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Research of Mutual Connection and Differences Between Academic Procrastination and Excessive Internet Use Among College and University Students

Dominika DOKTOROVÁ [1]
Dominika KURAJDA [2]
Varečková ĽUBICA [3]

[1] Univerzita sv. Cyrila a Metoda v Trnave, dominikka.doktorova@gmail.com
[2] University of Ss. Cyril and Methodus in Trnava, kurajda1@ucm.sk
[3] University of Ss. Cyril and Methodus in Trnava, lubica.vareckova@ucm.sk

Abstract: *In the educational environment the Internet is a basic and widely used tool for teaching and learning, but along with its use the Internet can also bring many problems to students' lives, if it becomes problematic. However, problematic Internet use can have negative consequences for students, especially when a tendency to procrastinate in their academic tasks develops. The study examines the connection between excessive Internet use and academic procrastination among high school and university students. The carried-out research used a questionnaire method; where a PRIUSS questionnaire to measure problematic Internet use, and a PPS questionnaire to measure academic procrastination were used. The research group consisted of 389 respondents, of whom 205 were university students and 184 were high school students, and the respondents ranged from 16 to 22 years (M = 18.4, SD = 3.16) of age. The study demonstrates a positive significant connection between problematic Internet use and academic procrastination (Sig. < 0.01), and therefore an increase in excessive Internet use increases the level of academic procrastination. The difference between academic procrastination among students at universities and high school students has not been demonstrated (Sig. > 0.05), but the benefit of the work is the knowledge and usability in both psychological and pedagogical practice.*

Keywords: *academic procrastination, problematic Internet use, high school students, university students, gender difference, mutual connections.*

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Introduction

There is no doubt that the Internet has contributed to the development of society, facilitated communication, and has become an essential tool in many occupations and professions. Recently, people have been using the Internet extensively not only for work, but especially for spending their free time. This is happening not only to the general population, but especially to students who spend much of their time surfing the Internet, using social networks, or watching videos, which leads to neglecting their tasks. Nevertheless, the Internet is an important source of learning for students, and use of digital technologies at adolescents helps in their cognitive development, as they learn to be creative (Nwosu et al., 2020). The use of digital technologies must have a reasonable purpose and optimal use, otherwise, it has a negative impact on students' lives (Madden et al., 2013). In relation to academic tasks, the concept of academic procrastination arises, which means postponing the task to the last minute or even the inability to complete it (Steel, 2017) because of redirecting students' attention to more enjoyable activities, such as using the Internet or social networks.

Academic Procrastination

Academic procrastination is a predominant problem among students, affecting academic well-being and associated with negative consequences, including failure (Solomon et al., 1986). Steel (2017) defines academic procrastination as a form of self-regulatory failure in which an individual voluntarily delays an intended course of action despite expectations. Through academic procrastination, the student delays the beginning or completion of academic tasks which deadlines are established (Nwosu et al., 2020), and arises mainly in the planning of tasks completion (Gabrhelík et al., 2006). Academic procrastination thus becomes a problem that occurs especially in the tasks that are from students expected, such as preparing for exams, homework, or creating a project. In the university environment, academic procrastination mainly concerns low academic performance or early school leaving (Garzón Umerenkova & Gil Flores, 2016) and is based on students' fear of failing (Ozer & Sackes, 2011). The occurrence of academic procrastination in the school environment is a problematic but natural phenomenon (Gabrhelík et al., 2006), with 50% to 70% of university students admitting significant delays in important tasks (Ozer & Sackes, 2011). Apart from university students, academic procrastination is a problem for high school students, where the prevalence of academic procrastination is between 10% and 70% (Steel &

Ferrari, 2013). In this context, the authors (Steel & Ferrari, 2013; Ziegler & Opdenakker, 2018) found that the rate of procrastination increases with age, and it is more than likely that academic procrastination begins earlier than at university, among students at high schools (Ziegler & Opdenakker, 2018). Khan et al. (2014) found that procrastination is higher among high school students compared to university students. They explain this difference due to the high competition in the academic career at the university level, which requires more hard work. On the other hand, there are studies (McCown & Roberts, 1994; Mohammadi et al., 2015) which have found that the rate of procrastination increases throughout university life. Although age and academic procrastination are closely related, there are surprisingly few studies examining the prevalence of procrastination, especially at universities and high schools.

A significant role in the academic procrastination occurrence can be also played by gender where in general the study findings (Khan et al., 2014; Steel & Ferrari, 2013) suggest that men procrastinate more than women. On the other hand, there also exist studies that confirm the absence of a statistic important difference in the rate of procrastination between gender (Gabrhelík, 2008; Solomon & Rothblum, 1984; Ziegler & Opdenakker, 2018). To sum up, the occurrence of procrastination in students due to the gender or age has not been researched sufficiently, while it is also necessary to specify this phenomenon for all individuals.

Problematic Internet Use

With the gradual development of technology, the concepts of Internet addiction, or excessive Internet use began to appear in various studies (Douglas et al., 2008; Lin & Tsai, 2002; Odaci, 2011). These terms have a common definition, which includes indicators such as irritability in situations without the Internet or the compulsive need to be online (Odaci, 2011). Problematic Internet use is also defined as an extreme controlled involvement, or actions related to Internet use, which leads to fear or worsening of behaviour (Hayat et al., 2020). Using the Internet to achieve a specific goal within a reasonable time frame is considered as a healthy use. The excessive Internet use – can soon chief to the postponement of the tasks they have to work on (Nwosu et al., 2020). Problematic Internet use, is nowadays a widespread and universal phenomenon, especially among young people (Hayat et al., 2020). Various authors (Aznar-Díaz et al., 2020; Odaci, 2011; Traş & Gökçen, 2020;) argue that Internet use is the highest in the 16 – 24 age groups, which means that students are the most at-risk group for Internet addiction development. A large amount of research has

been devoted to investigation of the relationship between Internet addiction and the age variable. The research of Odaci (2011) showed that university students have the highest risk of becoming Internet addicted, because of excessive Internet use. Studies have also shown that 8% – 34% of university students are dependent on the Internet (Nwosu et al., 2020; Xin et al., 2018). Young (2004) identified significant trends in Internet addiction among university students. First, there is too much unstructured time for students, and at that time procrastination and dependence on the Internet are both possible appearing results of poorly used time. Another reason is that young students between 18 and 22 years of age, can do anything without being watched by their parents. The economic reason for addiction may be the fact that they have free Internet and unlimited Internet access both at home as well as in various institutions, and the next reason is the absence of interpersonal contacts, whereby instead of finding friends, students use various applications on the Internet to pass the time (Young, 2004). Holdoš (2012) on a sample of university students found that younger university students are more susceptible to become Internet addicted; the mentioned research shows that the rate of problematic and risky use of the Internet is higher among university students compared to high school students.

Connected with the Internet addiction prevalence, investigated were also gender differences, where some research (Demetrovics et al., 2008; Parker et al., 2013 Dewitte et al 2002) pointed to the absence of a significant difference between the sexes; on the other hand, some research (Meier et al, 2016) found gender differences in favour of men, while 9% of the 199 examined subjects were addicted (Mo et al., 2020).

Holdoš (2012) found that men achieved significantly higher values in the Internet addiction test, but women showed higher overall scores in problematic Internet use rates. In connection with this finding, the research of Zeynep Oktug (2012) shows a higher rate of Internet addiction in favour of women. Based on empirical research, it is not entirely clear whether the investigated construct of the Internet addiction is related to gender or age, so we will try to find out which gender and classification in the group of university or high school students is related to the given construct.

The connection between academic procrastination and problematic Internet use

Problematic Internet use greatly increases students' chances of procrastination. Lavoie (2000) emphasizes the fact that the Internet is a good place for procrastination, as there is a high risk of distraction from the primary interest and academic tasks (Lavoie, 2000; Reinecke et al., 2018;

Tratcher et al. 2008; Young, 2004). Several researchers have studied the connection between academic procrastination and problematic Internet use (Aznar-Diaz et al., 2020; Mohammadi et al., 2015; Odaci, 2011; Reinecke et al., 2018; Traş & Gökçen, 2020), but generally valid definitions have not been revealed yet. The results of empirical studies (Lavoie, 2000; Mohammadi et al., 2015; Reinecke et al., 2018) on the connections between problematic Internet use and academic procrastination have revealed that there is a positive correlation. The link between academic procrastination and problematic Internet use has been addressed by many international researchers. In this regard Reinecke et al. (2018) argue that the international literature is full of studies showing that Internet users use online media as a means of procrastination. For example, in Turkish schools, there has been a significant linear increase in academic procrastination as well as Internet dependence (Murat et al., 2014). Furthermore, Internet addiction and procrastination correlated significantly among students (Yang et al., 2019), and procrastination and problematic Internet use correlated positively among university students in Estonia (Rozgonjuk et al., 2018). Reinecke et al. (2018) further found in their research the existence of a positive connection between procrastination and poorly controlled Internet use. Similarly, Lian et al. (2018) found that social networks and the Internet had led to an increase in the problematic behaviour and associated with irrational procrastination. Hayat et al. (2020) found a positive correlation between variables, explaining Internet addiction as a negative behaviour that affects activities such as doing homework or studying for exams.

There is no doubt that academic procrastination is more associated with studying at university, where a higher burden is placed on the student in the form of homework projects or presentations. Yurdakoş and Biçer (2019) found a positive connection between social network addiction and academic procrastination in a sample of university students. On the other hand, academic procrastination may already appear in high school environment, as confirmed by research by Gürültü (2016), who also found a positive connection between academic procrastination and social network addiction among high school students.

Based on several of these studies (Aznar-Diaz et al., 2020; Mohammadi et al., 2015; Odaci, 2011; Reinecke et al., 2018; Traş & Gökçen, 2020), the relationships that exist between Internet-related behaviours and academic procrastination are not fully explored. Overall, these results propose that diverse uses of the Internet appear to be one of the most common alternate activities used by procrastinators and may be partly responsible for the negative links between postponing tasks and the

psychological functioning of adolescents. Therefore, it is necessary to understand how the link between the use of social media and problematic Internet-related behaviour can predict students' academic procrastination. To gain a deeper understanding of academic procrastination, we will examine the difference in the degree of academic procrastination between high school students and university students. Adolescents are active users of social networks, and given that the use can lead to delays, it is essential to understand the associations between social networks, problematic Internet use, and academic procrastination.

Research questions and hypotheses

RQ1: Is there a difference in the score of academic procrastination and score of problematic Internet use between high school and university students?
RQ2: Is there a difference in the score of academic procrastination and score of problematic Internet use between male and female?
H1: There exist a statistically significant positive connection between the excessive Internet use and academic procrastination (Aznar-Diaz et al., 2020; Mohammadi et al., 2015; Odaci, 2011; Reinecke et al., 2018; Traş & Gökçen, 2020).

Methods

The research samples

The research group consisted of 389 respondents, specifically students from several schools, who were selected using convenience sampling method: the study sample consisted of high school students from the Business Academy in Topoľčany or Business Academy in Nitra, and the second part of the research sample consisted of bachelor's degree freshmen at the Institute of Management UCM. The main condition for the respondents´ selection was that everyone was a high school or university student at the time of research conduct; the respondents age ranged from 16 to 22 years, with an average age of 18.41 years, where the total research sample created 50.6% of female and 49.4% male respondents.

Research methods

According to the stated study objectives, an adequate methodology to conduct the research and data collection was chosen, where the chosen methods took a quantitative form of the research plan. The header of the

questionnaires gave complete instructions and the overall conclusion did not require more than 10 minutes.

Procrastination Scale for Students – PSS

PSS (Lay, 1986) is a scale designed for high school and university students to obtain information about whether and to what extent an individual suffers from procrastination. This scale contains of 20 items, where the respondents answer using a 5-point Likert scale, and the scale includes ten oppositely scored items. Based on the value of the summary score, the respondent falls into one of three categories. Individuals with scores up to 52 are categorized as mild procrastinators, moderate procrastinators score from 53 to 63, and those scoring 64 are severe procrastinators (Gabrhelík et al., 2006). In our research, the Cronbach's alpha was 0.75.

Problematic and Risky Internet Use Screening Scale – PRIUSS

PRIUSS created by the authors Jelenchick et al. (2014) is designed to measure problematic levels of Internet use among students aged 16 to 24. The scale is based on individual self-assessment, which indicates the level of Internet use from normal to problematic, with respondents being asked to express their Internet use over the last 6 months. It consists of 18 items, and the respondent answers via a five-point Likert scale from 1 to 5. In PRIUSS, problematic and risky scores of Internet use increase with overall score increasing. Higher scores mean that Internet excessive use is increasingly unhealthy, i.e. it has a negative impact on adolescents' lives and can lead to susceptibility to pathologies such as Internet addiction. In the case of our research, the reliability through Cronbach's alpha reached 0.86.

Procedure

The research was carried out by selected scales administering at several high schools in Topoľčany, Nitra, and at universities in Trnava in the months from April 2021 to June 2021. The respondents received all the necessary information about the research purpose, as well as instructions on how to proceed when the scales completing, while participating in the research voluntarily by filling in an anonymous battery of questionnaires online. The firs were collected the data in Excel, where were adjusted the data that needed to be recoded, and then were calculated the total score in the monitored variables. To process and analyze the quantitative data obtained from the questionnaires, the statistical system SPSS 23 for Windows was used within mathematical-statistical procedures. Using SPSS

statistical software, descriptive indicators of variables (mean, standard deviation, median, minimum, and maximum) were generated and then their normality of distribution was verified. Based on the results of the Kolmogorov-Smirnov test for normality, were concluded the Problematic Internet use variables in our research group, that does not have a normal distribution, so we used a nonparametric form of comparative analysis (Mann- Whitney U test) as well as a nonparametric form of correlation analysis to investigate the research question and test the hypotheses (Spearman's rank correlation coefficient).

Results

Table 1 reports descriptive characteristics of the tested variables such as the measures of the mean (mean, median), measures of variability (standard deviation), range of variables (minimum, maximum), and measures of the shape of the distribution group (skewness, kurtosis).

Table 1. Descriptive table for variables in research

	N	Min.	Max.	Med.	Mean	SD	Skewness	Kurtosis
Age	389	16	22	18	18.4	2.09	1.375	4.671
Academic Procrastination	389	24	65	42	41.97	8.62	0.067	0.007
Problematic Internet Use	389	20	70	30	32.84	10.82	1.121	0.535

Source: Author's own conception

In the table, can be seen that the mean of the variable Age is 18.4, the mean of Academic Procrastination is 41.97 and the mean of the variable Problematic Internet Use is 32.84.

H1: There exist a statistically significant positive connection between the overall rate of problematic Internet use and academic procrastination.

The analysis of the connection showed a moderately positive connection between the variables Procrastination and Problematic Internet Use at the level of statistical significance Sig. < 0.01. The value of Spearman's correlation coefficient $\varrho = 0.42$. Based on the determined statistical significance of Sig. < 0.01, the connection between the variables Academic Procrastination and Problematic Internet Use was considered as significant. Based on the results, we supported hypothesis H1 about the existence of a positive connection between the variables. Academic

procrastination is linearly related to problematic Internet use, so when higher problematic Internet use is recorded, the rate of academic procrastination also increases.

Table 2. Spearman's rank correlation coefficient between problematic Internet use and Academic procrastination

		Academic Procrastination
Problematic Internet Use	Spearman's ϱ	0.42
	Sig.	0.001
	N	389

Source: Author's own conception

RQ1: Is there a difference in the score of academic procrastination and problematic Internet use between high school and university students?

Comparative analysis (Table 2) did not show a statistically significant difference in the significance level of Sig. < 0.05 in the variable Academic Procrastination (U=1361,000; Z=-1,141) in the group of high school and university students. Thus, there is no significant variance in academic procrastination between the groups of students. Based on the mean values in the table, was concluded that university students (M = 91,83) have a higher rate of procrastination, although not statistically significant, compared to high school students (M = 79,79).

The difference analysis of the variable the problematic use of the Internet among students was with the result U = 1020.0; Z = -2.418; Sig. < 0.05. The differences between groups were in average ranks interpreted as statistically significant. There is a statistically significant difference in problematic internet use between high school students and university students. Based on the average ranks, were recorded higher values of problematic Internet use among university students (MR= 105.74) compared to secondary school students (MR = 77.49).

Table 3. Comparation between high school students and university students

		N	Mean Rank	Mann- Whitney U test
Academic procrastination	High school students	139	79,79	U= 1361,000
	University students	23	91,83	Z= -1,141
	N	389		Sig. = 0,254
Problematic Internet use	High school students	139	77,49	U= 1041,000
	University students	32	105,74	Z= -2,678
	N	389		**Sig. = 0,007**

Source: Author's own conception

RQ2: Is there a difference in the score of academic procrastination and problematic Internet use between male and female?

The comparative analysis, the results of which are presented in the Table 3. did not show a significant variance at the level of significance Sig < 0.05 in the variable Procrastination (U=2913.000; Z=-1.231) in the group of men and women. Thus, there is no significant difference between men and women in academic procrastination. On the other hand, there is a significant difference between gender in the rate of problematic use of the Internet (U=795.5; Z=-3.562; Sig < 0.001), while in women was seen higher average values (MR=85.19) compared to men (MR=47.66).

Table 4 Differences between gender in the rate of problematic use of the Internet

		N	Mean Rank	Mann- Whitney U test
Academic procrastination	Male	80	76,91	U= 2913,000
	Female	82	85,98	Z= -1,231
		162		Sig. = 0,218
Problematic Internet use	Male	80	47,66	U= 795,5
	Female	82	85,19	Z= -3,562
		162		**Sig. = 0,000**

Source: Author's own conception

Discussion

The aim goal of the presented study was to verify the mutual connections between academic procrastination and problematic Internet use drawing on previous research (Lavoie, 2000; Mohammadi et al., 2015), which found a significant connection between these variables. Our results showed that problematic Internet use was positively associated with academic procrastination and based on that, can be stated that there is a linear relationship between the variables, and therefore, as the time spent on the Internet increases, so does the procrastination behaviour of students. These research results are consistent with the results of empirical studies that have found a connection between problematic Internet use and academic procrastination (Aznar-Diaz et al., 2020; Mohammadi et al., 2015; Odaci, 2011; Reinecke et al., 2018; Traş & Gökçen, 2020). Lavoie (2000) found that there is a positive connection between academic procrastination and Internet use. Using the Internet to escape tasks evolves also more frequent Internet use. Mohammadi et al. (2015) supports our finding, namely the fact that there is a moderate connection between Internet use and academic procrastination of students. In the finding context, important is to point out the possibility of Internet addiction due to the frequent postponement of academic tasks. According to Young (2004), due to Internet addiction, students may suffer from poor study habits related to academic tasks postponing. Tratcher et al. (2008) argue that students use the Internet to delay their tasks, and thus support the claim about the connection between procrastination and problematic Internet use. According to Tratcher et al. (2008), the Internet provides students with several potentially fun activities, such as communicating with friends or family, through which they can easily digress from completing their tasks. Students who are problematic Internet users usually spend a significant amount of time on non-work-related Internet activities, and therefore neglect their academic duties. Overall, these results advise that different uses of the Internet appear to be one of the most mutual alternative activities used by procrastinators and may be partly responsible for the negative links between postponement and the psychological effective of adolescents (Odaci, 2011). In our opinion, procrastination via the Internet is an attractive option for students, because of the multifunctionality of the Internet and the illusion of work. The results support the finding that academic procrastination can be defined as behavioural imbalances, behavioural control problems, and the planning of activities that may develop because of uncontrolled use of the Internet. These findings clarify the connection between academic procrastination and problematic Internet use. The student perceives the Internet as an escape

environment from stressful situations or unwanted emotions; academic procrastination thus becomes an important determinant in shaping behavioural and psychological problems that may prevent students from showing their talent or actual performance (Traş & Gökçen, 2020).

Another aim of the study was to find out the existence of a difference in the degree of academic procrastination and degree of problematic internet use between high school and university students. Since the relationship between students' age and academic procrastination is not well researched, we decided to clarify it in our research. Various authors (Khan et al., 2014; Steel, 2017; Ziegler & Opdenakker, 2018) report conflicting results on the discussed relationship. Our research showed there was no statistically significant difference in the degree of academic procrastination between the group of high school and university students. Tuckman (1991) stated that with the gradual development of children at school, parents and teachers are less responsible for helping the student to perform their tasks; therefore, could be expected that when a student starts attending university, is able to monitor his or her own performance. The university student should have developed internal self-control and should have mastered functional learning strategies that would enable him or her to manage the tasks (Steel, 2007). Khan et al. (2014) found that procrastination behaviour peaked by the end of one's 20s and then gradually declined. The same finding is confirmed in a study by Mohammadi et al. (2015), who concluded that first-year university students procrastinate the most, and longer the student study, the less they procrastinate. In this regard, Kim and Seo (2015) point out that very few studies have been conducted among younger students that could confirm that procrastination is age-related, thus the riskiest group for the procrastination occurrence are high school students, not university students. Most procrastination studies use samples of university students or adults. Researchers should therefore approach the group of students at high schools as a separate group, and not just draw conclusions about other populations (Ziegler & Opdenakker, 2018).

The use of the Internet in society has improved significantly among students (Odaci, 2011), therefore, as a part of the first research question, we investigated whether there is a difference between high school and university students in problematic use of the Internet. Our results suggest that rates of problematic and risky Internet use are higher among university students compared to high school students. Holdoš (2012) brings findings that especially students in the first years of university study are a risk group for the addiction emergence, as they come to a new environment, where they gradually settle in, and have a lot of free time. Through the Internet, they

can fill this unused time or reduce their anxiety about the new life situation. Similarly, Raacke et al. (2008) discuss increased Internet use among college freshmen. This is primarily because the new environment forces them to be in touch with old friends, get in touch with current friends and meet new friends as well.

In the framework of gender comparison, it is possible to state that girls exert more in demanding tasks, therefore we could ultimately expect that procrastination is linked primarily to the male gender (Steel, 2017). Many studies (Steel & Ferrari, 2013; Steel, 2017) have concluded that procrastination is experienced differently by each gender but also found at different levels, and higher rates of procrastination were associated with male gender (Khan et al., 2014). Our research did not confirm a statistically significant difference in the occurrence of academic procrastination between men and women. The fact that no gender differences in the overall rate of academic procrastination were found in our study indicates that these findings can be further generalized to all students, regardless of gender. The insignificance of gender is the evidence of universal occurrence of procrastination in all students. Furthermore, we investigated the differences in the level of problematic Internet use, while in our study was found that the given construct is significantly related to gender, and our results pointed to a higher rate of problematic Internet use in the group of women. This result is in conformity of Holdoš (2012), whose explanation for the more problematic use of the Internet lies in the mass expansion of the so-called social networks that are more intensively used by women. Even though men tend to show serious addiction (Mo et al., 2020; Meier et al., 2016, Mingle et al 2015), women significantly catch up - especially in the results of problematic Internet use (Holdoš, 2012).

Research limits

Although our study has contributed to understanding the connection between academic procrastination and problematic Internet use, it is limited by several factors. The first relates to the research instruments used, and therefore the point that the data was gathered through instruments that were self-reporting. The students may not have possessed sufficient self-knowledge and thus did not evaluate their actual behaviour, but rather gave socially desirable responses to make their positive qualities stand out, while not acknowledging the negative ones they possessed. Another limiting factor is the small number of respondents, where the increased number of respondents in the research could increase the results credibility and generality.

Future intentions

Further research should be directed with research groups from different schools and from different areas to ensure demographic diversity. Equally interesting research would find out the rate of procrastination and problematic Internet use among students of various specializations. Odaci (2011) found that higher scores in problematic Internet use were demonstrated by students of economics than by students of medicine and architecture. This finding can be attributed to the academic and practical intensity of the study programmes of medical students, as it can be assumed that these students have less free time, which could be another research area. The faculty of economics is closer to the social sciences, and less demanding compared to medical and architecture faculties, and tasks, assignments and projects are suitable for computer processing, indicating that they are more at risk of procrastination in the online environment. Future study should consider other factors that may contribute to or mediate the connection between anxiety and procrastination where can be considered the importance to examine other predictors that would explain the high level of academic procrastination, thus future research should therefore consider other personality factors and cognitive abilities that may contribute to increased rates of academic procrastination.

Recommendations for practice

Our findings can be important for psychological and pedagogical practice. School counselors are those who should develop measures to minimize and control procrastination through proper education and intervention. Encouraging students to develop academic relationships with other students and teachers, is the way to share problems with each other or find appropriate solutions when they are not mastering a task; creating deeper real relationships, would also allow to prevent compulsive Internet use which damages relationships with family and friends.

Conclusion

The existence of procrastination has been present at schools for a long period of time, but its research has only begun recently. This study was designed to determine the connection and predictive significance of problematic Internet use and academic procrastination. Problematic Internet use was found to directly predict academic procrastination, and these variables were found to correlate significantly with each other. It was concluded that Internet use may not be detrimental to students' academic

efforts if there is no associated problematic use. This finding is very important and useful for the intervention and prevention of academic procrastination among university and high school students. Educators should strive to build students' self-regulatory skills, encourage them to make productive use of time online, especially by visiting educational sites that improve their academic skills and abilities.

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