Exploring sociodemographic factors of problematic internet use: a cross-national study of North Macedonia and Poland

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Abstract

This paper investigates the correlation between problematic internet use (PIU) and sociodemographic factors, with a specific emphasis on culture, gender, and age. Employing a quantitative, cross-national survey design, data was collected from a total of 780 respondents from North Macedonia and Poland. The study did not find relationship between demographic factors, such as age and gender, and PIU. However, disparities emerged upon examination of cross-national differences. Respondents from North Macedonia exhibited a greater susceptibility to PIU when compared to those from Poland. These national differences manifested across multiple aspects of PIU, including decreased enjoyment of offline activities, diminished real-life relationships, and weakened self-control. The findings emphasize the importance of considering cultural context when studying internet usage patterns and potential addiction. As social media and the internet have become a regular social activity, prevention campaigns should be based on social norms and harm-reduction strategies directed towards social groups rather than individuals. This approach acknowledges the collective nature of the problem and seeks to address the root causes of problematic internet use.

Keywords Problematic internet use · Internet addiction · Psychopathology · Cross-cultural research

1 Introduction

The widespread adoption of computers and smartphones in recent years has revolutionized various aspects of human existence, including education, work and social dynamics. Individuals are increasingly relying on these technological devices for communication, connectivity, and conducting business operations. This increased reliance on screens and the internet has led to unregulated and problematic usage patterns, with negative consequences for physical health, mental well-being and social interactions [1]. Excessive internet use, especially when it is related to recreational use and gaming, is a growing concern. It may turn into addictive behavior that manifests itself in the form of compulsion when an individual spends prolonged periods of time on internet-related activities, such as online gaming and gambling, social networking, and cybersex in order to produce the desired effects. In fact, an increasing amount of research indicates that problematic internet use (PIU) includes potentially addictive behaviors involving compulsive use, activation

of the reward systems, loss of control, increased tolerance, negative repercussions and withdrawal phenomena, such as changing moods and irritability [2, 3].

A growing body of research shows a correlation between pathological internet use and sociodemographic factors. This study aims to contribute to the existing research by investigating the correlation between PIU and sociodemographic factors, specifically focusing on culture, gender and age. The following research question guided the study: Does problematic internet use among young adults from North Macedonia and Poland exhibit significant correlations with sociodemographic factors such as gender, age, and culture? There is a substantial gap in studies that investigate such disorder in these two European countries. Much research is Anglo- and Asia-centric, which unfortunately means that its findings tend to exhibit bias and make understanding internet addiction more difficult. Most cross-cultural research on internet addiction has been carried out to examine inter-continental comparison [4–6] or focuses on western Europe [7, 8]. However, the results of these studies are inconclusive. Given the mounting evidence that PIU correlates with cultural differences, it is important to further test the correlation. While a large body of research is Anglo- and Asia-centric, it is important to assess the correlation in a cross-national study focusing on post-communist countries. Because of the absence of comparable tests, this study helps to address that gap in the literature. The two countries have been selected because although they share a common post-communist tradition, Poland and North Macedonia differ in many factors that have been proved to determine dependency on new technology, such as collectivism—individualism, independent—interdependent self-construals, and attitudes towards gender.

2 The complex nature of problematic internet use (PIU)

Problematic internet use (PIU), also known as pathological or compulsive internet use, internet use disorder, or internet addiction, refers to a dysfunctional pattern of internet usage characterized by significant time consumption and resulting in considerable impairment or distress. This condition encompasses a range of behaviors indicating excessive or compulsive internet use, often lacking user control, and leading to negative behavioral, psychosocial, or physical outcomes. PIU has been extensively studied and was proposed as a disorder in 1996 [9]. Nevertheless, PIU has not been recognized as an addictive disorder because it does not involve any chemical substance users can become addicted to and "there is insufficient peer-reviewed evidence to establish the diagnostic criteria and course descriptions to identify the behavior as a mental disorder" [3]. Instead, it is recognized as more a manifestation of underlying psychiatric disorders, such as depression or social anxiety [2, 10]. Some clinicians argue that PIU should be separated into different subtypes and treated as a type of its offline counterpart. They maintain that PIU is an expression of an individual's focus on specific addictive behaviors, with these behaviors being the primary problem, not the internet itself. For instance, online gamblers should be treated as gamblers, and internet pornography addiction as compulsive sexual behavior [11].

In more recent studies the interpretation of PIU varies ranging from classifying it as a non-substance or behavioral addiction, to an impulse control disorder, or a combination of both [12, 13]. The lack of agreement results from existing research gaps and conflicting research findings related to behaviors associated with internet use. However, a large body of recent research indicates that PIU is a behavioral addiction that shares core components with other addictive behaviors, compulsive use, activation of the reward systems, loss of control, increased tolerance, negative repercussions and withdrawal phenomena. Numerous research studies prove that all addiction disorders, not only substance addiction but also behavioral addictions, including PIU, have grave consequences on cognitive processes and brain function and structure. One potential impact of frequent internet use is on attention and focus. Studies have found that heavy internet users tend to have shorter attention spans and have difficulty concentrating on tasks that require sustained attention. Additionally, internet use may impact memory and learning, as some research suggests that excessive use may affect the brain's ability to store and retrieve information as well as reducing verbal intelligence [12, 13]. Hence, Internet Gambling Disorder was included in the appendix of the Diagnostic and Statistical Manual of Mental Disorders, 5th edn (DSM-5) of the American Psychiatric Association (2013) as an addictive disorder warranting further study. The World Health Organization (2018) recognized online Gaming Disorder in the 11th International Classification of Diseases (ICD-11).

Excessive internet use has been associated with symptoms such as anxiety, palpitations, loneliness and reduced productivity. In addition, individuals who overuse the internet often face problems such as social isolation and harassment [1, 14, 15]. Such problems can affect an entire family and society at large as excessive internet use has resulted in marital or family conflict, decreased work efficiency, legal problems and dwindling academic performance [16]. Furthermore, excessive computer use makes people at increased risk of smoking, abusing alcohol and drugs [17]. In fact, comorbidity is frequently associated with numerous co-occurring conditions, including depression, social anxiety disorder, social

phobia, OCD, ADHD, hostility, substance use disorders (e.g., gambling, alcohol, marihuana, nicotine, and cocaine use), eating disorders (e.g., binge eating disorder, bulimia, and obesity), and certain personality traits and personality disorders (e.g., impulsivity, borderline, avoidant personality, and antisocial disorders) [18]. What is more, comorbidities tend to be associated with typical internet use-related problems. General PIU is associated with common mental health disorders (anxiety, mood, eating, psychotic, and dissociative disorders) as well as increased substance dependency, whereas individuals with a gaming addiction experience a more diverse and severe burden of comorbidities [18].

3 Problematic internet use—a cross-cultural perspective

Problematic internet use has become increasingly common among more population groups. It is linked with the type of activity users are engaged in rather than the type of device (mobile phone or desktop). At-risk use is particularly relevant when the Internet is used as a resource for evasion, distraction, coping, or control of dysphoria and anxiety [19, p. 10]. Internet use can turn into abuse when users engage with their devices without concrete objectives, as a distraction, instead of task-focused or objective-focused use [20, 21]. Furthermore, online gaming is highly addictive with gamers being at risk of developing a psychological and behavioral dependence [22].

While some studies have not found causality between demographic variables and internet addiction [23–26], a large body of research proves that internet abuse is more common among men, young people aged 16–25 with a lower educational level [4, 20, 26–28]. The risk of addiction may also depend on factors such as personality traits, mental health, parental control, and life circumstances [29, p. 141–142].

Cross-cultural studies show there is excessive internet use in eastern populations (China, Korea, and the United Arab Emirates). No significant difference has been identified among western countries. A large body of research suggests that factors such as collectivism, interdependent self-construals, and cultural motivations are important [7, 30]. Indeed, culture affects internet-related activities. In many countries, e.g. in India and Egypt, cultural norms prevent women from accessing and benefiting from the internet. Women in developing countries use technology disproportionately less frequently than men, most probably due to entrenched socio-cultural attitudes about the roles of women in society. Since men use the internet more frequently, they are more prone to developing internet addiction [28, p. 95–96]. Therefore, access to technology, which to a great extent is culture-related (with interrelated social, political and economic factors involved), may be a critical factor that limits dependency on new technology.

Although a growing number of studies prove that cultural differences correlate with excessive internet use, they do not take into consideration the fact that the Internet may be used differently in various cultures due to differences in the environmental and social context. For example, internet users from western cultures tend to do more searching for information, whereas those from the east focus on maintaining and strengthening social ties. On social networking sites, western users are more user-centric and less intimate, while users in western countries tend to be more ingroup-oriented [31]. Therefore, research proves that the motivations towards Internet use are culture-dependent with users using the Internet to fulfill different psychological, social and information needs [30, 32]. Furthermore, individuals from different countries differ in their approach to understanding mental health problems. Asians abstain from mental health treatment and tend to rely on local alternative medicines to reduce discomfort. Therefore, the symptoms of PIU may be perceived differently simply for the reason that different cultures view mental health issues differently [30].

4 Methods

4.1 Participants

This study is based on data collected between May and August 2022 in both the Republic of North Macedonia and Poland as part of the *Internet addiction in the student population and the quarantines because of the COVID 19 pandemic* research project funded by University St Climent Ohridski, Bitola, North Macedonia. The study received approval from the Security Studies Discipline Council of War Studies University, Warsaw, Poland.

The survey sample was conveniently selected from online communities associated with universities in both the Republic of North Macedonia and Poland. The survey was disseminated through several social networking sites: Facebook, Instagram and Twitter. The inclusion criteria specified that respondents should be aged 30 or under. The survey was administered via Google Forms. It included a clause for informed consent, assuring the participants of anonymity and

confidentiality. Furthermore, participants had the right to withdraw from the study at any point. Individuals who declined to provide consent or who did not fully complete all survey scales were excluded from the study. A total of 780 respondents from the two countries participated in the study with 146 respondents from North Macedonia) and 634 respondents from Poland. However, valid questionnaires were collected from 137 Macedonian and 373 Polish respondents (N = 510). Informed consent was acquired from each respondent before they took the survey so that they were introduced to the research purpose before taking part. Fifty-six percent (N = 288) of the respondents were female. Eighty-six percent (N = 432) were aged 18 to 25 years old. The remaining respondents were aged 26 to 30 years old.

4.2 Data analysis

The statistical analysis was conducted using SPSS software. To assess the normality of the sample data, the Shapiro–Wilk Test was employed. Additionally, the Kaiser Meyer Olkin (KMO) measure of sampling adequacy was calculated to determine the proportion of variance in the variables. Bartlett's test of sphericity was used to test the null hypothesis that the variables in the dataset are uncorrelated in the population. Descriptive statistics, Cronbach's alpha, and chi-square tests were used to investigate the correlation between PIU and sociodemographic factors (age, gender, and nationality).

The Shapiro–Wilk Test was used to assess the normality of the data, revealing that the null hypothesis of normal distribution could be rejected based on the obtained p-value being less than 0.05. The Kaiser Meyer Olkin (KMO) coefficient, with a value of 0.951, demonstrated that the matrix was suitable for analysis. Bartlett's test of sphericity yielded a value of 7166.71 with a p-value less than 0.05, which indicated that the variables were uncorrelated in the population. Therefore, significant relationships among the variables were observed. The internal consistency coefficient (Cronbach's alpha) for the sample was 0.928, indicating high internal consistency and establishing a reliable measure.

4.3 Instrument

The Internet Addiction Test (IAT) developed by Kimberly Young [9] was used for this study. The questionnaires contained the culturally adapted and validated Macedonian and Polish versions [33] of IAT. This test investigates the existence and intensity of internet addiction. The test comprises 20 items that evaluate the degree of preoccupation, compulsivity, behavioral problems, emotional changes and the personal, social and occupational impact of internet use. The IAT consists of 4 scales: reliance on online life, relationships, neglect of work, and self-control. The answers are rated on a Likert-scale with scores ranging from 0 to 5, with higher scores indicating a greater inclination towards addictive internet use. Based on the answers, the addictive behavior is categorized into four categories: lack of addiction, mild signs of addiction, moderate signs of addiction, and severe addictive behavior.

The reliability and validity of the IAT has been well-established in previous studies conducted in North Macedonia [34] and Poland [35, 36]. The respondents' demographic information was also collected (age and gender, and nationality).

5 Results

The mean IAT score was 1.51 (SD = 1.184 ranging from 0.87 to 3.37) for the Polish sample and 2.26 (SD = 1.496 ranging from 1.55 to 3.22) for the Macedonian sample. Further analysis revealed that 44.1% (n = 225; 52.3% Polish and 21.9% Macedonian respondents) presented a normal level of internet usage; 36.3% (n = 185; 36.5% Polish and 35.8% Macedonian respondents)—a mild level of PIU; 18.4% (n = 94; 10.7% Polish and 39.4% Macedonian respondents)—a moderate level; and 1.2% (n = 6; 0.5% Polish and 2.9% Macedonian respondents)—a severe PIU (see Table 1).

A chi-square test showed a significant difference between internet usage level in Polish versus Macedonian respondents, with $\chi^2 = 70,568^a$, $p < 0.001$, V Cramer's = 0.372 suggesting that respondents from Macedonia, compared to those from Poland, more often have problems with PIU. This indicates that individuals from Macedonia experience more problems with PIU compared to those from Poland, suggesting variations in internet usage patterns between the two countries. While the majority of participants in both countries reported mild levels of addiction, there were disparities in the prevalence of moderate and severe addiction levels, with a higher percentage of participants from Macedonia reporting moderate addiction levels compared to those in Poland. No statistically significant relationship between the group and age or the gender; however, it was found that young adults and females scored higher on the IAT scale.

Table 1 Demographic characteristics of students

	Poland	Macedonia	Total n (%)	p value and additional tests
Age				p 0.098 χ^2 2.730[a] df = 3
18–25	310 (83.1)	122 (89.1)	432 (84.7)	
26–30	63 (16.9)	15 (10.9)	78 (15.3)	
Gender				p 0.092 χ^2 2.841[a] df = 3
Males	154 (41.3)	68 (49.6%)	222 (43.5)	
Females	219 (58.7)	69 (50.4)	288 (56.5)	
Nationality	373 (73.1)	137 (26.9)	510	
Normal internet use	195 (52.3)	30 (21.9)	225 (44.1)	p 0.000 χ^2 70,568[a] df = 3 p Monte Carlo 0.000[b] V Cramer's 0.372
Mild level of PIU	136 (36.5)	49 (35.8)	185 (36.3)	
Moderate level of PIU	40 (1,.7)	54 (39.4)	94 (18.4)	
PIU	2 (0.5)	4 (2.9)	6 (1.2)	

Table 2 presents data on various factors contributing to PIU, including reliance on online life, relationships, neglect of work, and self-control. Mean scores for these factors are provided for both Poland and North Macedonia, across different levels of internet use: normal use, mild overuse, moderate overuse, and internet addiction.

The comparison of factors contributing to PIU based on different levels of overuse revealed that the mean factor scores for each factor in both countries were generally higher among individuals with higher levels of overuse, indicating a positive correlation between overuse and PIU. Both Polish and Macedonian groups showed statistically significant differences in all aspects of PIU, except for one question: regardless of nationality, all respondents stayed online longer than intended. Nationality differences were observed in all aspects of PIU, particularly among Macedonian respondents who reported a decrease in enjoyment of offline activities, a decrease in real-life relationships, and a weakened ability to exercise self-control. The greatest difference was visible in self-control, with the Macedonian respondents experiencing a significantly greater difficulty in managing screen time, especially among those with moderate overuse and PIU. This suggests that self-control challenges may be a key factor in the development of PIU. Polish respondents with normal internet use or mild overuse demonstrated greater difficulty in balancing work and online time, potentially leading to the use of social media or web surfing during work hours. These results align with previous studies highlighting the association between an increased internet dependence and reliance on online activities and neglect of work obligations [24, p. 128].

Given the observed correlation between PIU and nationality, a chi-square test was conducted to examine a relationship between nationality and scores on each of the four scales: reliance on online life ($\chi^2 = 81.27$, $p < 0.001$), relationships ($\chi^2 = 30.17$, $p < 0.001$), neglect of work ($\chi^2 = 50.50$, $p < 0.001$), and self-control ($\chi^2 = 49.79$, $p < 0.001$). The small p-values for all the scales indicate a significant association between nationality and scores on each scale. These findings emphasize the significance of considering the cultural context in the study of internet usage patterns and potential addiction.

6 Discussion

The study yields considerable insights into the problem of PIU in a cross-national context. It provides comparable findings from two post-communist countries: Poland and the Republic of North Macedonia. Overall, the findings reveal that PIU is a growing concern in both countries, and efforts should be made to promote responsible internet use and reduce overuse.

Regarding demographic variables, the study did not find relationship between demographic factors (age and gender) and PIU, aligning with previous studies [23, 25]. However, other studies have identified higher rates of PIU among males [4, 20, 26–28]. Sinkkonen et al. [24] found gender differences in two categories of PIU: male respondents revealed a greater drop in real-life relationships, whereas female respondents showed a greater decline in self-control. This correlation was evident even with mild overuse of the Internet. De-Sola et al. [19] showed that gender differences correlate with the type of online behavior: females tend to spend more time at their screens and overuse social media and smartphone applications, whereas males engage in comparatively more generalized internet use. Furthermore, females revealed greater abusive behavior but, on the other hand, they had a greater capacity for personal care.

Regarding the variable of age, research findings in relation to PIU are inconclusive. Some studies, including the present one, have reported no significant age-related differences in PIU [24, 26]. However, other studies found that the age at

Table 2 Group comparison between the levels of internet use

Factors of PIU	Mean of factor scores											
	Normal use		Mild overuse		Moderate overuse		Internet addiction		Group overuse			
	Poland	N. Macedonia	Poland	N. Macedonia	Poland	N. Macedonia	Poland	N. Macedonia	Poland	N. Macedonia
Reliance on online life	0.68	0.71	1.62	1.78	2.72	2.97	4.75	4.47	1.23	1.38
Relationships	0.72	0.79	1.49	1.31	2.65	4.78	5	4.12	1.2	1.11
Neglect of work	1.27	1.24	2.2	2.11	2.88	3.24	4.12	4.69	1.77	1.79
Self-control	1.52	1.81	2.69	2.70	3.4	3.51	4.12	4.25	2.14	3.36

which individuals first experience the internet has been linked to at-risk internet use [37]. Furthermore, age influences the type of online activities users engage in, with online abuse being more prevalent among young users aged 16 to 25 [19]. Adolescents and young adults are more involved in online gaming, whereas adults are more frequent gamblers [18]. Paying online games has been associated with an increased risk of developing an addiction [25]. Both online gaming and using social networks are identified as the most addictive internet activities among young adults [27, p. 303]. Users who use the internet for entertainment and leisure purposes tend to be more at risk of developing addictive behavior [19, 20].

The most important finding of this study was proving that nationality is a significant predictor of PIU, with Macedonian respondents scoring significantly higher. When examining the factors contributing to PIU, reliance on online life scores were relatively similar between the two countries, but as the level of internet use increased, so did the reliance on online life for both countries. Similarly, relationships scores were comparable between Poland and North Macedonia, but showed significant increases as internet use progressed from normal use to internet addiction, particularly among Macedonian respondents. Neglect of work scores were relatively similar across all levels of internet use for both countries, with slightly higher scores in Poland, indicating a higher level of neglect of work. Finally, when considering self-control, both countries show an increasing trend in mean scores as the level of internet use progresses. North Macedonia generally exhibits higher mean scores compared to Poland, suggesting lower levels of self-control among Macedonian participants.

The correlation between PIU and nationality can be understood by considering additional factors such as economic development and social norms, which may contribute to the observed differences in PIU. Poland, with a higher rate of GDP per capita compared to North Macedonia, may experience different cultural and societal influences on internet usage patterns and addiction tendencies. It is worth noting that greater internet penetration, often coupled with steady economic growth, is typically associated with higher rates of PIU [31, p. 94]. The rapid increase in social media users in North Macedonia compared to Poland further supports the higher internet use observed among Macedonian participants, because using social network sites is highly addictive [20, 25]. A high internet penetration and social media use in both countries sheds light on the prevalence of social norms associated with using the Internet. Peer influences have a particularly significant impact on addictive behavior and online gaming and social networking sites have become a common socially accepted entertainment. The ubiquity of mobile devices makes internet overuse more than likely. Furthermore, there may be a low awareness of the negative consequences of internet overuse. Unlike substance use, online gaming and social networking sites are not typically considered to be addictive. Although such activities have numerous benefits in many fields [38], excessive use yields addictive behavior.

Some studies have found a correlation between problematic internet use and consumption of tobacco, alcohol and illegal drugs [19, 20]. This, however, is not supported by the present study. Poland and North Macedonia have inconsistent patterns of substance use, with the average consumption of pure alcohol twice as high in Poland (11.89 L per year among all adults aged 15+ in Poland and 6.43 in North Macedonia [39]). Drug use, however, remains at a similar level in both countries: 0.005% in Poland and 0.006% in North Macedonia. Drug dependency and overdose is 5.59% in Poland and 6.29% in North Macedonia [40].

Finally, Poland and North Macedonia are distinct across cultural variables that have been proven to influence dependency on new technology. Cross-cultural differences, including collectivism-individualism dimension, play a crucial role in shaping attitude and value formation [41–43] as well as technology adoption and usage patterns. North Macedonia is more collectivistic and based on interdependent self-construals. It is therefore more likely that the Internet is used to maintain social relations. Macedonian users might also spend more time online to fit in with their peer group. The two countries also differ in their attitudes towards gender. Macedonia is a more traditional culture in terms of gender roles with strong social norms around gender roles, which may affect Internet-related activities.

7 Conclusion

This study adds to our understanding of problematic internet use (PIU) in an international and multicultural context. The analysis of cross-national differences reveals that Macedonian students have a relatively higher tendency to experience problematic internet use compared to their Polish counterparts. Nationality differences were found in various aspects of PIU, including decreased enjoyment of offline activities, diminished real-life relationships, and weakened self-control. The findings emphasize the importance of considering cultural context when studying internet usage patterns and potential addiction. Demographics have not been found as correlating with overuse of the Internet. These findings shed light on the significant implications of this study. As social media and the internet have become a regular social activity,

prevention campaigns should be based on social norms and harm-reduction strategies need to be targeted at social groups, not individuals.

8 Limitations

Despite the valuable insights provided by the study, several limitations need to be taken into consideration, such as the overrepresentation of respondents from Poland and the low response rate among the Macedonian population, which may limit the generalizability of the findings to a broader population. A larger study sample could indicate a greater variability in the responses and increase the study's validity. Another limitation arises from the use of a convenience sampling method. Consequently, caution should be exercised when applying the results beyond the sampled participants. Furthermore, the study relied on questionnaires that primarily focused on to the Internet Addiction Test and few sociodemographic variables. Future research should incorporate a more comprehensive questionnaire to capture additional variables. The analysis has not provided causality, only correlation; therefore, further research is needed to investigate the causal relationships and effects of the observed trends. In light of these limitations, future studies should conduct more specific analyses of at-risk internet use in international and multicultural contexts to deepen our understanding of this complex phenomenon.

9 Further studies

Further cross-cultural research is needed to understand the influence of social variables on internet abuse, such as social norms, economic development, parental relations, and comorbid factors like substance use. Future studies might investigate both risk and protective factors, shedding light on cultural differences in PIU. Comprehensive studies analyzing cultural differences and their influence on online behaviors will further enhance our understanding of PIU in various socio-cultural contexts.

Future research might also explore social factors in at-risk internet use, such as perceived norms of behavior and knowledge of negative consequences. Given contrasting findings from other studies suggesting gender- and age-specific tendencies in PIU, more research is needed into demographics to provide rich insights across different population groups. This is particularly true for younger children, who are becoming increasingly dependent on digital devices and spend more time online. Lastly, the persistently low response rates in online surveys, social desirability bias and online survey fatigue may have compromised the validity of the study leading to skewed results. To mitigate potential biases, face-to-face interviews are recommended.

Declarations

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