with the help of mobile Internet and mobile applications (Haug et al., 2015; Kumcagiz & Gunduz, 2016; Salehan & Negahban, 2013). These opportunities and settings provided by smartphones cause many in the modern world to use their smartphones to an excess (Wolniewicz et al., 2018). Overuse of smartphones brings with it certain negativities especially for students both in and out of school settings. Addiction to a technological device underlies these negativities because excessive and problematic use of smartphones leads the young in

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particular to switch from habitual smartphone use to an addictive one (Choliz, 2012; Gezgin et al., 2018; Noyan et al., 2015; Yusufoglu, 2017).

Smartphone addiction is described as a behavioral disorder not dissimilar to a non-chemical and pathologic gambling. (Billieux et al, 2015). Individuals with smartphone addiction display lack of attention and tolerance, mood swings, conflict, withdrawal and repetition (Griffiths, 2005). For those with such symptoms, a smartphone becomes indispensable and the individual loses his or her ability to overcome issues that are encountered in everyday life (Gezgin et al., 2020). Smartphone addiction is regarded as one of the important psychological variables that have an adverse effect on human life and which researchers struggle to understand. Researchers conducting studies into smartphone addiction seek to gain insight into which variables smartphone addiction is linked. There are many studies on smartphone addiction in the literature and their numbers are growing by the day. Smartphone addiction has been found to be related with academic failure (Hawi & Samaha, 2016; Huang & Leung, 2009; Kibona & Mgaya, 2015), reduction in physical and social activities (Kim et al., 2015; Lepp et al., 2013; Yen et al., 2009), sleep disorders (Gezgin, 2018; Sahin et al., 2013; Thomée et al., 2011) and loneliness (Bian & Leung, 2015; Cosguner, 2012; Guzeller & Takao et al., 2009).

Additionally, there are remarkable studies that analyze the relationship between smartphone addiction and fear of missing out (FoMO) considered to be one of the reasons for the overuse of social media. FoMO is described as the modern fear of missing out of developments on social networks and failing to catch up to them (Przybylski et al., 2013). Another definition portrays FoMO as a social structure that is associated with the failure to access any kind of information in settings that include texts or multimedia (Hetz et al., 2015). Individuals spend long periods on social networks due to FoMO (Dossey, 2014). Overuse of social media increases the risk of developing social media addiction. Using smartphones to reach social network sites and displaying behaviours that lead to smartphone addiction are reported to be associated with FoMO (Coskun & Muslu, 2019; Fuster et al., 2017; Gezgin, 2018). Although FoMO affects a wide range of people, the young are more susceptible to FoMO. It is said that the tendency among teenagers towards FoMO and potential addictions may lead to several problems such as stress, insomnia and physical as well as mental developmental problems in young people (Biber, 2020). A study in the literature conducted with the participation of 296 people found that FoMO is significantly correlated with both problematic and social smartphone use (Wolniewicz et al., 2018). Another study undertaken by Tras and Oztemel (2019) on 608 university students demonstrated that FoMO was the most significant variable predicting problematic smartphone use. This study, in parallel with the literature, stresses that the need to be aware of others' social life activities, the concern that others may be leading more satisfying lives and fear of failing to catch up to developments put university students in a group that is at higher risk of smartphone addiction.

In addition, many academic data as well as the interactions of variables with one another show that FoMO and cyberloafing are correlated. Students' FoMO-related repeated technological device and social media use behaviours that they display during lessons are thought to be in close relation with a phenomenon that is defined as cyberloafing in the literature. This belief is supported by a study undertaken by Gezgin and Sarsar (2020) in which the reasons for cyberloafing in students were established, with addictions being shown among the "mental (psychological)" reasons. The term cyberloafing was coined by Lim (2002), who defined it as the use of the Internet inside working hours for purposes outside work, especially for personal purposes. It has also been defined as the use of the Internet in school settings for purposes other than education (Kalayci, 2010). The use of smartphones has recently increased particularly at universities both for mobile learning applications and as a source of reference. For example, one study found that students, when bored, resorted to their smartphones for various purposes, spent time on social network sites and stopped to tweet when doing homework (Lepp et al., 2015). Similarly, there are studies in the literature indicating that the rise in the use of social media increases cyberloafing behaviors in business or educational settings (Garrett & Danziger, 2008).

Cyberloafing behaviors were categorized under two headings as surfing activities and e-mail activities at the beginning when technology began gaining momentum (Lim, 2002). Akbulut et al. (2016) further expanded the scope of the factors in cyberloafing in a study. Today, cyberloafing behaviors are studied under five categories: sharing, shopping, real-time updating, accessing online content and gaming/gambling. Studies conducted into cyberloafing focus on negative circumstances that may arise due to cyberloafing. A study carried out by Gokcearslan et al. (2016) analyzed the relationship between cyberloafing and smartphone addiction and put forward that cyberloafing was among the predictors of smartphone addiction. Yet another study undertaken by Gokcearslan et al. (2018) similarly found a positive correlation between smartphone addiction and cyberloafing. Both these studies emphasize that any increase in cyberloafing will trigger an increase in the risk of smartphone addiction and its intensity. In another study conducted among 623 vocational school students, it was found that "the fear of isolation and curiosity", one of the sub-dimensions of the cyberloafing scale, had a greater impact on students' cyberloafing behaviors (Cinar et al. 2016). The conclusion of this study points to FoMO in terms of the "Curiosity" sub-dimension. One study including 702 teachers examined the existence of the relationship between FoMO and cyberloafing and it found a highly significantly positive relationship between FoMO and cyberloafing (Gullu & Serin, 2020). In another study conducted among 141 teacher candidates, a significant correlation between the FoMO levels of teacher candidates and their cyberloafing behaviors was established and it was found that FoMO was a significant precursor to cyberloafing behavior in terms of socialization. (Tozkoparan & Kuzu, 2019). Another study points out that any increase in the frequency with which smartphones are checked, a type of behavior that can be associated with cyberloafing, results in an increase in FoMO levels, as well (Hosgor et al. 2017).

As it is mentioned above, a large body of structural equation modeling besides the descriptive studies provide empirical evidence for the connections among smartphone addiction, cyberloafing and FoMO. Based upon the theoretical framework above, this study shows that cyberloafing, FoMO and smartphone addiction are interrelated. In light of these data, the mediating role of FoMO in the relationship between cyberloafing and smartphone addiction was analyzed. The variable chosen as the mediator variable in research is generally the structures that can be changed by working on and that include cognitive or emotional processes. In this study, the mediator variable FoMO provides this situation because FoMO is a situation in which the individual lives cognitively and emotionally, and educational technology and mental health specialists can work on this subject with an individual focus. The fact that no other previous study in the literature looked into the mediating effect of FoMO adds strength to the significance of this study. In conclusion, this study has sought to find an answer to the question "Does the FoMO play a mediating role in the relationship between cyberloafing and smartphone addiction in university students?".

2. Methodology

2.1. Research Model

This study, which aims to investigate whether FoMO plays a mediating role in the relationship between undergraduates' level of cyberloafing and their smartphone addiction, was designed with predictive correlational research in quantitative techniques (Karasar, 2011). In the predictive relational model, the relationships between variables are examined and a quantitative estimate is obtained about the effect of one of the variables on the dependent variable (Fraenkel & Wallen, 2009). Within the scope of the study designed with the relational model, the mediating role of fear of missing out on developments in the relationship between cyberloafing and smartphone addiction was investigated by structural equation modeling.

2.2. Participants

This study was conducted with the participation of 338 students who continue their formation education in the education faculty of a state university in the western part of Turkey and were reached by convenience

sampling method. The data used in the research were collected in the 2018-2019 academic year. Since the representational power of the sample groups is restricted, Fraenkel and Wallen (2009) point to the importance of the presentation of demographic data. Table 1 shows the demographic data of the research group.

Table 1.

Demographic data of the participants.

Variables	Categories	f	%
Gender	Female	239	70.7
	Male	99	29.3
Class	1	62	18.3
	2	24	7.1
	3	65	19.2
	4	113	33.4
	Graduate	74	21.9
Age	<19	19	5.6
	19-20-21-22	173	51.2
	>22	146	43.3

Table 1 shows that while 239 participants are females (70.7%), 99 are males (29.3%). 62 (18.3%) are freshmen, 24 (7.1%) are sophomores, 65 (19.2%) are juniors, 113 (33.4%) are seniors and 74 (21.8%) are graduates. 5.6% of the students are under the age of 19; 51.2 % are between 19 and 22 and 43.3% are over 22. The average age of the participants is 22.92.

2.3. Data Collection Tool

Data were collected using Demographic form, FoMO Scale, Smartphone Addiction Scale, and Cyberloafing Scale. Details of the scales are presented in this section.

2.3.1. Demographic Form

Along with these scales, the students were given a Personal Information Form containing information on gender, age, and grade level of education.

2.3.2. Fear of Missing Out Scale (FoMOs)

Developed by Przybylski et al. (2013), the scale measures the level of fear of missing out levels in individuals. It uses a 5-point Likert scale (1 = "Not at all true of me" to 5 = "Extremely true of me") and has 10 items. Possible scores to be obtained from the scale range between 10 and 50, with higher scores obtained denoting an increase in the level of FoMO in individuals. The scale was adapted to Turkish by Gokler et al. (2016). The adaptation study found the Cronbach alpha internal consistency coefficient to be .81 whereas this study found the internal consistency coefficient of the scale to be .77.

2.3.3. Smartphone Addiction Scale – Short Version (SAS-SV)

The study undertaken by Kwon et al. (2013) aims to reduce the number of items in the 33-item smartphone addiction scale previously developed by Kwon et al. (2013b). Sata and Karip (2018) carried out the adaptation work of SAS-SV to Turkish. The scale is made up of 10 items and uses 6-point Likert interpretation (1 = "Strongly disagree", 6 = "Strongly agree"). Scores to be obtained from the scale range between 10 and 60. In terms of reliability, Cronbach α coefficient was found to be .91. The reliability study found the Cronbach alpha internal consistency of the Turkish form of the scale to be .90. This study found the internal consistency coefficient of the scale to be .87.

2.3.4. Cyberloafing Scale

Developed by Akbulut et al. (2016), this scale measures the level of cyberloafing in individuals during class hours. It uses a 5-point Likert scale (1 = "Never", 5 = "A great extent") and it has 30 items. Scores to be

obtained from the scale range between 30 and 150, with higher scores obtained denoting higher levels of cyberloafing during class hours. The Cronbach alpha internal consistency coefficient for the entire scale was found to be .94. Sub-dimensions and internal consistency coefficients of each sub-dimension are as follows: "Sharing" .93; "Shopping" .88; "Real-time updating" .94; "Accessing online content" .94; "Gaming/Gambling". 81. The Cronbach alpha internal consistency of the scale in this study was found to be .92 while the internal consistency coefficients of the sub-dimensions were .88, .86, .91, .91, and .80, respectively.

2.4. Data Collection and Analysis

Before data collection, the students were informed about why the study was being conducted and how the data to be obtained from the study would be put to use and this was followed by the collection of data from volunteering students who responded to the set of scales presented to them. Once collected, data were transferred to an electronic platform and analyzed with the use of SPSS Windows 22 and Lisrel 8.80 programs.

This study, which aims to determine the correlative network between the students' cyberloafing, FoMO and smartphone addiction, looked first and foremost at the descriptive statistics and correlation coefficients of the variables of the research. This was followed by the application of Structural Equation Modeling (SEM) in line with the recommendations of Anderson and Gerbing (1988) and Kline (2015). Subsequently, the measurement model and the hypothetical structural model were tested. By comparison with the techniques such as regression, SEM handles such complex research problems as the modelling of the relations between dependent and independent variables in a systematic fashion (Anderson & Gerbing, 1988). Additionally, this method is based on theory and acknowledges the existence of the causality structure between latent variables (Yilmaz, 2004).

This study made use of the method devised by Baron and Kenny (1986). According to this method, four hypotheses need to be tested to support the mediating factor. Firstly, there has to be a significant correlation between independent and dependent variables. Secondly, there has to be a significant correlation between the independent variable(s) and the mediator(s). Next, there has to be a significant correlation between the mediator(s) and the dependent variable(s). Finally, if the inclusion of the mediator(s) in the model causes a statistically insignificant correlation between the independent variable and the dependent variable, then this is acknowledged as full mediation. Partial mediation, on the other hand, arises when the correlation between the dependent and independent variable does not get insignificant but the strength of the correlation diminishes (Simsek & Demir, 2013).

In order to see whether the data collected supported the model, a two-stage method was employed that is frequently used in the SEM literature. In the first part of the analysis, the measurement model was tested (Huchting et al., 2008 as cited in Dursun & Kocagoz, 2010) and an assessment was made to see whether the measurements of the structures in the model provided accurate reflections. In the second part, the structural model was tested that had been devised on the basis of theoretical background. The structural model creates methods that establish a relation of causality between variables, with the significance of the model being investigated by evaluating the goodness-of-fit statistics of the model. In this study, along with the chi square ($\chi 2$), GFI, CFI, NFI, IFI, SRMR, RMSEA and %90 CI for RMSEA values were presented as goodness-of-fit statistics. Figures deemed to be within the acceptable limit were: $\chi 2/sd \leq 5$; GFI, CFI, NFI, AGFI and IFI $\geq .90$; RMSEA and SRMR $\leq .080$ (Hu & Bentler, 1999; MacCallum et al. 1996; Maydeu-Olivares et al. 2018; Tabachnick & Fidell, 2001). The fact that goodness-of-fit indexes turn out to be good does not necessarily mean that the model is entirely correct; instead, it shows the model to be reasonable or acceptable (Kaya & Altinkurt, 2018).

Since the cyberloafing scale has five sub-dimensions, these sub-dimensions were included in the model as observed variables. As for the FoMO and smartphone addiction, item parceling was used, for they have single dimensions. As such, each variable was divided into two parcels, with each parcel being included in

the model as the observed variables of each latent variable. With item parceling, virtual factors (ensuring that total factor loadings of the items in each parcel are close) of the latent variable are created.

Before testing the hypothetical structural model, it is examined whether the data meet the prerequisites of structural equation modeling. Within the scope of the preconditions, firstly missing values and outliers were examined. Upon inspection of the sets of scales filled in by the students, 11 forms were discarded for reasons of missing value (not answering or giving identical answers no matter the questions etc.). Following this, of the 347 sets of scales, 9 were excluded from the analysis, for they were not within the acceptable z-value range (outliers) ($z \geq 3$). As such, the analysis of the data was performed using 338 sets of scales. Afterwards, the skewness and kurtosis values of the variables were examined within the scope of normality analysis. The skewness and kurtosis values of FoMO, cyberloafing and smartphone addiction were found to be .07, -.25, .43 and -.46, -.73, -.57, respectively, which shows that there was no significant deviation in normal distribution for any variable according to the criteria established by Finney and DiStefano (2006) for normality assumption. The linearity assumption, which means that there is a linear relationship between the variables, was examined through scatter plots (Tabachnick & Fidell, 2001) and it was seen that the data set met the linearity assumption. After examining the preconditions, the findings of the analyzes carried out within the scope of the research are presented.

3. Findings

Findings obtained through analyses were presented under three headings. Firstly, correlation coefficients showing the correlations between FoMO, smartphone addiction and cyberloafing variables are reported. Secondly, the measurement model was explained. Finally, the results of the structural model were presented.

3.1. Correlation Values of the Variables

In order for the first three hypotheses of Baron and Kenny (1986) to be satisfied, there must be statistically significant correlations between the variables. Table 2 shows the correlations for all variables.

Table 2.

Correlation values of the variables used in the model.

Variables	1	2
1.Fear of missing out	-	
2.Cyberloafing	.33**	-
3.Smartphone addiction	.52**	.34**

Notes: N = 338, ** p<.01

Inter-variable correlations displayed in Table 2 shows that all the variables in the study have significant correlations between one another. The level of FoMO was found to have a positive correlation with that of cyberloafing (r (338) = .33; p<.01). Similarly, cyberloafing is positively correlated with smartphone addiction (r (338) = .34; p<.01). Additionally, FoMO has a positive correlation with smartphone addiction (r (338) = .52; p<.01).

3.2. Testing of the Measurement Model

The measurement model was tested firstly in SEM. The measurement model shows the relationships between the latent variables and the observed variables. Anderson and Gerbing (1988) recommended that the measurement scale be tested first before the structural model test was tested. The measurement scale has three latent variables (cyberloafing, FoMO and smartphone addiction) and nine observed variables that bring about these latent variables. After the measurement scale was subjected to testing, the cyberloafing scale was found have an insignificant p-value in the sharing sub-dimension (t = 1.49, p>.05). As such, the eighth item was removed from the analysis as it barely contributed to the sharing sub-dimension of the cyberloafing scale. Subsequent to this removal, all path coefficients were found to be significant and the

factor loadings were found to range between .44 and .90. The analysis of the goodness-of-fit values of the scale [$\chi 2$ (22, 338) = 65.24, $\chi 2$/sd = 2,97, p<.001; GFI = .96; CFI = .96; NFI = .94; AGFI = .91; IFI = .96; SRMR = .058; RMSEA = .076] indicated that the scale fitted within an acceptable range and that it was confirmed.

3.3. Testing of the Structural Model

In order to determine the correlative network between the students' cyberloafing, FoMO and smartphone addiction, the model in which the FoMO had a full mediation role between cyberloafing and smartphone addiction was tested first in the hypothetical structural model. The mediation test was conducted using Maximum Likelihood Estimation Method. In models where full mediation is to be found, no path links the dependent variable with the independent variable and the relationship between these two variables is established by the mediator variable (Satici & Deniz, 2019). Acceptable goodness-of-fit values support the model in which the FoMO had full mediation: $\chi 2$ (23, 338) = 69,78, p<.01; GFI = .96; CFI = .95; NFI = .93; IFI = .95; SRMR = .063; RMSEA = .078 (%90 CI for RMSEA = 0.057; 0.099). Following the testing of the full mediation, the partial mediation role of FoMO in the relationship between cyberloafing and smartphone addiction was tested with a view to establishing the best model. In the partial mediation model, a direct path links cyberloafing to smartphone addiction. The goodness-of-fit statistics of the structural model where the FoMO had partial mediation are as follows: $\chi 2$ (22, 338) = 65,24, p<.01; GFI = .96; CFI = .96; NFI = .94; IFI = .96; SRMR = .058; RMSEA = .076 (%90 CI for RMSEA = 0.055 ; 0.098). As a result of the testing of partial mediation, the goodness-of-fit statistics were found to be within the acceptable range and they were shown to be better by comparison with the values obtained after the testing of the full mediation model. Additionally, the fact that the path linking cyberloafing to smartphone addiction is significant (β = .15, p<.05) supports partial mediation. In partial mediation, the path linking the dependent variable to the independent variable did not get insignificant with the presence of the mediating variable.

According to the results of the chi-square difference test that aimed to decide which of the models, where the FoMO had a full or a partial mediation, were to be preferred, it was established that the direct path linking cyberloafing and smartphone addiction provided a significant contribution ($\Delta\chi 2$ = 4,54, sd = 1, p<.05), showing that partial mediation model was more preferable. In addition, because the path coefficients in the partial mediation model were all significant (including the path between cyberloafing and smartphone addiction), the partial mediation structural model was determined to be the best model. Figure 1 shows the path coefficients regarding the preferred model.

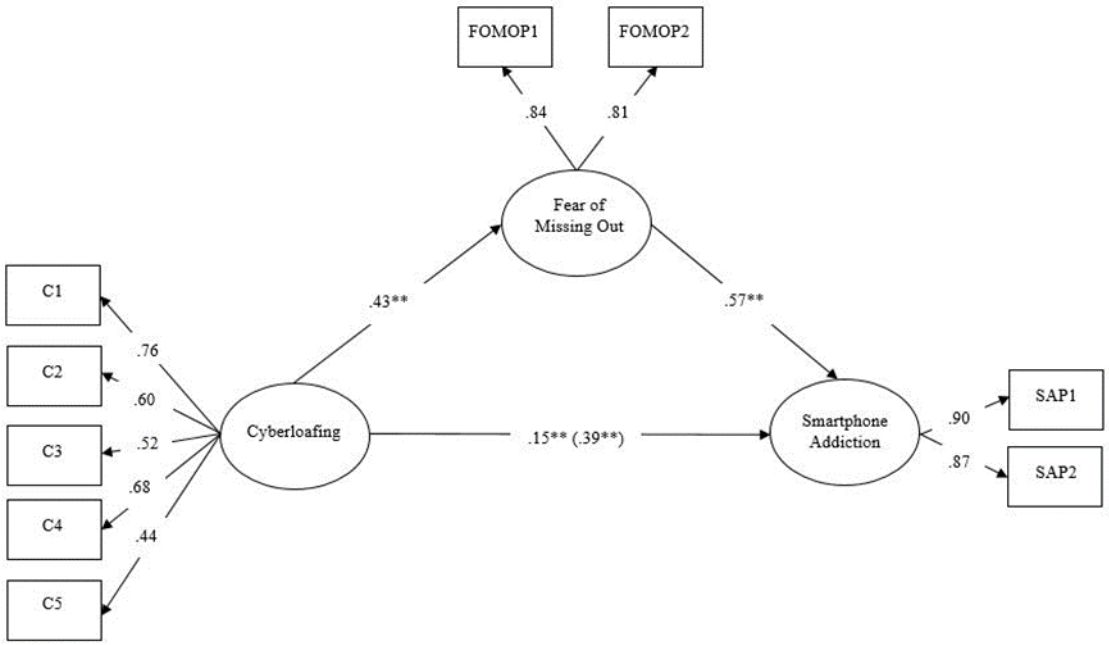

Fig. 1. The standardized parameter values of the recommended structural model (*t* values).

Notes: N= 338; straight lines show significant paths; the number in parenthesis shows the correlation coefficient before the mediating variable was included in the model; C1-C5 variables are the sub-dimensions of Cyberloafing Scale. FOMOP1 and FOMOP2 are the parcels of the fear of missing out variable. SAP1 and SAP2 are the parcels of the smartphone addiction variable. All the parameter values are significant (p<.01).

3.4. Bootstrapping Process

According to the bootstrapping test conducted to see whether or not cyberloafing's indirect role is significant in its prediction of smartphone addiction through FoMO, the indirect effect was found to be significant (β = .294, %95GA = .197, .391). Percentile upper and lower endpoint confidence interval values in Bootstrapping do not include the zero value. With all the data obtained, it is safe to say that FoMO has a mediating role in the relationship between cyberloafing and smartphone addiction.

4. Discussion and Conclusion

The study seeks to find answer to the following question: "Does FoMO play a mediating part in the relationship between cyberloafing and smartphone addiction in university students?" Data collected through analyses on the basis of this question were compared to the findings of similar studies in the literature. The first finding of the study suggests that the rise in the students' tendency towards cyberloafing increases smartphone addiction. Similarly, a study of 598 undergraduates by Gokcearslan et al. (2016) suggests that the duration of smartphone use and cyberloafing are positively correlated to smartphone addiction. Another study of 885 undergraduates by Gokcearslan et al. (2018) reports that there is a positive correlation between cyberloafing and smartphone addiction. Gozum et al. (2020), in a study conducted with 306 pre-school teacher candidates, found that smartphone addiction increased with the increase in cyberloafing in the classroom. Saritepeci (2019), in his study with 269 high school freshmen, states that students' smartphone addiction levels are one of the main predictors of cyberloafing behaviors. As can be seen, cyberloafing behaviors can have negative effects in terms of smartphone addiction on students.

The second finding of the study suggests that there is a significantly positive correlation between undergraduates' FoMO levels and smartphone addiction. According to this finding, FoMO on

developments on social networks trigger heavy and risky smartphone use, thereby increasing the risk of smartphone addiction in university students. Indeed, a number of studies point to a significantly positive correlation between FoMO and smartphone addiction, describing FoMO as one of the predictors of smartphone addiction (Elhai et al., 2016; Gezgin, 2018; Tunc-Aksan & Evin-Akbay, 2019; Wolniewicz et al., 2018). A study conducted by Coşkun and Muslu (2019) on 1630 teenagers reported a positive correlation between FoMO and smartphone addiction among teenagers. One reason for this was found to be the widespread use of social network applications. A study conducted by Elhai et al. (2018) established a positive relationship between FoMO and smartphone addiction with the participation of 296 undergraduate students, emphasizing the potential mediator role of the negative mood variable in the relationship between FoMO and smartphone addiction.

The third finding of the study found a positive correlation between cyberloafing and FoMO. The literature contains similar studies, which reveal significantly positive correlations between cyberloafing and FoMO (Gullu & Serin, 2020; Tozkoparan & Kuzu, 2019). In addition to these studies, Senel et al. (2019) applied the Cyberloafing Behavior Scale to 124 university students and asked why they showed these behaviors. According to the findings of the study, among the reasons for cyberloafing are the notifications students receive on their smartphones, their desire to communicate, feelings of curiosity and the need to spend time more pleasurably. Since the reason "feelings of curiosity" is an important indicator of FoMO, it points to a correlation between cyberloafing and FoMO (Senel et al., 2019). A study seeking to establish a potential relationship between cyberloafing and FoMO found that university students displayed cyberloafing behaviours by accessing online content and sharing it during lessons (Gezgin & Sarsar, 2020). Sharing online content and using social networking sites to access online content are behaviors associated with the belief that FoMO is the driving force for the use of social media (Bányai et al. 2017; Przybylski et al., 2013). Additionally, as far as the effects of cyberloafing and FoMO are concerned, the FoMO levels of students increase when students are overly engaged in interactions on social media during lessons, as a result of which students become less likely to concentrate on schoolwork and more likely to adopt superficial learning approaches (Rozgonjuk et al., 2019).

Lastly, a careful analysis of the findings of the study demonstrates that FoMO plays a partly mediating role in the effect of university students' tendency towards cyberloafing upon smartphone addiction. In a study conducted by Dursun et al. (2018), the reasons for cyberloafing were documented. Some of the opinions of undergraduates are in support of FoMO's mediating role. The following sentences are remarkable for the relationship between FoMO and addiction: "Socials networks are becoming an addiction", "Addiction causes you to frequently visit social networks" and "When you are addicted, you have to visit the social networks again and again." These views reveal the addictive role of FoMO in university students' cyberloafing behaviors. Individuals concerned about not being able to log on to their networks may develop over time instinctive checking behaviors (Kuss & Griffiths, 2017). Another study looked into the relationship between superficial learning and FoMO and concluded that individuals experiencing high levels of FoMO are constantly in anticipation of notifications, increasing their risk of establishing interactions with others at the expense of learning tasks (Rozgonjuk et al. 2019). A study by Gezgin and Mihci (2020) among students from the Sports Faculty revealed that the Instagram application might be linked to a FoMO on things, accounting for smartphone addiction. Popular with university students, the Instagram application can be said to have an effect upon students' cyberloafing behaviours during lessons. In addition to the cyberloafing behavior, FoMO, accompanied by a feeling of curiosity, may lead to the formation of an addictive behavior as in the case of smartphone addiction. Another study into the daily duration of smartphone use and the frequency with which the smartphone is used highlighted the effect of smartphone use upon smartphone addiction (Gokcearslan et al., 2016). According to this study, the frequency of smartphone use may be shown to be a sign of cyberloafing and FoMO, both of which can lead to smartphone addiction.

The findings of the study offer a way of research by which strategies can be developed in order to prevent smartphone addiction among university students as well as reduce the adverse effects of smartphone addiction on students' academic and daily lives. University students tend to get in touch with one another and organize events in and out of the classroom by means of smartphones (Ting & Chen, 2020). However, cyberloafing (Selwyn, 2008), defined as the use of smartphones in school settings for irrelevant activities, has come to be seen as a problem as a result of an increase in the use of technological devices for several reasons. As specified in the study, this problem poses a risk for smartphone addiction. Academics and teachers should take certain precautions so as to prevent cyberloafing during in-class activities. There is every reason to believe that smartphone and cyberloafing behaviors may develop into a habit in time, which in turn may trigger smartphone addiction. As such, lectures and technological integration at universities should be updated in accordance with the structure of the Generation Z (Nagy & Kolcsey, 2017), and academics should make sure they have adequate communication skills and expertise in their field, being able to construct their lectures in a way that motivates and appeals to the students (Dursun et al., 2018; Ergun & Altun, 2012). In addition, the findings of the study demonstrate that cyberloafing behaviors may increase smartphone addiction by means of FoMO. When using social networking sites for educational purposes during lectures, academics should know that FoMO might carry a risk in terms of the heavy use of social networking sites; thus, keeping this in mind may be useful in terms of the prevention of addiction and the efficiency of learning in the classroom.

5. Suggestions and Limitations

As a result of the study, some suggestions are presented for field workers, educators, other researchers. In terms of cyberloafing, it is necessary to create enriched and interesting environments for the Z generation in addition to traditional teaching methods in the lessons of educators. In addition, attention should be paid to the use of social networks in lessons and not to the use of social network mechanisms that support FoMO. Because, considering the effects of negative situations such as cyberloafing and smartphone addiction on students, it would be appropriate to use technological applications that will not be triggered by FoMO in the lessons. It should not be forgotten that a social network application that includes extracurricular sharing and instant stories might cause negative effects on some students in terms of FoMO and other variables. Besides, in university classrooms where smartphones are freely available, moving from traditional methods (PowerPoint presentation, etc.) to educational environments that appeal more to the Z generation, to make the lessons more interesting and provide motivation, may be preventive in terms of cyberloafing.

Other mediation models in which different mediation variables are considered rather than fear of missing out may be examined on the link between cyberloafing and smartphone addiction. Finally, self-report measures were used to collect the data. Therefore, different methods can be used to collect data in future studies.

The study has certain limitations. Some institutions affiliated with the Ministry of Education have recently taken precautions to prevent actions associated with cyberloafing. Such measures involve switching off smartphones during lessons. For this reason, the study had to exclude teenagers and worked with university students as participants. Therefore, using different populations could be helpful to improve reliability.

References

Akbulut, Y., Dursun, O. O., Donmez O., & Sahin, Y. L. (2016). In search of a measure to investigate cyberloafing in educational settings. *Computers in Human Behavior, 55*, 616-625. https://doi.org/10.1016/j.chb.2015.11.002

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411-423. https://doi.org/10.1037/0033-2909.103.3.411

Bányai, F., Zsila, Á., Király, O., Maraz, A., Elekes, Z., Griffiths, M. D., … Demetrovics, Z. (2017). Problematic social media use: Results from a large-scale nationally representative adolescent sample. *PLoS ONE, 12*(1), e0169839. https://doi.org/10.1371/journal.pone.0169839

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173–1182. https://doi.org/10.1037//0022-3514.51.6.1173

Bian, M., & Leung, L. (2015). Linking loneliness, shyness, smartphone addiction symptoms, and patterns of smartphone use to social capital. *Social Science Computer Review, 33*(1), 61-79. https://doi.org/10.1177/0894439314528779

Biber, L. (2020). Social media, FoMO and intergenerational differentiation. *Journal of Economics and Management Research, 9*(1), 26-43.

Billieux, J., Maurage, P., Lopez-Fernandez, O., Kuss, D. J., & Griffiths, M. D. (2015). Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Current Addiction Reports, 2*(2), 156–162. https://doi.org/10.1007/s40429-015-0054-y

Choliz, M. (2012). Mobile-phone addiction in adolescence: The test of mobile phone dependence. Progress in Health Science, 2(1), 33-44.

Cinar, H., Bengul, S. S., & Keskin, N. (2016). The effect of fear of missing out on cyberloafing. *5th International Vocational Schools Symposium* – 18-20 May, Prizren-Kosovo.

Coskun, S., & Muslu, G. K. (2019). Investigation of problematic mobile phones use and fear of missing out (FoMO) level in adolescents. *Community Mental Health Journal, 55*(6), 1004-1014. https://doi.org/10.1007/s10597-019-00422-8

Dereli, N. & Sahin Izmirli, O. (2022). Research on the cyberloafing levels of middle school students. *Journal of Educational Technology & Online Learning, 5*(4), 825-849. https://doi.org/10.31681/jetol.1146420

Dossey, L. (2014). FOMO, digital dementia, and our dangerous experiment. *Explore: The Journal of Science and Healing, 10*(2): 69-73. https://doi.org/10.1016/j.explore.2013.12.008

Dursun, O. O., Donmez, O., & Akbulut, Y. (2018). Predictors of cyberloafing among preservice information technology teachers. *Contemporary Educational Technology, 9*(1), 22-41. https://doi.org/10.30935/cedtech/6209

Dursun, Y., & Kocagoz, E. (2010). Structural equation modeling and regression: A comparative analysis. *Erciyes University Journal of Faculty of Economics and Administrative Sciences, 0*(35), 1-17.

Elhai, J. D., Levine, J. C., Alghraibeh, A. M., Alafnan, A. A., Aldraiweesh, A. A., & Hall, B. J. (2018). Fear of missing out: Testing relationships with negative affectivity, online social engagement, and problematic smartphone use. *Computers in Human Behavior, 89*, 289-298. https://doi.org/10.1016/j.chb.2018.08.020

Elhai, J. D., Levine, J. C., Dvorak, R. D., & Hall, B. J. (2016). Fear of missing out, need for touch, anxiety and depression are related to problematic smartphone use. *Computers in Human Behavior, 63*, 509–516. https://doi.org/10.1016/j.chb.2016.05.079

Ergun, E., & Altun, A. (2012). The student's perspective of cyberloafing and its causes. *Educational Technology Theory and Practice, 2*(1), 36-53.

Finney, S. J., & DiStefano, C. G. (2006). Non-normal and categorical data in structural equation modeling. G. R. Hancock ve R. O. Mueller (Ed.), *Structural equation modeling: A second course* at (269-314). Greenwich, CT: Information Age.

Fraenkel, J. R., & Wallen, N. E. (2009). *How to design and evaluate research in education,* 7th Edt., Pearson: London.

Fuster, H., Chamarro, A., & Oberst, U. (2017). Fear of missing out, online social networking and mobile phone addiction: A latent profile approach. *Aloma: Revista de Psicologia, Ciències de l'Educació i del'Esport, 35*(1), 1. https://doi.org/10.51698/aloma.2017.35.1.22-30

Garrett, R. K., & Danziger, J. N. (2008). On cyberslacking: workplace status and personal internet use at work. *CyberPsychology & Behavior, 11*(3), 287–292. https://doi.org/10.1089/cpb.2007.0146

Gezgin, D. M. (2018). Understanding patterns for smartphone addiction: age, sleep duration, social network use and fear of missing out. *Cypriot Journal of Educational Sciences, 13*(2), 166-177. https://doi.org/10.18844/cjes.v13i2.2938

Gezgin, D. M., & Mihci, C. (2020). Smartphone addiction in undergraduate athletes: Reasons and effects of using Instagram intensively. *International Journal of Technology in Education and Science, 4*(3), 188-202. https://doi.org/10.46328/ijtes.v4i3.106

Gezgin, D. M., & Sarsar, F. (2020). The views of the students that are studying in the department of CEIT on the situation of cyberloafing: a mixed method study. *Turkish Journal of Social Research, 24*(1), 243-256.

Gezgin, D. M., Hamutoglu, N. B., Samur, Y.., & Yildirim, I. S. (2018). A spreading addiction among young generation: An examination of smartphone addiction according to gender, academic success and mobile game playing variables, *Educational Technology Theory and Practice, 8*(2), 212-231.

Gezgin, D. M., Ummet, D., & Hamutoglu, N. B. (2020). Smartphone addiction in university students: The predictive role of multidimensional loneliness. *Trakya Journal of Education, 10*(2), 317-329.

Gokcearslan, S., Mumcu, F. K., Haslaman, T., & Cevik, Y. D. (2016). Modelling smartphone addiction: The role of smartphone usage, self-regulation, general self-efficacy and cyberloafing in university students. *Computers in Human Behavior, 63*, 639–649. https://doi.org/10.1016/j.chb.2016.05.091

Gokcearslan, S., Uluyol, C., & Sahin, S. (2018). Smartphone addiction, cyberloafing, stress and social support among university students: A path analysis. *Children and Youth Services Review, 91*, 47-54. https://doi.org/10.1016/j.childyouth.2018.05.036

Gokler, M. E., Aydin, R., Unal, E., & Metintas, S. (2016). Determining validity and reliability of Turkish version of fear of missing out scale. *Anatolian Journal of Psychiatry, 17*(Suppl.1), 53-59. https://doi.org/10.5455/apd.195843

Gozum, A. I. C., Erkul, R., & Aksoy, N. (2020). Use of smartphones in class: Examining the relationship between m-learning readiness, cyberloafing, nomophobia and addiction variables. *International Journal of Progressive Education, 16*(6), 94-120. https://doi.org/10.29329/ijpe.2020.280.6

Griffiths, M. D. (2005). A "components" model of addiction within a biopsychosocial framework. *Journal of Substance Use, 10*(4), 191–197. https://doi.org/10.1080/14659890500114359

Gullu, B., & Serin, H. (2020). The relationship between fear of missing out (FoMO) levels and cyberloafing behaviour of teachers. *Journal of Education and Learning, 9*(5), 205-214. https://doi.org/10.5539/jel.v9n5p205

Guzeller, C. O., & Cosguner, T. (2012). Development of a problematic mobile phone use scale for Turkish adolescents. *CyberPsychology, Behavior, and Social Networking, 15*(4), 205–211. https://doi.org/10.1089/cyber.2011.0210

Haug, S., Castro, R.P., Kwon, M., Filler, A., Kowatsch, T., & Schaub, M.P. (2015). Smartphone use and smartphone addiction among young people in Switzerland. *Journal of Behavioral Addictions 4*(4), 299–307. https://doi.org/10.1556/2006.4.2015.037

Hawi, N. S., & Samaha, M. (2016). The relations among social media addiction, self-esteem, and life satisfaction in university students. *Social Science Computer Review, 35*(5), 576–586. https://doi.org/10.1177/0894439316660340

Hetz, P. R., Dawson, C. L., & Cullen, T. A. (2015). Social media use and the fear of missing out (FoMO) while studying abroad. *Journal of Research on Technology in Education, 47*(4), 259-272. https://doi.org/10.1080/15391523.2015.1080585

Hosgor, H., Koc-Tutuncu, S., Gunduz-Hoşgör, D., & Tandogan, O. (2017). Examination in terms of different variables of prevalence of fear of missing out among college students. *International Journal of Academic Value Studies, 3*(17), 213-223.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1-55. https://doi.org/10.1080/10705519909540118.

Huang, H., & Leung, L. (2009). Instant messaging addiction among teenagers in China: Shyness, alienation, and academic performance decrement. *CyberPsychology & Behavior, 12*(6), 675–679. https://doi.org/10.1089/cpb.2009.0060

Kalayci, E. (2010). *Investigation of relationship between cyberloafing and self-regulated learning strategies among undergraduate students* (Unpublished doctoral dissertation). Hacettepe University, Ankara, Turkey.

Karasar, N. (2011). *Bilimsel araştırma yöntemi [Scientific research methodologies],* 21st Edt., Nobel Academy Publishing: Ankara, Turkey.

Kaya, C., & Altinkurt, Y. (2018). Role of psychological and structural empowerment in the relationship between teachers' psychological capital and their levels of burnout. *Education and Science, 43*(193), 63-78. https://doi.org/10.15390/EB.2018.6961.

Kibona, L., & Mgaya, G. (2015). Smartphones' effects on academic performance of higher learning students. *Journal of Multidisciplinary Engineering Science and Technology, 2*(4), 777-784.

Kim, S.-E., Kim, J.-W., & Jee, Y.-S. (2015). Relationship between smartphone addiction and physical activity in Chinese international students in Korea. *Journal of Behavioral Addictions, 4*(3), 200–205. https://doi.org/10.1556/2006.4.2015.028

Kline, R. B. (2015). *Principles and practice of structural equation modeling.* Guilford Press: New York.

Kumcagiz, H., & Gunduz, Y. (2016). Relationship between psychological well-being and smartphone addiction of university students. International *Journal of Higher Education, 5*(4). https://doi.org/10.5430/ijhe.v5n4p144

Kuss, D., & Griffiths, M. (2017). Social networking sites and addiction: Ten lessons learned. *International Journal of Environmental Research and Public Health, 14*(3), 311. https://doi.org/10.3390/ijerph14030311

Kwon, M., Kim, D. J., Cho, H., & Yang, S. (2013). The smartphone addiction scale: Development and validation of a short version for adolescents. *Plos One, 8*(12), e83558. https://doi.org/10.1371/journal.pone.0083558

Kwon, M., Lee, J. Y., Won, W. Y., Park, J. W., Min, J. A., Hahn, C., … Min, J. A. (2013b). Development and validation of a smartphone addiction scale (SAS). *Plos One, 8*(2), e56936. https://doi.org/10.1371/journal.pone.0056936

Lepp, A., Barkley, J. E., & Karpinski, A. C. (2015). The Relationship Between Cell Phone Use and Academic Performance in a Sample of U.S. College Students. *SAGE Open, 5*(1), 215824401557316. https://doi.org/10.1177/2158244015573169

Lepp, A., Barkley, J. E., Sanders, G. J., Rebold, M., & Gates, P. (2013). The relationship between cell phone use, physical and sedentary activity, and cardiorespiratory fitness in a sample of U.S. college students. *International Journal of Behavioral Nutrition and Physical Activity, 10*(1), 79. https://doi.org/10.1186/1479-5868-10-79

Lim, V. K. G. (2002). The IT way of loafing on the job: cyberloafing, neutralizing and organizational justice. *Journal of Organizational Behavior, 23*(5), 675–694. https://doi.org/10.1002/job.161

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological Methods, 1*(2), 130-149. https://doi.org/10.1037/1082-989X.1.2.130

Maydeu-Olivares, A., Shi, D., & Rosseel, Y. (2018). Assessing fit in structural equation models: A Monte-Carlo evaluation of RMSEA versus SRMR confidence intervals and tests of close fit. *Structural Equation Modeling: A Multidisciplinary Journal, 25*(3), 389–402. https://doi.org/10.1080/10705511.2017.1389611

Nagy, Á., & Kolcsey, A. (2017). Generation alpha: Marketing or science? *Acta Technologica Dubnicae, 7*(1), 107-115. https://doi.org/10.1515/atd-2017-0007

Noyan, C. O., Enez-Darcin, A., Nurmedov, S., Yilmaz, O., & Dilbaz, N. (2015). Validity and reliability of the Turkish version of the Smartphone Addiction Scale-Short Version among university students. *Anatolian Journal of Psychiatry, 16*(Special issue.1), 73-81.

Oberst, U., Wegmann, E., Stodt, B., Brand, M., & Chamarro, A. (2017). Negative consequences from heavy social networking in adolescents: The mediating role of fear of missing out. *Journal of Adolescence, 55*, 51-60. https://doi.org/10.1016/j.adolescence.2016.12.008

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computer in Human Behaviours, 29*(4), 1841-1848. https://doi.org/10.1016/j.chb.2013.02.014

Rozgonjuk, D., Elhai, J. D., Ryan, T., & Scott, G. G. (2019). Fear of missing out is associated with disrupted activities from receiving smartphone notifications and surface learning in college students. *Computers & Education,* https://doi.org/10.1016/j.compedu.2019.05.016

Sahin, S., Ozdemir, K., Unsal, A., & Temiz, N. (2013). Evaluation of mobile phone addiction level and sleep quality in university students. *Pakistani Journal of Medical Sciences, 29*(4). https://doi.org/:10.12669/pjms.294.3686

Salehan, M., & Negahban, A. (2013). Social networking on smartphones: When mobile phones become addictive. *Computers in Human Behavior, 29*(6), 2632–2639. https://doi.org/10.1016/j.chb.2013.07.003

Saritepeci, M. (2019). Predictors of cyberloafing among high school students: unauthorized access to school network, metacognitive awareness and smartphone addiction. *Education and Information Technologies, 25*, 2201–2219. https://doi.org/10.1007/s10639-019-10042-0

Sata, M., & Karip, F. (2018). Turkish culture adaptation of smartphone addiction scale-short version for adolescents. *Cumhuriyet International Journal of Education, 6*(4), 426-440. https://doi.org/10.30703/cije.346614

Satici, S. A., & Deniz, M. E. (2019). Adolescents' self-perception and school satisfaction: Assessing the mediating role of subjective vitality. *Education and Science, 44*(197), 367-381. https://doi.org/10.15390/EB.2019.7289

Selwyn, N. (2008). A safe haven for misbehaving? An investigation of online misbehavior among university students. *Social Science Computer Review, 26*(4), 446-465. https://doi.org/10.1177/0894439307313515

Senel, S., Gunaydin, S., Saritas, M. T., & Cigdem, H. (2019). The factors predicting cyberloafing behaviors of undergraduate students. *Kastamonu Educational Journal, 27*(1), 95-105. https://doi.org/10.24106/kefdergi.2376

Simsek, O. F., & Demir, M. (2013). Parental support for basic psychological needs and happiness: The importance of sense of uniqueness. *Soc Indic Res, 112*, 661-678. https://doi.org/10.1007/s11205-012-0075-z

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics.* 4th. Edt. Boston, MA: Allyn & Bacon.

Takao, M., Takahashi, S., & Kitamura, M. (2009). Addictive personality and problematic mobile phone use. *CyberPsychology & Behavior, 12*(5), 501–507. https://doi.org/10.1089/cpb.2009.0022

Thomée, S., Härenstam, A., & Hagberg, M. (2011). Mobile phone use and stress, sleep disturbances, and symptoms of depression among young adults - a prospective cohort study. *BMC Public Health, 11*(1). https://doi.org/10.1186/1471-2458-11-66

Ting, C. H., & Chen, Y. Y. (2020). Smartphone addiction. In *Adolescent addiction* (pp. 215-240).Academic Press. https://doi.org/10.1016/B978-0-12-818626-8.00008-6

Tozkoparan, S. B., & Kuzu, A. (2019). The relationship between fear of missing out (FoMO) levels and cyberloafing behaviors of teacher candidates. *Anatolian Journal of Educational Sciences International, 9*(1), 87-110. https://doi.org/10.18039/ajesi.520825

Tras, Z., & Oztemel, K. (2019). Examining the relationships between Facebook intensity, fear of missing out, and smartphone addiction. *Addicta: The Turkish Journal on Addictions, 6*(1), 91-113. https://doi.org/10.15805/addicta.2018.6.1.0063

Tunc-Aksan, A., & Evin-Akbay, S. (2019). Smartphone addiction, fear of missing out, and perceived competence as predictors of social media addiction of adolescents. *European Journal of Educational Research, 8*(2), 559-566. https://doi.org/10.12973/eu-jer.8.2.559

Wolniewicz, C. A., Tiamiyu, M. F., Weeks, J. W., & Elhai, J. D. (2018). Problematic smartphone use and relations with negative affect, fear of missing out, and fear of negative and positive evaluation. *Psychiatry Research, 262*, 618-623. https://doi.org/10.1016/j.psychres.2017.09.058

Yen, C.-F., Ko, C.-H., Yen, J.-Y., Chang, Y.-P., & Cheng, C.-P. (2009). Multi-dimensional discriminative factors for Internet addiction among adolescents regarding gender and age. *Psychiatry and Clinical Neurosciences, 63*(3), 357–364. https://doi.org/10.1111/j.1440-1819.2009.01969.x

Yilmaz, V. (2004). Consumer behaviour of shopping center choice. *Social Behavior and Personality an International Journal, 32*(8), 783-790. https://doi.org/10.2224/sbp.2004.32.8.783

Yusufoglu, O. (2017). Smart phones as leisure activities and their impact on social life: A research on students of the university. *Journal of the Human and Social Science Researches, 6*(5). 2414-2434.