Analysis of the Relationship between University Students' Problematic Internet Use and Loneliness

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Abstract: The computer is part of the information and communication age, and the Internet today is the most used communication tool. Studies have shown that there is a relationship between problematic Internet use and loneliness. The aim of this study was to investigate the relationship between problematic Internet use sub-scales and loneliness. In this study, data were collected from the college students at an Anatolian University in Turkey. The participants of this study consisted of 392 undergraduates. Of the participants, 43% are male (n = 167) and 57% female (n = 225). The average age for the participants is 22 years old. The Problematic Internet Use Scale and the University of California, Los Angeles (UCLA) Loneliness Scale were used as data collection instruments. In the present study, structural equation modeling (SEM) procedures are used to explore the relationships that exist among the variables. The findings of the study revealed that while university students' social benefit/social comfort of Internet has a direct effect on their excessive Internet use and negative consequences, it is related to the loneliness level indirectly. In addition, it is seen in the research model that with an increase in the negative consequences of the Internet, the loneliness level was raised. Another result from the study is that when university students' excessive Internet use increased, their loneliness level decreased.

1. INTRODUCTION

The computer is part of the information and communication age, and the Internet today is the most used communication tool (Koc & Ferneding, 2013). Quick access to the information provided by the Internet is rapidly increasing the ability of individuals to communicate without time and space limitations. The negative effect of increased Internet use on social interaction is considered to be one of the disadvantages and may be associated with feelings of loneliness (Ceyhan, Ceyhan, & Gurcan, 2007; Demirer, Bozoglan, & Sahin, 2013 Eren, Çelik, & Aktürk, 2014). Some users may be affected by negative aspects of Internet use. Positive returns tend to occur when people use the Internet in accordance with the purpose of the online environment (Boz & Adnan, 2017; Bozoglan, Demirer, & Sahin, 2014; Li, Newman, Li, & Zhang, 2016; Pontes, Caplan, & Griffiths, 2016; Tokunaga & Rains, 2016). For example, the goal of increasing the academic achievement of students around the world can be facilitated by providing access to online information resources (Erdogan, 2016; Karahan & Roehrig, 2016).

Through the Internet it is possible to communicate with experts who are far away and to share information as if they were present in the same environment as the Internet user. Many innovations that take place in the world have the opportunity to be followed simultaneously on the Internet (Siciliano et al., 2015; Unsal, Sahin, Celik, Akturk, & Shelley, 2012). However, using the Internet outside of its purpose to share information and resources can bring about negative outcomes (Lam & Wong, 2015; Mazzoni et al., 2016; Škařupová, Ólafsson, & Blinka, 2015). For instance, a person who cannot make productive use of the time spent on the Internet is obligated to spend much effort and time in the online environment. A person who spends lots of time on the Internet environment can be dragged into negative behaviors from unknown people who are present on that platform. Those who cast about online without a clear goal in mind cannot use the Internet in a useful way and can be subject in the virtual environment to problematic consequences of Internet use. The concept of Internet addiction has been used in some studies to address the potentially pathological dimension of Internet use (Ceyhan et al., 2007; Sahin, Kesici, & Thompson, 2010; Tutgun, 2009). According to Morahan-Martin and Schumacher (2000), problematic Internet usage, characterized as extensive use of the Internet that is not under control, can result in serious harm to people's lives. Excessive problematic Internet use is associated with emerging social and academic/vocational difficulties that may be associated with negative cognitive and behavioral symptoms within a multidimensional syndrome (Caplan, 2005; Casale, Caplan, & Fioravanti, 2016). In other words, the situation of problematic Internet use, combined with a person's inability to prevent actualization of the desire to use the Internet, may establish the conditions for an adverse impact on daily life (Douglas et al., 2008; Li, Li, & Newman, 2013; Spada, 2014).

According to 2016 data from Global Digital Statistics, the Internet is used worldwide by 3.42 billion people. College students 18-24 years of age are the heaviest users of the Internet. University students' desire to locate and use academic resources is among the reasons for their use of the Internet, in addition to being able to build social relationships through easy and limitless Internet access that provides opportunities to play, watch movies, listen to music, and establish romantic relationships (Ceyhan, 2010). When university students spend more time on the Internet for these purposes, one consequence may be to weaken their prospects to remain in contact with their ability to socialize through the real-world environment. The online environment, if it is adopted by college students as the single environment for conducting social skills, may lead students to neglect friendship relationships because the time spent online may mean that they cannot spend enough time with their social circles in real life and thereby may drift toward loneliness. People who sustain social interactions only through the online environment seem to have reduced opportunity to improve their social skills and seem to feel that they have become lost in their relationships (Lopez-Fernandez et al., 2014; Odabasioglu et al., 2007).

Loneliness is considered to be a different situation than being alone. The difference lies in the fact that loneliness is the condition in which people want to have social relationships but are not successful in doing so, resulting in an unpleasant emotional state (Batıgün, 2010). The unhappiness associated with loneliness results in a number of problems that may arise in one's professional life, which, combined with the loss of enjoyment of life, can lead to a cascade of problems such as negative results associated with problematic Internet use. Time spent on the Internet reduces the amount of time that could be spent on family and the social environment (Ang et al., 2012; Odaci & Celik, 2013).

In the literature, studies have shown that people who attempt to get rid of their sense of loneliness spend time on online platforms; young people under the age of 25 are especially more likely to have adopted this behavior (Ozturk & Ozmen, 2011). According to Yildiz and Bolukbas (2005), as the duration of Internet usage grows, users are less likely to enter into real

social relationships with people and as a consequence suffer from social isolation. To save themselves from their perceived loneliness beyond the scope of interacting with individuals using the Internet, they actually have pushed more people into physical loneliness by staying away from real-life social situations. It is noted that one of the most basic developmental tasks of adolescence is to establish close relationships with peers of the same or opposite gender (Can, 2004; Odacı & Cikrikci, 2014). Communicating effectively prevents problematic Internet use by adolescents and young adults. Bonetti et al. (2010) found that a high level of loneliness poses problems for adolescents and young adults in later ages. Today, as adolescents and young adults have found that loneliness provides them with the opportunity to spend extra time on the Internet, it can be concluded that problems in the social environment occur as a result of improper Internet usage by individuals to isolate themselves. Individuals who prefer to continue to communicate in the online environment rather than being in contact with each other face inevitable problems of inappropriate Internet usage, not to mention their communication problems with other individuals also confronting solitude. Within the young population, the rate of spread of problematic Internet usage is greatest among college-age youth. In another study conducted with university students, perceived social support and loneliness variables were found to be significant predictors of problematic internet use (Oktan, 2015). Despite there are some studies on loneliness and problematic internet use in the relevant literature (Demirer et al. 2013; Derbyshire et al., 2012; Moreno, Jelenchick, & Christakis, 2013; Ozgur, Demiralay, & Demiralay, 2014), to the best of our knowledge, there is no study that examines the relations between the sub dimensions of problematic internet use and loneliness based on a model. The determining the sub scales associated with problematic internet use and level of perceived loneliness may contribute to literature. Thus, problematic internet usage of university students can give information about their loneliness levels. The research conducted for this study was carried out on university students. The aim of the study was to investigate the relationship between problematic Internet use and loneliness.

2. METHOD

2.1. Participants

In this study, data were collected from the college students at an Anatolian University in Turkey in spring term of 2016-2017. University students participated in the current study voluntarily after receiving the necessary permission for the research. The participants of this study consisted of 392 undergraduates. Of the participants, 43% are male (n = 167) and 57% female (n = 225). The average age for the participants is 22 years old.

2.2. Data Collection Instruments

Problematic Internet Use Scale (PIUS): Ceyhan et al. (2007) developed the PIUS to measure problematic Internet use. The PIUS is a Likert scale consisting of 33 items rated on a five-point metric ranging from "not appropriate at all" to "very appropriate." High scores on the scale indicate problematic Internet use and addictive tendencies. The PIUS has three subscales derived from factor analysis: negative consequences of the Internet, social benefit/social comfort, and excessive use. Negative consequences of Internet use include items such as: "I neglect my daily routines for spending more time on Internet," "Internet makes me experience relationship difficulties with my significant others," "Internet enslaves me," and "I am late to my courses and my appointments since I cannot give up using Internet." The social benefit/social comfort of Internet comprises items such as: "Concealing my name on Internet makes me freer" and "I share my loneliness with Internet." A few examples of the last subscale, excessive use, are: "I cannot understand how time flows when I am online" and "I cannot give up Internet usage although I want to quit it very much."

University of California, Los Angeles (UCLA) Loneliness Scale: The UCLA Loneliness Scale was developed by Russell, Peplau, and Cutrona (1980) to determine individuals' perceived loneliness levels. The validity and reliability of the Turkish form was established by Demir (1989). This is a Likert-type scale consisting of 20 items, each with four options. Scores for this scale range from 20 to 80. Higher scores indicate a higher level of loneliness. The standardized UCLA Loneliness Scale has a high level of internal consistency (Cronbach's alpha coefficient=0.96) and test-retest reliability (Spearman-Brown coefficient=0.94).

2.3. Data Analysis

In the present study, structural equation modeling (SEM) procedures are used to explore the relationships that exist among the variables. The SEM procedure is used due to its capacity to test casual associations between constructs with multiple measurement items (Joreskog & Sorbom, 1996). For each endogenous (dependent) variable, an equation is estimated by exogenous (independent) or other endogenous variables from another equation. Both the direct and indirect effects of independent variables on the dependent variables are estimated. Data analyses were conducted using SPSS (Statistical Package for the Social Sciences) 17.0 and AMOS (Analysis of Moment Structures) 16.0 software. Before data analysis, the SEM assumptions were checked. For the normality assumption, the skewness and kurtosis values were in an acceptable range for a normal distribution. Considering the literature regarding sample size in SEM studies, it is stated that the participants more than 200 is acceptable (Harrington, 2009; Kline, 2005).

3. FINDINGS

The structural equation analysis was conducted to test the relationships among the constructs negative consequences of the Internet, social benefit/social comfort, excessive use, and loneliness. In Table 1, the ideal and acceptable fit indices and the actual results for our estimated structural equation research model are presented (Celik, Sahin, & Aydin, 2014; Hu & Bentler, 1999; Jöreskog & Sörbom, 1984; Tanaka & Huba, 1985).

**Table 1.** Criterion references for fit indices of structural equation model

Criterion References	Ideal Fit Indices	Acceptable Fit Indices	Indices for the Estimated Research Model
χ^2/df	≤ 3	$\leq 4\text{-}5$	1.074
Root Mean Square Error of Approximation(RMSEA)	≤ 0.05	0.06-0.08	0.013
Normed Fit Index (NFI)	≥ 0.95	0.94-0.90	0.998
Comparative Fit Index (CFI)	≥ 0.97	≥ 0.95	0.981
Goodness of Fit Index (GFI)	≥ 0.90	0.89-0.85	0.999
Adjusted Goodness of Fit Index (AGFI)	≥ 0.90	0.89-0.85	0.987
Tucker Lewis Index (TLI)	≥ 0.95	0.94-0.90	0.999

As seen from Table 1, the research model fits the data well ($\chi^2 = 1,074$, df = 1, p= 0.300; GFI = 0.999; AGFI = 0.987; CFI = 0.981; TLI = 0.999; NFI = 0.998; RMSEA = 0.013). As depicted in Figure 1, the research model includes three exogenous variables (negative consequences of the Internet, excessive use, and loneliness) for the endogenous variable (social benefit/social comfort). Negative consequences and excessive use also are endogenous with respect to social benefit/social comfort. In the figure representing the SEM, only significant paths are included.

Table 2. Decomposition of Total Effects for Research Model

Predictor variable	Dependent Variable	Total Effect[a]	Direct Effect	Indirect Effect	Standard Error	Critical Ratio
social benefit/social comfort	negative consequences	0.78	0.78	-	0.05	25.37[**]
negative consequences	excessive use	0.45	0.45	-	0.03	7.15[**]
excessive use	loneliness	-0.17	-0.17	-	-3.16	<0.00[**]
social benefit/social comfort	excessive use	0.52	0.17	0.35	0.05	2.80[**]
negative consequences	loneliness	0.46	0.53	-0.76	0.05	9.95[**]
social benefit/social comfort	loneliness	0.33	-	0.33	-	-

a: Total effect= Direct effect + Indirect effect; **: $p < 0.01$
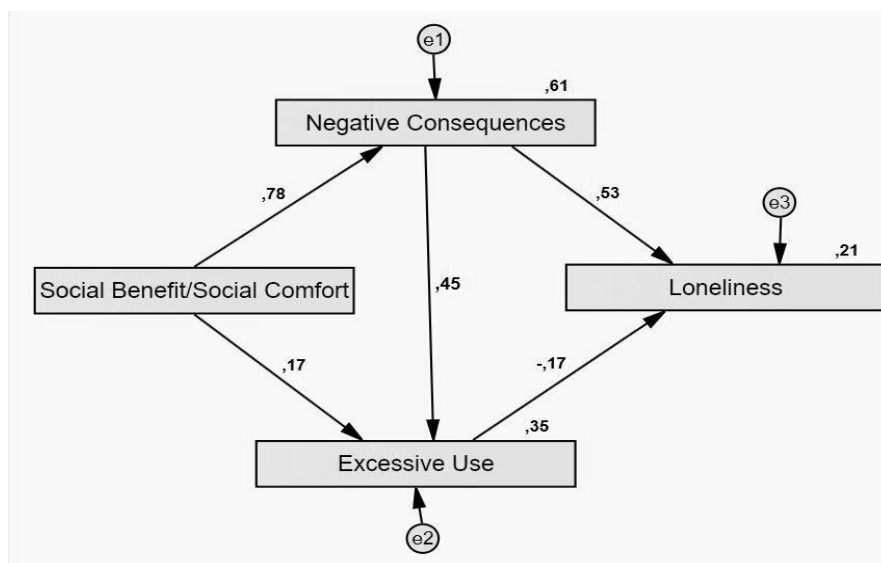
Figure 1. Research Model

In Figure 1, social benefit/social comfort, which is the exogenous variable in the model, has a direct and positive effect on negative consequences (β=0.78) and excessive use (β=0.17). Furthermore, social benefit/social comfort also has an indirect and positive effect on excessive use (β=0.35) and loneliness in the model. Negative consequences of the Internet has a direct and positive effect on both loneliness (β=0.53, $p<0.01$) and excessive use (β=0.45). In addition, negative consequences of the Internet has an indirect and negative effect on loneliness (β=-0.76). Finally, excessive use had a direct (β=-0.17) and negative effect on loneliness (Table 2).

When each of the separate equations in the model was examined, it can be seen that social benefit/social comfort explains approximately 61% of the variance in negative consequences. Also, negative consequences and social benefit/social comfort together explain approximately 35% of the variance in excessive use. Social benefit/social comfort, excessive use, and negative consequences together explain 21% of the variance in loneliness.

4. DISCUSSION and CONCLUSIONS

This study has demonstrated that excessive Internet use caused individuals to feel themselves less lonely. This finding can be interpreted as meaning that lonely individuals who have difficulties in communicating with their environment feel more comfortable in the Internet environment, satisfy their needs for socializing, and feel themselves less lonely in this environment. Roshoe and Skomski (1989) explain that the individuals who feel themselves

lonely consider the Internet as a tool to help relieve loneliness and want to use it gradually more and more. Sheeks and Birchmeier (2007) state that since the online communication environment decreases the anxiety and worry that individuals experience in face-to-face interaction and communication, those with social anxiety tend to use the Internet more compared to others. Other studies conducted on this topic emphasize that the reason for the preference of Internet environments by individuals who feel loneliness could be based on these individuals finding a way to cope with loneliness by interacting with the other individuals in these environments (Ryan & Xenos, 2011; Sheldon, 2008).

When the literature is reviewed, it is seen that contrary to the results of this study, there are several studies that show excessive Internet use leads to increased loneliness (Engelberg & Sjoberg, 2004; Kraut et al., 2002; Moody, 2001; Morahan-Martin, 1999; Pawlak, 2002). It is considered that the difference between these research findings and results reported in the literature originates from cultural factors and differences in the samples. In a study conducted to examine the relationships between increased Internet use, and loneliness and interpersonal styles, Batigun and Hasta (2010) found that individuals with higher Internet use had higher loneliness levels. However, since their research was a correlative study, they could not provide a clear conclusion regarding whether loneliness was an indicator of excessive Internet use, or vice versa. In this context, Morahan-Martin (1999) states that it would not be possible to determine the direction of the mentioned relationship, and asserts that Internet use could cause loneliness. In addition, Morahan-Martin stated that the time individuals with excessive Internet use spend online harms face-to-face communication and social activities, and that Internet use isolates individuals from society and the real world and deprives them of the sense of belonging. Considering the purpose of Internet use among university students in Turkey, it is observed that many college students use to spend time on the social networking (Akar, 2015; Ceyhan, 2010; Çelik, 2012; Karal & Kokoç, 2010). Individuals who use the Internet to socialize on sites such as Facebook, Twitter or Instagram may feel less alone. Facebook usage is very common in Turkey compared to other countries in the world and 37% of Facebook users in Turkey are college students in the 18-24 age range. (Karal & Kokoç, 2010 Aktürk, Emlek, & Çelik, 2017). The level of loneliness of a college student attending a group on Facebook and meeting with his friends may be reduced.

Previous studies showed that individuals spent more time on the Internet to fulfill interpersonal communication needs, create alternative social channels, try to obtain the satisfaction provided by interpersonal relations that cannot be achieved in real life from the Internet, and express themselves more freely on the Internet compared to in daily life (Papacharissi & Rubin, 2000; Peris et al., 2002). Ratunda et al. (2003) state that such individuals reveal significant Internet use characteristics such as spending unnecessary time online and spending more time than actually planned on the Internet. In addition, a study conducted by Caplan (2007) showed that online social interaction provided more privacy compared to face-to-face communication and that individuals with social anxiety perceived less social risk on the Internet.

The findings of this study have revealed that the negative outcomes that emerge as the result of problematic Internet use increased loneliness. This finding indicates results similar to those of previous studies conducted by Kraut et al. (2002), Caplan (2002), Pawlak (2002), and Ozcan and Buzlu (2005), which show a positive relationship between loneliness and problematic Internet use. However, the researchers focus on two different points in explaining this relationship. While some researchers state that problematic Internet use does not increase the level of loneliness, but problematic Internet use emerges as the result of loneliness (Ceyhan & Ceyhan, 2008; Hamburger & Ben-Artzi, 2003), others suggest the opposite view (Morahan-Martin & Schumacher, 2000). Esen and Siyez (2011) state that the causality of this relationship

between loneliness and problematic Internet use could be explained through a longitudinal study, which is missing in the literature.

Another finding obtained in this study is the relationship between problematic Internet use and social benefit. The findings of the study showed that the increase in social benefit/social comfort obtained from the Internet also increased excessive Internet use and the negative effects of the Internet. A review of the literature shows studies revealing the existence of both positive and negative relationships between problematic Internet use and social benefit. According to a study conducted by Tanrıverdi (2012), there is a significant, strong, and negative relationship between excessive Internet use and social benefit. In other words, social benefit decreases as excessive Internet use increases. In a study conducted on university students, Ozcan and Buzlu (2005) also found a negative significant relationship between social benefit and excessive Internet use. Contrary to those studies, several other studies in the literature show a positive relationship between problematic Internet use and social benefit (Shaw & Gant, 2002; Silverman; 1999; Winzelberg, 1997). Mossbarger (2008) states that this situation mostly occurs in individuals who use the Internet to play online games with their friends or make new friends in chat rooms, rather than to get information. In a study conducted on high school students, Pawlak (2002) determined that loneliness and social benefit were associated with excessive Internet use, and stated that the lack of social benefit could lead students to excessive Internet use.

When the literature is reviewed, it is seen that there are two different prevailing views regarding social benefit and excessive Internet use. While some researchers (Kraut et al., 1998; Ozcan & Buzlu, 2005) point out that face-to-face interaction and relationships decrease as a result of increased time spent on the Internet, which could cause a decrease in affection, sincerity, and closeness in real life, others assert that the Internet develops the social relationship networks of individuals (Valkenburg & Peter, 2007), and increases social interaction and support (Shaw & Gant, 2002; Silverman, 1999).

Yeh et al. (2008) state that the lack of social benefit causes problematic Internet use. Individuals who experience obstacles in establishing social relationships often refer to the Internet to recreate and continue their personal relationships and tend to prefer the Internet to face-to-face communication (Inderbitzen, Walters, & Bukowski, 1997; Kubey, Lavin, & Barrows, 2001). Individuals who cannot get support from their environments turn to use of the Internet more to socialize in different environments and to create unique social channels. This reveals that the lack of social benefit could be closely related to loneliness (Batigun & Kilic, 2010). In fact, the present study revealed that increased social benefit/social comfort from the Internet, although indirectly, increases loneliness.

In this study, the relationships between university students' problematic Internet uses and their loneliness levels were investigated. The findings of the study revealed that while university students' social benefit/social comfort from the Internet has a direct effect on their excessive Internet use and negative consequences, it is related to the loneliness level indirectly. In addition, it is seen in the research model that increased negative consequences of the Internet are associated with higher levels of loneliness. Another result from the present study is that when university students' excessive Internet use increased, their loneliness level decreased. It is very important to take steps to prevent youth from engaging in problematic Internet use in today's world. Factors related to problematic Internet use should be considered in research studies and the results should be shared with the university students to increase their levels of awareness regarding this problem. Moreover, some university courses may involve contents about safe Internet usage and Internet ethics. This study was carried out with university students. Future studies can be conducted with different sample groups, or could use research

designs such as mixed or qualitative methods to yield further insights regarding the relationship between loneliness and problematic Internet use.

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