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Research Article

Relationship between Self-control and Facebook Use: Case of CEIT Students*

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Abstract

This is an explanatory mixed-method study that analyzes the relationship between the variables of students' self-control and Facebook usage. TIME's online Facebook calculator and the Brief Self-Control Scale are used for data collection. The research participants are 60 students in a department of computer education and instructional technology during the 2014 fall semester. The programs, SPSS and NVivo, were used in analyzing the data. Students who had changed their Facebook accounts at least once were found to have used Facebook longer statistically with less self-control. The analyses indicated a statistically significant relationship between Facebook use and self-control (F (1, 58) = 4.388, p < .05; β = -.367). According to students' views supporting these conclusions, the three most important reasons for this negative relationship are distracting content on Facebook, limited self-control, and notifications/alerts. These results suggest that students should receive support through special courses and educational programs when maintaining self-control to cope with Facebook and Internet addiction. Also, future studies on Facebook addiction should take self-control into account.

Keywords

Social web • Facebook • Self-control • Students of computer education and instructional technologies • Digital natives

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Digital natives are the children and youth of today who have always been surrounded by advanced technologies and whose daily life is centered around online environments, mobile phones, computers, video games, digital cameras, and music players (Palfrey & Gasser 2013; Prensky, 2001). Information and communication technologies (ICTs) like the Internet, personal computers, tablets, and smart phones are the gadgets that digital natives now use for all their daily business and communication needs. Along with the speed and ease they provide, these advanced technological tools have changed the way people interact with each other, their lifestyles, and almost every other aspect of life (Kinshuk-Huang, Sampson, & Chen, 2013). One of the most prominent of these developments is the Internet and the social web. According to alexa.com, six of the top 10 sites in the world have a substantial social component that offers user-generated content (e.g., YouTube, Wikipedia) or that supports direct interaction among users (e.g., Facebook, QQ).

The increasing popularity of social networks and social media has transformed the current generation that socializes in a cyber world based on digital media. The intensive use of ICTs, especially by youths, as well as the increasingly faster and easier access to information and the rising popularity of social networks, have all contributed to the emergence of a new generation that socializes in a digital media-based cyber world (Pedró, 2006; Carstens & Beck, 2005; Oblinger & Oblinger, 2005; Prensky, 2001). This young population is familiar with media-based interactions and feels comfortable multi-tasking (Sánchez, Salinas, Contreras, & Meyer, 2011). Also known as Web 2.0, the social web has had profound effects on digital natives in particular (McLoughlin & Lee, 2010). Digital natives have adapted easily and quickly to social-web environments. This can be explained by the digital sociability, participatory environments, and rich media support provided by the social web. In a way, the social web has created a tendency for this new generation of Internet users to create virtual communities on their own websites, participating in and sharing with other communities of interest. Living ever-dependent on media, they make effective use of social networks like Facebook, micro-blogs like Twitter, web blogs, and Internet forums as part of their daily lives. According to Statista (2015), which conducts research on Internet statistics, there were almost two billion social-web users in 2015, and this figure is expected to rise to two and a half billion by 2018. Facebook, the leader of the social networking market, became the first social network to surpass one and half billion active users as of January 2016 according to Statista (2016) data. Ranking fifth, Twitter, the micro-blogging network, has over 300 million monthly-active accounts.

As the leader in the social networking market, Facebook has gained global popularity, and institutions of higher education have an interest in the potential of social network services for supporting student learning and peer networking (Huang, Wu, She, &

Lin, 2014; Vivian, 2011). According to a report by *The Guardian*, 556 million people worldwide now access Facebook every day with their PCs, smartphones, or tablets (Sedghi, 2014). This shows that mobile and other technologies including TVs are actively used on the social web. Furthermore, studies show that 85-99% of university students use Facebook (Hargittai, 2007; Matney & Borland, 2009). These days, most people admit that digital technologies interrupt their daily lives. Moreover, many studies among the relevant literature show that a considerable number of users are addicted to the Internet, mobile phones/text messaging, online games, and mobile phone apps like Facebook (Morahan-Martin, 2008; Walsh, White, & Young, 2008). One of the most important factors causing problematic Internet behaviors is self-control (Li, Dang, Zhang, Zhang, & Guo, 2014).

Gottfredson and Hirschi (1990) define self-control as an individuals' capacity to control their emotions, behavior, and cognition. Muraven and Baumeister (2000) stated that this capacity is used to achieve goals. Duckworth (2011) described self-control as the inhibition of thoughts and desires in order to achieve goals. In another definition, self-control is defined as having individual control over one's attention and the ability to self-adapt when problem solving and planning (Wills, Sandy, & Yaeger, 2001).

Various studies show that individuals with low levels of self-control display problematic behaviors (Sinha, 2009). Furthermore, individuals have difficulty establishing self-control when using the Internet, and as a result, psychological, academic, and social problems may develop (Davis, 2001). Consequently, problematic Internet use can be seen in individuals who have lost their self-control (Li et al., 2014). Respectively, individuals with a high level of self-control are less inclined to have negative behaviors and more inclined to perform better at school and in their personal relationships (Özdemir, Kuzucu, & Ak, 2014). Individuals with high levels of self-control can achieve their goals by controlling their attention, behavior, and emotions (Duckworth, 2011).

Digital technology offers exciting opportunities for digital natives. However, Goleman (2013) underlined that people's attention is under siege more than it has ever been in human history. In particular, if digital natives as young students don't have the focused attention they need, they could have problems controlling their emotions (Schwartz, 2013). One of the most widely used social-web technologies among young people today is Facebook. This study investigates the relationship between graduate students' self-control and their Facebook usage.

Related Literature

The literature related to both Facebook use and self-control is extensive. Educational Facebook usage (Junco, 2012; Kittinger, Correia, & Irons, 2012; Vivian, 2011), Facebook users' characteristics (Smith & Borreson Caruso, 2010), and the effects of self-control on addictions like Internet addiction (Assunção & Matos, 2017; Kittinger et al., 2012; Koc & Gulyagci, 2013; Przepiorka, Błachnio, & Díaz-Morales, 2016) are the most frequent research topics in the relevant literature. Some recent studies directly related to the current study are included here.

As a social web environment, Facebook has attracted prominent attention in recent years, not only in the communications field, but also in a wide variety of academic disciplines (Su & Chan, 2017). Statista's records show that there were approximately two billion social network users worldwide in 2016. About 79% of them have a Facebook account. In a study conducted by the EDUCAUSE Center for Applied Research with 36,950 students from 127 US and Canadian universities, 90% of students were found to use social networks (Smith & Borreson Caruso, 2010). Of these, 97% use Facebook. More recently, according to a Pew Research Center study, 39% of adult Facebook users have between 1 and 100 Facebook friends, 23% have 101-250 friends, 20% have 251-500 friends, and 15% have more than 500 friends (Smith, 2014). Half of all Facebook users have more than 200 friends, and half have less than 200. Another finding from that study is that younger users have a significantly higher number of friends than older users. According to this, 27% of 18- to 29-year-old Facebook users have more than 500 friends in their network, while 72% of users over 65 have 100 friends or less. However, according to Dunbar (2008), brains cannot handle more than 150 friends. Dunbar's hypothesis is based on the human cognitive limit. This limit to the number of friends denotes those with whom a stable, social relationship has been built and where the inter-relationships are known. Thus, the number of Facebook users' friends seems to conflict with Dunbar's numbers.

Some studies exist in the literature on the determining factors that encourage Internet use. Lin and Lu (2011) used a network externalities and motivation theory to study 402 Taiwanese Facebook users. Their findings show that Facebook's entertainment value is the most effective reason for users who continue to use Facebook. Among other important factors in continued Facebook use are the number of Facebook friends and Facebook's user-friendliness, respectively. Mazman and Usluel's (2010) study supports these results, which found a significant relationship to exist between adapting to Facebook and its usefulness, ease of use, social effects, facilitating factors, and group-identity factors. According to Dindar and Akbulut (2015), meanwhile, individuals who experience problems with self-control in limiting their Facebook use tend to close their accounts or open a new one.

A study by Junco (2012) tried to determine the relationship among frequency of Facebook use, participation in Facebook activities, and students' class engagement. Conducted with 2,368 students, this study found that Facebook use negatively predicts student engagement in class, but positively predicts their length of participation in activities. This finding indicates that as their Facebook use increases, students' general engagement decreases but their participation in course activities rises. Vivian's (2011) study discussed the benefits and limitations of their Facebook use on informal learning using 15 university students' group posts from online discussions. It found students' informal learning benefits from Facebook's status updates, private messaging, live chats, tagging, and Facebook groups. Overall, the students reported Facebook as a reason to delay their studies, while noticing its benefits are comparable to other social networks. Furthermore, some students were found to benefit from certain self-control strategies for the social web, like changing passwords, terminating sessions, or setting study goals in order to reduce Facebook use.

The study of Kittinger et al. (2012) attempted to determine the relationship between university students' Facebook use and their problematic Internet use. According to the results of the study conducted over 281 students, few students have problems with their Internet use, but using Facebook may lead to Internet addiction. In another study, Kang, Shin, and Park (2013) reinterpreted addiction to social network services (SNS) from a marketing perspective and named SNS addiction as an addictive consumption trait (ACT). The dimensions of ACT were determined to be salience, euphoria, immersion, compulsion, and association. Also, Assunção and Matos (2017) found that Facebook use positively and significantly predicts deficient self-regulation of Facebook use, which in turn significantly predicts the negative outcomes associated with it.

Koc and Gulyagci's (2013) study investigated Facebook addiction and its behavioral, demographic, and psychological health predictors. This research was carried out over 447 university students. The Facebook Addiction Scale and the General Health Questionnaire were used as data collection tools. According to the results of their study, weekly time commitment, social motives, depression, anxiety, and insomnia positively predict Facebook addiction. Neither demographic variables nor gender interactions were found to significantly predict usage characteristics. Przepiorka et al. (2016) studied 954 Facebook users between the ages of 18 and 58. The Facebook Intrusion Questionnaire, Facebook Intensity Scale, General Procrastination Scale, and Decisional Procrastination Scale were used in their research, whose results showed that young participants use Facebook more intensely and are more likely to become addicted to Facebook. The study by Kittinger et al. (2012) aimed to determine how Facebook use relates to problematic Internet use. Their research results suggested that a sizable minority of students experience problems related to Internet use and

that using Facebook may contribute to the severity of symptoms associated with Internet addiction.

A recent comprehensive study by Dindar and Akbulut (2015) investigated pre-service teachers' reasons for quitting Facebook, comparing temporary and permanent quitters. It revealed that temporary quitters regard Facebook to be more useful compared to permanent quitters. Interviews with 11 participants revealed similar factors underlying their quitting behavior. Confidence building among couples was a novel but significant predictor of this quitting. Also, participants felt obliged to have a Facebook account, as either the faculty's instructional Facebook use or peer pressure urged them to use Facebook.

Various studies in the literature indicate that this addiction is not homogenous but is clearly affected by self-control and the effects of losing self-control (Griffiths, 2013). According to Wilson, Fornasier, and White (2010), uneducated Internet users tend to become addicted to social web platforms because such irrational behavior mostly stems from a lack of self-control. In the study, "The Science of Self-Control," Rachlin (2000) presented a clear view of self-control in theory and research. According to this theory, the problem of self-control is based on conflicts among certain actions. Browsing Facebook while urgent tasks are waiting to be done can be given as an example. Self-control failure is a term used to refer to an individual's failure to make decisions and carry out actions consistent with one's general goals and values. It is viewed as one of the most complex phenomena of human behavior (Fujita, 2011).

Various studies have been identified by reviewing the relevant literature. The effects of Facebook use on students' informal learning (Vivian, 2011); the relationship of Facebook use with course engagement (Dyson, Vickers, Turtle, Cowan, & Tassone, 2015; Junco, 2012); the relationship of Facebook use with problematic Internet use (Kittinger, Correia, & Irons, 2012); Facebook addiction (Koc & Gulyagci, 2013); the relationship between Facebook use and self-regulation (Rouis, Limayem, & Salehi-Sangari, 2011), and problematic use of Facebook and Facebook addiction (Lee, Cheung, & Thadani, 2012) are among the research topics that have been studied thus far. However, scant research has analyzed the relationship between Facebook use and self-control. Therefore, the present study expects to contribute to filling this gap in the literature. According to Wilcox and Stephen (2013), while millions use social networks every day, the number of studies analyzing the behavioral effects of these environments is quite inadequate. Furthermore, given the positive and negative effects of social networks, very few studies have focused on the types of people that use these networks (Wilson et al., 2010).

Facebook use is quite common among university students. When considering their ages and fields of study, the research subjects can be said to be digital natives. The

related literature is quite rich with digital natives (Palfrey & Gasser, 2013; Prensky, 2001). Also, commonly used scales exist, such as the Digital Natives Assessment Scale (DNAS; Teo, 2013; Teo, Kabakçı Yurdakul, & Ursavaş, 2016). Bennett, Maton, and Kervin's (2008) study provides a critical review of the evidence on the distinction between digital natives and digital immigrants. They criticize the common approach of digital natives and even considered this distinction as just a moral panic. However, most social researchers are in agreement on the clear difference between those born under digital technologies and those who encounter these technologies after a while (Howe & Strauss, 2009; Palfrey & Gasser, 2013). Students of computer education and instructional technology (CEIT), being rather involved with technology as their field of study, are appropriate examples of the digital native generation. In the context of CEIT programs, students' age range makes them a good example of digital natives. This intersection makes them one of the best samples for digital natives and a target group for research. Being both prospective IT teachers and representatives of the current digital native generation, these IT students make a primary target group for research. Furthermore, apart from simply accessing it, IT teachers also are responsible for educating learners to become people who can keep up with technological advances and have the skills necessary to effectively use, produce, and share information. Therefore, this study expects to obtain important data regarding both CEIT students' statuses in view of these two variables as well as how they will provide guidance to their students on these issues in the future.

Determining the relationship between self-control and Facebook use has critical importance both for students and educators. Understanding the nature of this relationship will shed light on explaining the reasons for social media addiction, determining differences according to demographics, and discovering precautions to take for avoiding social media over-use and problematic Internet behaviors. Previous studies have focused on the practical implications of social media as brought forth by Facebook. The insufficient research analyzing the behavioral effects of these environments also shows the importance of this study. This study's findings are expected to better explain the relationship between learner's self-control and Facebook addiction. The results of this study will be a significant endeavor in researchers, practitioners, educators, and students' consideration of self-control as an important factor of social media usage and Facebook addiction.

Purpose and Research Questions

The main purpose of this study is to determine CEIT university students' self-control and their Facebook usage status, whether a significant relationship exists between these two variables, and if so, the nature of this relationship. To this end, the research questions regarding CEIT students are as follows:

- What is their status in terms of Facebook use and self-control?
- How does their Facebook use change in terms of demographics?
- How does their self-control change in terms of demographics?
- Does a significant relationship exist between their Facebook use and self-control? If so, how strong is this relationship?
- What are these students' views on the relationship between self-control and Facebook use?

Method

This study uses the sequential explanatory mixed-methods design (Tashakkori & Teddlie, 1998). What makes mixed-methods research more effective than just quantitative or qualitative research is its inherent balance of each method's limitations (Fırat, Kabakçı Yurdakul, & Ersoy, 2014). In an explanatory mixed-methods design, qualitative data is collected in order to explain the findings derived from the quantitative data (Creswell & Plano-Clark, 2011). In this study, qualitative data were collected and analyzed to support the findings of the quantitative data. This section presents information about the research participants, data collection methods, data collection procedures, and data analysis.

Participants

The study's participants was 60 students in the CEIT program in Anadolu University's Education Faculty during the fall semester of 2014. The participants' ages range between 20 and 26. The purposeful sampling was used in determining the research participants. As is the nature of their field of study, CEIT students are viewed as one of the best examples for the digital native generation deeply involved with technology. Information about the students' gender and level of technological use is given in Table 1.

Table 1
Participants' Demographic Information

Demographic Status	Frequency (*f*)	Percentage (%)
Gender		
Female	22	36.7
Male	38	63.3
Facebook account change		
Never	35	58.3
At least once	25	41.7
Technological competency		
Basic	40	65.7
Advanced	20	33.3

As can be seen in Table 1, the majority of participant CEIT students are male (63.3%), and 41.7% of all the students have changed their Facebook account at least once. In terms of technological competency, 65.7% see themselves at a basic level, while 33.3% view themselves at an advanced level.

Data Collection Tools

TIME's Facebook calculator (Wilson, 2014) and the Brief Self-Control Scale (BSCS) developed by Tangney, Baumeister, and Boone (2004) are used as data collection tools. A form consisting of three questions is also used for determining students' gender, status of Facebook account changes, and technological competency. The participants' technological competency was determined using a multiple-choice question with two options, basic or advanced.

Facebook calculator. The researcher used *TIME*'s online Facebook calculator to determine the CEIT students' Facebook socialization. In this application program interface (API), users sign onto their own Facebook account. The API calculates the number of days they've been registered, the number of posts made, and the time spent per day in hours and minutes on Facebook. In calculating the time spent, retrospective time stamps are tracked and this calculation continues until the last time stamp is accessed. Through this application, it is possible to determine the exact time the participants signed up on Facebook, how much time they've spent on it, and how many posts they've made. In this study, the participants were asked to use the application with their personal accounts. The participants entered their obtained results into the textbox on the first part of the questionnaire form. A sample of the Facebook API results is given in Figure 1.

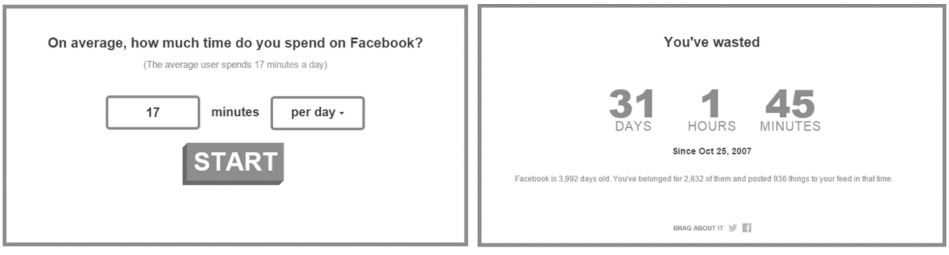

Figure 1. An example of the result of *TIME*'s online Facebook calculator.

As can be seen in Figure 1, the number of days registered on Facebook (F_{rd}), their time spent on Facebook (F_{ut}), and the total number of posts (F_{tp}) were elicited using the results from the participants' Facebook calculators. The variables of daily mean time spent on Facebook and daily mean Facebook posts were derived from the obtained data. The formulas used in calculating these variables are given in Equations 1 and 2.

$$F_{\text{daily use}} = \frac{F_{\text{ut}}}{F_{\text{rd}}} \quad (1)$$

$$F_{\text{daily post}} = \frac{F_{\text{tp}}}{F_{\text{rd}}} \quad (2)$$

Based on the data from *TIME*'s calculator the daily mean Facebook-use score (total use time divided by the number of registered days) and the daily mean Facebook post score (number of posts divided by the number of registered days) were calculated.

The Brief Self-Control Scale. In order to find participants' levels of self-control, the Brief Self-Control Scale (BSCS), developed by Tangney et al. (2004) and translated into Turkish by Nebioglu, Konuk, Akbaba, and Eroglu (2012), was used. The study by Nebioğlu et al. (2012) aimed to adapt the BSCS to Turkish. The validity and reliability analyses of the scale were conducted over 523 people. Correlations between the sub-dimensions and the whole scale of the Turkish and English versions were analyzed using the Pearson correlation and were found to be $r = 0.72$ for impulsiveness, $r = 0.76$ for self-discipline, and $r = 0.73$ for the whole scale.

The BSCS is a 13-item, single-factor, self-reporting scale and includes 13 items evaluated on a 5-point Likert-type scale where 1 = not like me at all and 5 = very much like me (e.g., I do certain things that are bad for me if they are fun). The BSCS has five positive and eight negative items. In calculating the scale's score, the eight negative items are reverse scored. Accordingly, the lowest possible score for the scale is 13, and the highest possible score is 65.

Data Collection Procedure

Before the application and data-collection procedures in this study, formal written permission was obtained from the university, as well as individual consent from the participating CEIT students. After securing the needed university permission and students' consent, the 5-point application form was developed electronically. The first step of the application form presented the introductory page, informing the CEIT students about the study. The second step asked three questions about demographic information and Facebook use. These questions were about the CEIT students' gender, the status of changes to their Facebook account, and their technological competency. In the third step of the application, the results of *TIME*'s Facebook calculator for the CEIT students were collected. In the fourth part, the BSCS items aimed to determine students' levels of self-control. Finally, the last part of the application used an open-ended question to collect students' views on the relationship between self-control and Facebook use.

The application was conducted in the 2014 fall semester at the computer lab of Anadolu University's Education Faculty in three sessions with third-year CEIT students. The researcher informed the students about the study before implementing it. The students were first asked verbally whether or not they wanted to participate in the study. Of the 63 students present in the lab, 3 did not want to participate. All students declared that they had created a Facebook account at least once. After getting written consent from the students who had verbally volunteered, the application was conducted. The application procedure was carried out under the researcher's supervision. The participants were informed about issues like how to use *TIME*'s Facebook calculator. After the initial two steps, the participants answered the items on the scale and then replied to the open-ended question. This ended the application.

Data Analysis

Quantitative and qualitative data were collected and analyzed in this study. Quantitative data were collected electronically and downloaded into Microsoft Excel then transferred to the program, SPSS 15, which analyzed the quantitative data. In the descriptive analysis of the obtained quantitative data, percentages, frequencies, standard deviations, sample size, and chi-bar descriptive statistics were employed. In order to compare CEIT students' daily Facebook-usage time, daily mean of Facebook posts, Facebook socialization, self-competency based on gender, and technological competency, an independent samples *t*-Test (a parametric test) was used. The Pearson correlational coefficient was used to find if a relationship exists between CEIT students' $F_{\text{daily use}}$ and self-control. Because correlational coefficients are not sufficient for determining a detailed relationship between variables, linear regression analysis was used to determine this relationship.

The content-analysis technique was used to analyze the collected qualitative data from the open-ended question, "In your experience, is there a relationship between self-control and Facebook use? Why?" Inductive analysis was utilized in the content analysis to reveal unclear themes and dimensions, allowing concepts and relationships to be attained. Therefore, an in-depth analysis of this data requires using a qualitative analysis method (Yıldırım & Şimşek, 2006). The data collected from the students' answers to the open-ended question were then organized and transferred into the program, NVivo, which was used to analyze the qualitative data. Coded names (i.e., P4, P20) have been used for direct quotes instead of participants' actual names.

Findings

The findings obtained from the analyses are discussed here under the relevant research questions. The Kolmogorow-Smirnow normality test was conducted to look for normal distributions of self-control, the dependent variable. Kolmogorov-

Smirnov test results show that self-control has a normal distribution ($D_{(60)} = .521$, $p = .949 > .05$).

Students' Facebook Use and Self-Control Levels

N, x̄, and *SD* descriptive statistics were used to determine CEIT students' Facebook use and self-control scores. Descriptive statistics about the variables of students' number of days registered, number of posts, total time used (hr.: min.), daily mean use (minutes), and daily mean number of posts related to Facebook, as well as their self-control scores are presented in Table 2.

Table 2
Descriptive Statistics about CEIT Students' Facebook Use and Self-Control

Variables	*N*	Mean (x̄)	*SD*
Number of Days Registered	60	1,464.55	749.31
Total Number of Posts	60	1,296.90	1,299.94
Total time used (min.)	60	25,078.98	12,207.95
$F_{\text{daily use}}$	60	19.45	11.12
$F_{\text{daily post}}$	60	1.0197	.82687
Self-control	60	44.58	8.03

As can be seen in the descriptive statistics in Table 2, the 60 CEIT student participants had been registered on Facebook for a mean of 1,464 days, or 4.006 years. Given the fact that Facebook was launched on February 4, 2004, this figure is quite low, which can be explained by students having opened new Facebook accounts. The questionnaire data show that 25 students had opened a new Facebook account at least once. An independent samples *t*-test was used to compare the time registered on Facebook between participants who had never quit Facebook and those who had quit at least once. The mean time registered (x̄ = 1,954.31) for participants who'd never quit Facebook was found to be significantly higher than the mean time registered (x̄ = 778.8) for participants who had quit at least once ($t_{(58)} = 9.491$, $p < .001$). Many of these accounts had been opened in the previous few months. On average, the students use Facebook for 19 minutes a day and send 1 post daily. For the Brief Self-Control Scale, the participating CEIT students' self-control mean score (x̄ = 44.58, *SD* = 8.03) was found to be higher than the mean score (x̄= 32.5) found by Nebioğlu et al. (2012).

Comparing CEIT Students' Facebook Use in Terms of Demographics

Variations in CEIT students' mean Facebook use ($F_{\text{daily use}}$ and $F_{\text{daily post}}$) in terms of demographic characteristics are given in Table 3.

Table 3
$F_{daily\ use}$ *and* $F_{daily\ post}$ *Means in Terms of Demographic Characteristics*

Dependent variable	Independent variable	Demographic characteristics	*N*	x^2	*SD*
$F_{daily\ use}$	Gender	Female	22	19.30	11.25
		Male	38	19.54	11.19
	Facebook account change	Never	35	16.96	.094
		At least once	25	22.94	16.81
	Technological competency	Moderate	40	19.51	11.55
		Advanced	20	19.33	10.51
$F_{daily\ post}$	Gender	Female	22	1.09	.87
		Male	38	.98	.81
	Facebook account change	Never	35	.87	.67
		At least once	25	1.22	.98
	Technological competency	Moderate	40	.89	.82
		Advanced	20	1.26	.79

Looking at the means given in Table 3, $F_{daily\ use}$ means are seen to be similar at around $\bar{x}$ = 19 minutes. The exception regarding $F_{daily\ use}$ is evident for Facebook account changes. While students who had never changed their Facebook accounts have a daily mean Facebook use around 17 minutes, those who'd changed their Facebook accounts at least once have a daily mean Facebook use of approximately 24 minutes. A similar case is clear for $F_{daily\ post}$ means. Students who had changed their Facebook accounts at least once sent more posts than those who had never changed their accounts. $F_{daily\ post}$ means also reveal that those who rate themselves with high technological competency send a higher number of posts than those who rate themselves as moderately competent. Students' Facebook use in terms of demographic characteristics is given more clearly in Figure 2.

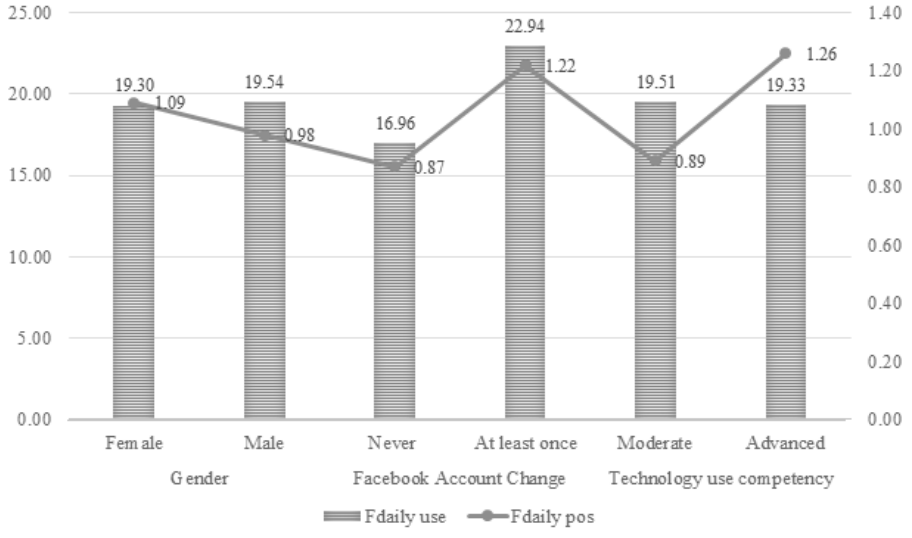

Figure 2. $F_{daily\ use}$ and $F_{daily\ post}$ Means in Terms of CEIT Students' Demographic Characteristics.

An independent samples *t*-test was used to compare CEIT students' Facebook use in terms of their technological competency, gender, and change to their Facebook account. The results of the independent samples *t*-test show that students' $F_{\text{daily use}}$ values do not significantly differ in terms of their technological competency ($t_{(58)} = .059$, $p = .95 > .05$) or gender ($t_{(58)} = -.079$, $p = .93 > .05$). Nevertheless, CEIT students' $F_{\text{daily use}}$ values vary significantly in terms of change to their Facebook account. The *t*-test findings for $F_{\text{daily use}}$ in terms of change to their Facebook account are presented in Table 4.

Table 4
$F_{daily\ use}$ *t-Test Findings in Terms of Change to Facebook Account*

Variable	Group	*N*	x̄	*t*
$F_{\text{daily use}}$	Never	35	16.96	-2.111
	At least once	25	22.93	

As can be seen in Table 4, the $F_{\text{daily use}}$ mean ($\bar{x} = 22.93$) for CEIT students who had changed their Facebook accounts at least once is significantly higher than the $F_{\text{daily use}}$ mean ($\bar{x} = 16.96$) for CEIT students who had never changed their Facebook accounts ($t_{(58)} = -2.111$, $p = .039 > .05$).

An independent samples *t*-Test was conducted to see whether CEIT students' $F_{\text{daily post}}$ values vary in terms of demographics. According to the *t*-Test results, $F_{\text{daily post}}$ values show no significant difference ın terms of students' technologıcal competency, gender, or change to their Facebook account.

Comparing CEIT Students' Self-Control Scores in Terms of Demographics

To find out if students' BSCS scores vary by their technological competency, gender, or change to their Facebook account, an independent samples *t*-test was used. The *t*-Test findings are given in Table 5.

Table 5
The t-Test Results for BSCS scores in Terms of Demographics

Variables	Groups	N	x̄	T
Gender	Female	22	4.38	1.075
	Male	38	4.08	
Facebook account change	Never	35	4.24	.668
	At least once	25	4.10	
Technology use competency	Moderate	40	4.13	-1.820
	Advanced	20	4.17	

The analysis in Table 5 reveals that CEIT students' BSCS scores show no significant difference in terms of their technological competency, gender, or change to Facebook account. The mean BSCS score ($\bar{x} = 4.10$) for CEIT students who've changed their Facebook accounts at least once is lower than the mean BSCS score ($\bar{x} = 4.24$) for CEIT students who've never changed their Facebook accounts.

Relationship between CEIT Students' Facebook Use and Self-Control

To determine whether a significant relationship exists between students' Facebook use and self-control, the Pearson correlation coefficient was first used. This analysis reveals a statistically significant relationship to exist between $F_{\text{daily use}}$ and self-control (r = -.265, p < .05). To determine the causal relationship between $F_{\text{daily use}}$ and self-control, a linear regression analysis was performed, and for determining whether their BSCS scores predict the $F_{\text{daily use}}$ variable, a simple linear regression analysis was conducted. The regression analysis shows that students' self-control scores predict their $F_{\text{daily use}}$, negatively and significantly ($F_{(1, 58)}$ = 4.388, p < .05, *ARMSE* = .054). The simple scatterplot for these two variables is given in Figure 3.

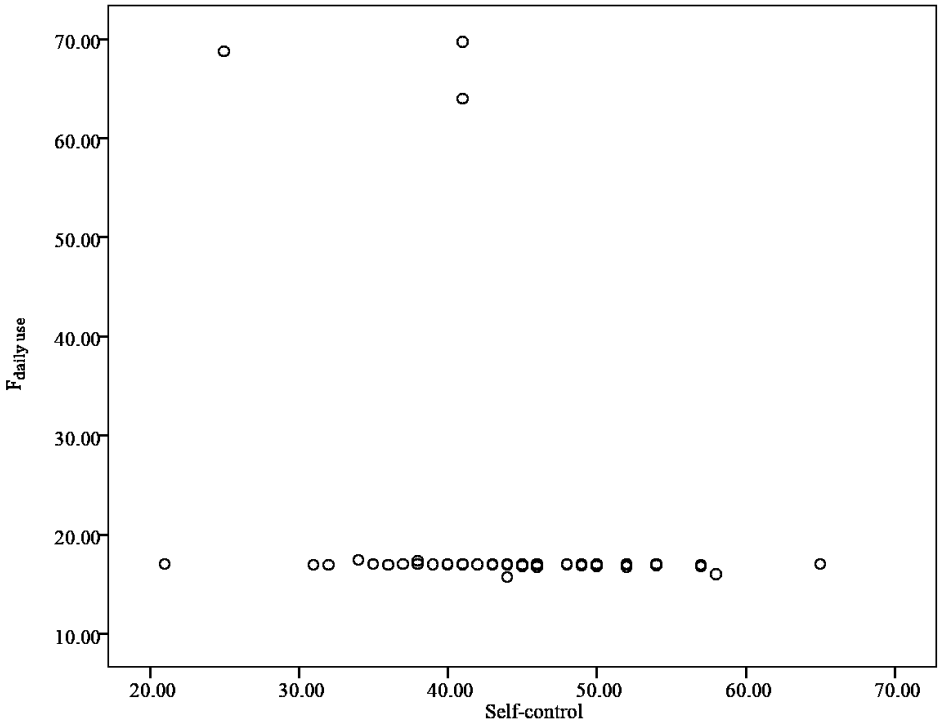

Figure 3. Scatterplot of the Relationship between Daily Use and Self-Control.

Regression weight is the non-standardized coefficient and refers to the (β = -.367) unit increase in the $F_{\text{daily use}}$ score yielded by a one-unit increase in CEIT students' BSCS score. Thus, a statistically significant and negative causal relationship was found between the variables of Facebook use and self-control.

CEIT Students' Views on the Relationship between Facebook Use and Self-Control

The content analysis technique was used to analyze CEIT students' views on the relationship between Facebook use and self-control. Some important results were revealed from the inductive content analysis using NVivo software. Two opposite themes were yielded by the codes from the inductive content analysis on the correlation between self-control and Facebook use. The revealed themes and sub-themes are given in Figure 4.

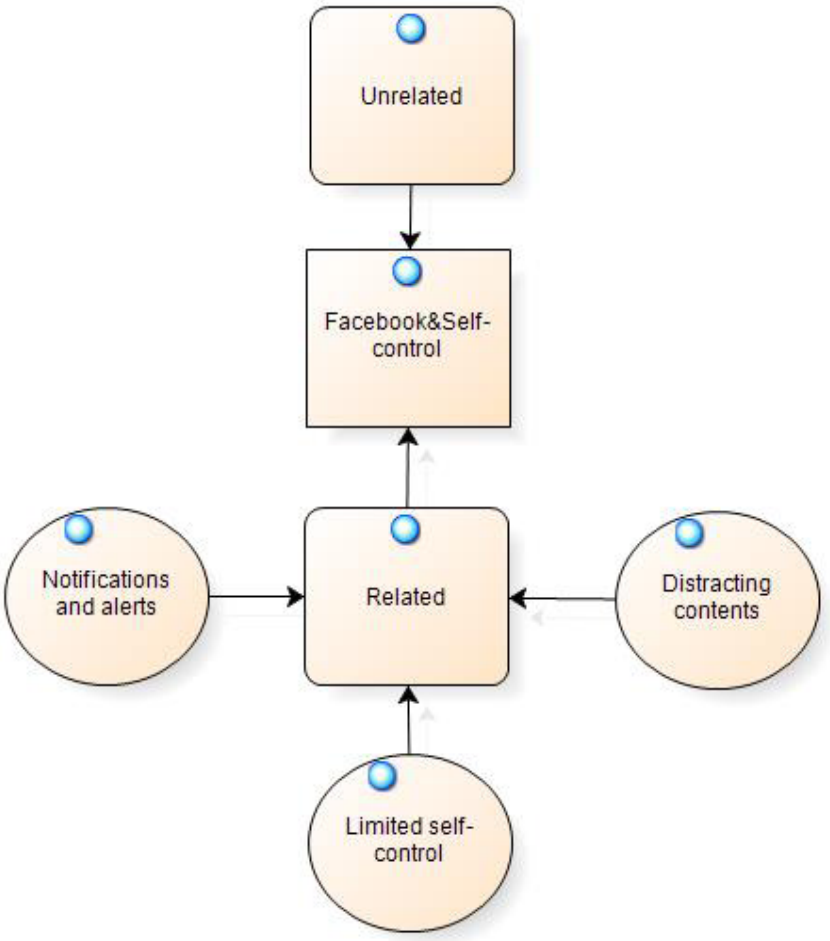

Figure 4. Themes Derived from Students' views on the Correlation between Self-Control and Facebook Use.

According to the results from the qualitative data analysis, 82% of students reported a relationship between Facebook use and self-control. Only 18% of students

claimed no significant relationship exists between these two variables. Claims were based on the point that Facebook usage is a matter of preference and self-control is unable to affect Facebook overuse. One direct quote derived from a student's views is given below:

> …I don't think that Facebook use and self-control are related. It varies according to the intended use.… I don't think adults would be affected. (P9)

All students who reported a relationship between Facebook use and self-control were found to talk about a negative relationship. Three main reasons were given for this negative relationship. Based on the number of repetitions in the qualitative data, these three reasons were determined as: distracting content on Facebook, limited self-control, and notifications/alerts, respectively. One quote for each of these three reasons has been taken from the student reports and are given below:

> …the distracting and focus-shattering structure of Facebook doesn't allow for prioritizing, and as a result, leads to a psychological breakdown. (P30)

> …the phenomenon that we call willpower is a reservoir that has a certain limit. The more we use it, the lower it drops. Hanging out on Facebook for too long causes our reserves of self-control reserves to decrease. That's because what we see as important there conflicts with something else that is also important. I think this is the reduction of willpower reserves. Roy Meister's experiments prove that willpower exists in a limited amount. (P25)

> …the red notifications and alerts on smartphones and PCs continuously direct us to Facebook. (P14)

When analyzing the opinions of students who think an inverse relationship exists between Facebook use and self-control, three prominent reasons are highlighted: one is user-derived, and the other two result from Facebook itself. As the most important reason for this negative relationship, students reported Facebook content with distracting notifications, news, ads, videos, links, or visuals. Also, students reported that limited self-control and notifications/alerts from Facebook, which operates compatibly with many electronic devices, are important factors that affect self-control.

Discussion

The quantitative and qualitative data of CEIT students were analyzed in accordance with the research questions and sequential explanatory mixed methods design. Findings from these analyses are discussed in this section. Findings from the descriptive statistics show that students use Facebook on average for 19 minutes a day and send 1 post daily. This finding differs from Junco's (2012) finding, where university students spend an average of 101.09 minutes a day on Facebook. According to Facebook data, however, Facebook users spend about 17 minutes

on Facebook daily. This difference might be due to the data in this study being drawn from the Facebook database, not from the students' self-reports. Differences between analytical data and participants' self-reporting have also been underlined in related literature investigating inconsistencies in responses from self -reports (Akbulut, 2015).

The results of the parametric test show that students' self-control scores do not differ in terms of their technological competency or gender. This finding is in line with Koc and Gulyagci's (2013) finding where neither demographic variables nor gender interactions were found to be significant predictors in terms of usage characteristics. Yet students who had changed their Facebook accounts at least once were found to be more active on Facebook. The reason for this finding is open to research. Although no statistical significance exists, the self-control mean score for CEIT students who had changed their Facebook accounts at least once was found to be lower than the self-control mean score for students who had never changed their Facebook accounts. This finding supports the result found by Mazman and Usluel (2010), where individuals who experience self-control problems using Facebook either close their accounts or open a new account.

A negative causal relationship was found between the variables of CEIT students' Facebook use and self-control. The results from regression analysis show that students' self-control scores predict their Facebook use. This negative correlation and significant predictor can be considered an indicator of Facebook over-use, or Facebook addiction. This claim also is supported by the related literature. According to Griffiths (2013), addiction is clearly affected by self-control and the effects of losing self-control. The negative causal relationship between Facebook use and self-control that was found in this study is compatible with finding of Kittinger et al. (2012), where using Facebook may lead to Internet addiction. This critical relationship clearly should be investigated for different participant groups.

The findings from the inductive content analysis of the qualitative data show that CEIT students support a negative correlation between self-control and Facebook use. Distracting content such as Facebook's news and notifications/alerts are also considered reasons for this negative correlation. This finding supports the findings of the quantitative data analysis results for the Pearson correlation and regression analysis in this research. These findings also support Vivian's (2011) finding that students report Facebook as the source of their procrastination, and Lin and Lu's (2011) finding that Facebook's rich content motivates users to lose self-control.

Conclusion and Suggestions

This study is limited by the 60 students studying in the Education Faculty's CEIT program at Anadolu University during the 2014 fall semester. This limitation may prevent any differences among the groups from becoming statistically significant. Therefore, future research on Facebook use and self-control while working with a larger number of participants and various demographics is recommended.

This study's aims were to find the status of CEIT university students' self-control and Facebook use, whether a significant relationship exists between these two variables, and if so, in which direction this relationship is. For this purpose, *TIME*'s Facebook calculator was used as the numeric data source for Facebook usage, as well as the BSCS. The descriptive analyses demonstrate that as digital natives, nearly half of CEIT students had changed their Facebook accounts at least once, use Facebook daily for 19 minutes, and send 1 post daily, on average. The participating CEIT students' self-control mean score was found to be higher than the mean found for the Brief Self-Control Scale by Nebioglu et al. (2012). However, when compared in terms of demographics, their self-control yielded no statistically significant difference.

When comparing the CEIT students' Facebook use in terms of demographics, CEIT students who had changed their Facebook accounts at least once were found to have a statistically higher daily mean for time spent on Facebook (and less self-control) than those who'd never changed it. CEIT students' self-control problems with using Facebook may have caused them to close their accounts and open a new one.

Pearson correlation coefficient and simple linear regression analyses were employed to determine whether a significant relationship exists between students' Facebook use and self-control scores. As a result of these analyses, a statistically significant and negative causal relationship was identified between students' daily mean Facebook use and their self-control.

The quantitative data collected by following the explanatory mixed method are supported by the qualitative data that were based on student opinions. The students were determined to draw attention to the negative relationship between Facebook use and self-control. This supports the findings obtained through the analysis of quantitative data. Additionally, students gave Facebook's distracting content, their limited self-control, and Facebook's notifications/alerts that operate compatibly with many electronic devices as the most important reasons for this negative relationship.

Practical Implications

The findings obtained within the given limitations of the study indicate that lack of self-control may cause an increase in students' Facebook use as one of the reasons for Internet addiction,. Therefore, these findings suggest that self-control should be

considered in future studies on digital natives' Facebook addiction. Furthermore, students should be supported in maintaining self-control for coping with Facebook and Internet addiction through special courses and educational programs.

Research Suggestions

Within the limitations of this study, various suggestions can be offered for future studies. The three most important suggestions are listed below:

- The students who had changed their Facebook accounts at least once were found to be more active (F_{daily} use and $F_{\text{daily posts}}$). The reason for this finding is open to research.
- The effects of self-control on Facebook addiction can be investigated through parametric tests, scales, and qualitative methods such as interviews with different samples.
- The relationship between self-control and Facebook use can be investigated for different participant groups. Such investigations can be extended to other social media environments like Twitter and Instagram.
- Structural equation modeling can be applied to clarify the factors that affect students' Facebook use.

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