

**RESEARCH PAPER****Impact of Internet Addiction on Academic Achievement in the  
subject of Mathematics****Muhammad Zubair**

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**\*Corresponding Author:** [zubairpaflt@gmail.com](mailto:zubairpaflt@gmail.com)**ABSTRACT**

The major purpose of this research is to determine whether or not the problematic internet use has a significant impact on mathematical ability within the setting of Pakistani schools with well-established counseling facilities. Correlational analysis was used as part of a cross-sectional study design in this investigation. Three hundred and fifty-eight (male 226; female 132) individuals between the ages of 14 and 18 were recruited using a purposive selection strategy to guarantee a representative sample. All of these students come from Rawalpindi and Islamabad colleges. The severity of internet use was evaluated with the use of Young's Internet Addiction Test. The cumulative average of the student's most recent set of comprehensive exam was used to determine academic success in mathematics. Academic performance was shown to be negatively correlated with internet dependence ( $r = -.205, p < .01$ ). Differences in internet addiction between sexes were found, however they were not statistically significant. The results of this study highlight the significance of encouraging efficient and prudent internet use among secondary and upper secondary school pupils. The possible academic consequences of students' improper internet use should also be communicated to all stakeholders including school psychologists and counselors who are responsible for formulating behavior modification strategies in collaboration with parents and college staff.

**Keywords:** Academic, Internet Addiction, Mathematics, Performance, Secondary Level**Introduction**

Everyone from teachers to students to parents to members of the wider public care deeply about finding effective ways to raise educational benchmarks. The success of their children and pupils in school is a goal shared by all parents and educators. The importance of education is emphasized because of the positive effects it has on many different aspects of life, including scientific discovery, economic growth, political power, and individual happiness. Adolescents' habits in many areas of life have been drastically altered by the proliferation of contemporary technology, especially the internet. Adolescents' abilities in all of these areas have been greatly boosted by their widespread use of the internet. However, several studies have shown that too much time spent online has a detrimental effect on children's academic performance, especially in mathematics, a crucial topic at the heart of most curriculum. More time and resources are devoted to teaching mathematics than any other subject (Orton & Frobisher, 2004). In addition, Ukeje (2005) argues that mathematics is vital to modern science, which is pivotal to cutting-edge technology, which in turn advances modern society. Numerous studies have shown that a country's industrial and economic progress is negatively affected by a lack of high-quality mathematics instruction and low academic success. As a result, studying how much time is spent online may affect academic performance is crucial. This study aims to examine the relationship between students' problematic internet use and their mathematical performance at prestigious colleges attended by students from middle class backgrounds. Several researchers have looked into how students' problematic internet use affects their academic performance as part of an effort to develop firm theoretical foundations for educational outcomes. Multiple studies in Pakistan have looked into the relationships between students'

sense of intellectual self, their internet use, and their academic success. Most studies examining how much time spent online affects students' ability to learn have focused on undergraduates. In this study, we'll look at how students' problematic internet use affects their grades at a select group of prestigious colleges in Islamabad, where they have access to resources like tutoring and career counseling in addition to the kind of supportive learning environment that is all too rare in Pakistani classrooms. By shedding light on new factors like the problematic use of the internet in deteriorating the performance of math performance even in highly conducive learning environments at educational institutions and at home, this study will improve the understanding of all stakeholders to improve academic brilliance at the undergraduate and graduate levels, particularly in the subject of mathematics. Most parents whose children attend reputable schools are content for their children to receive generic advice on how to deal with learning difficulties, and most reputable schools' administrations are content to leave potent factors like internet addiction unchecked when managing students' learning habits and outcomes. Results were shared with everyone who had a stake in the study. Both parents and schools are worried about high rates of internet addiction amongst teenagers, especially those in high school. The results of this research will help teachers at all levels of education combat students' negative online habits and raise academic performance.

### **Literature review**

"Academic achievement or academic performance is the outcome of education" [Strage & Brandt, 1999; Hughes & Kwok, 2007]. In the context of formal education, the term refers to the public display of skills and understanding acquired in the course of formal study. Previous research has shown that girls often outperform guys in the classroom. However, previous studies have yielded conflicting results when examining the gender difference in many facets of academic achievement. Young (1998) and Griffiths (1998, 2000) are highly regarded pioneers in the field of internet addiction. Their work has been instrumental in shaping our understanding of this phenomenon, as they were the first to explore and define the concept. Their groundbreaking studies have provided valuable insights into the impact of excessive internet use on individuals' well-being. Internet addiction disorder, in essence, is a condition marked by an individual's preoccupation, intense desires, and behaviors related to excessive and uncontrolled internet usage, resulting in harm and distress. Weinstein (2010) highlights the presence of four common traits that are consistently observed across various definitions of internet addiction. It is not uncommon for individuals who spend excessive amounts of time online to experience a distorted perception of time and struggle to meet their basic responsibilities. Furthermore, individuals who struggle with internet addiction may find themselves grappling with a range of challenging emotions such as anger, anxiety, and hopelessness when they are unable to access the internet. It is important to acknowledge that the increasing reliance on sophisticated computer systems and the amount of time individuals spend using them can have potential drawbacks. It is important to understand that addiction to the Internet can manifest in various ways, and it can be helpful to categorize these manifestations into three distinct categories: compulsive gaming/gambling, sexual preoccupations (cybersex), and social networking/email/messaging. It has been observed in various studies that there is a correlation between being male and an increased likelihood of experiencing problematic internet usage, such as excessive online gaming (Haagsma et al., 2012). When it comes to online gaming, it is particularly important to consider this aspect. It is interesting to note that researchers have discovered a higher likelihood for males to develop an online gaming problem compared to females developing an internet usage disorder (Rehbein & Mößle, 2013; Strittmatter et al., 2015). This finding suggests that further efforts are needed to better differentiate between these two issues. According to the research conducted by Adiele and Olatokun (2014) and Adiele and Olatokun (2015), as well as Tsitsika et al. (2015), it was discovered that women tend to report experiencing lower levels of obsession with online activities compared to men. Research has shown that there is a higher likelihood for men to experience addiction compared to women, and this pattern has been observed in various

countries, including Pakistan (Waqas et al., 2016). It is important to acknowledge that various studies (Ha & Hwang, 2014; Ahmer & Tanzil, 2018; Bai et al., 2001) have explored the relationship between gender and online addiction. However, it is crucial to approach these findings with caution and consider the broader context. Some research suggests that gender may not be a reliable predictor of online addiction, and there are even indications that women's internet habits can be comparable to or potentially more problematic than men's. It is essential to recognize the complexity of this issue and avoid generalizations, as individual experiences and factors can significantly influence one's relationship with online activities. Recent research conducted by (Ilesanmi et al., 2021) indicates that there is no statistically significant difference in the occurrence of problematic internet use between men and women during the COVID-19 shutdown. Addiction to the internet has similar negative repercussions on health, relationships, and success in school as does substance consumption (Echebura, 2013). Because of the internet's convenience and availability, students may participate in fruitful online discussion groups and do their own research. Young (1996), Scherer (1997), Kraut et al. (2002), Kubey et al. (2001), Nalwa and Anand (2003), Brunborg et al. (2014), Choo and colleagues (2010), Gentile and colleagues (2011), Haghbin and colleagues (2013), Hosseinzadeh and colleagues (2015), Huang and colleagues (2015), and many others have found that too much time online can negatively affect academic performance and social behavior and habits and even skills. Research has established a correlation between internet addiction and several factors, such as low grades, gender (specifically being female), computer and internet access availability, excessive online time, and parental educational background (Mohamed & Bernou, 2020). Studies conducted in Azad Kashmir (Arslaan et al., 2018) show that problematic internet use negatively impacts students' academic performance. Similarly, research on business students in Pakistan indicated that too much time spent online has a detrimental impact on their grades (Islam et al., 2017). Another scholarly study looked at the effects of internet addiction on pupils' academic performance and development (Nabela et al., 2017). They found that students' emotional instability was a factor in their internet addiction, which in turn negatively impacted their academic performance. As a result, the students' reliance on the internet had a detrimental effect on their academic performance. According to the preceding internet addiction studies, regular internet usage is inversely related to mathematical achievement. However, there has been no study on the negative effects of internet use among students in the Pakistani context, which would include those students attending schools with guidance facilities, such as the availability of a school psychologist and personality grooming programmes, designed to meet students' academic needs and preventing disruptive behaviors. Students included in this study all attend schools with robust guidance and counseling departments. Examining problematic behavior within the setting of Pakistani schools with well-established counseling facilities is the defining feature of the present study.

## **Material and Methods**

### **Sample**

The sample comprised of 358 (n=226 Males, n=132 females) students from different well-established schools and colleges located in Islamabad and Rawalpindi. The sample size was calculated through an online sample size calculator and Gay (2019) formula. The sample was selected through purposive sampling technique. The age limit of the participants ranges from 14- 18 years, studying at SSC or HSSC level.

### **Instrument**

Internet dependence in adults and adolescents was assessed using the Internet Addiction Test, a 20-item scale. Dr. Kimberly Young is the creator of this metric. In the self-Administration version, after attentively reading each statement, the replies are selected from 0 to 5 on a 5-point Likert scale. 0 indicates no user, 1 indicates that rarely engaged and

5 indicate always engaged. Each item's score is summed together to arrive at the final tally. Hence, the sum of the scores was used to determine IA. Those with a higher score are more likely to be addicted. Score between 0–19 points show no or less internet user. 20–49 points show average internet use, 50-79 show moderate internet dependence and 80-100 points indicate severe internet addiction. The scale's internal consistency, as shown by coefficient alpha, was remarkable ( $\alpha = 0.90$ )

### Procedure

The researcher approached students at chosen high schools and colleges after getting the written approval from the concerned authorities. A brief explanation of the study was given to the participants, and they were then asked for their informed consent. After that, the information was gathered, and every ambiguity regarding the completion of the demographic sheet and the scale was clarified to everyone's satisfaction. Furthermore, participants were asked to be truthful in their responses. Participants' demographic information, including their age, gender, school, class, number of siblings, number of households, and father and mother's education and occupation, was obtained using a demographic data form. In this study, participants completed one questionnaire: Internet addiction. At the conclusion of the exercise, participants were congratulated for their participation in the study.

### Results and Discussion

**Table 1**  
**Descriptive Statistics for Age, Internet use and Math Marks**

	Age	Internet use	Academic Achievement
N	358	325	358
Missing	0	33	0
Mean	15.9	4.51	68.35
Median	16.00	4	73.00
Std	1.40	2.98	24.30
Minimum	14.00	1	8.00
Maximum	18.00	8	100.00

Table 1 shows the descriptive statistics for age, internet use and academic achievement. The findings showed that the mean age of the students was 15.9 years. Further, the results indicated that the students used internet on average for 4.51 years and the average academic achievement was 68.35.

**Table 2**  
**Psychometric Properties of the Study Major Scale among adolescents**

Variable	K	M	SD	$\alpha$	Potential	Actual
IAT	20	39.97	17.85	.84	0-100	0-84

Note. IAT = Internet Addiction

Table 2 shows the psychometric properties of the study major scale. The alpha reliability of the internet addiction scale was exceptionally good (.84).

**Table 3**  
**Statistical Association among study variables among adolescents**

Variables	1	2
Academic Achievement	-	-
Internet Addiction	-.205**	-

Note. \*\*. Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows the statistical association between internet addiction and academic achievements. The findings show the negative significant association between academic achievement and internet addiction ( $r = -.205, p < .01$ ).

**Table 4**  
**Mean Difference between Male and Female in Terms, Internet Addiction**

Variable	Male		Female		t	p	95% CI		Cohen's d
	M	SD	M	SD			LL	UL	
IAT	40.04	17.90	39.86	17.82	0.09	.930	-3.68	4.02	.01

Note. IAT = Internet Addiction

Table 4 shows the difference between male and female in terms of internet addiction is not significant.

## Conclusion

The data showed a negative correlation between internet addiction and academic achievement. Similar results have been found by other researchers including: Brunborg et al, (2014), Choo et al., (2010), Gentile et al., (2011), Haghbin et al, (2013), Huang et al., (2009), Rehbein et al, (2010), Tsitsika et al., (2013). The results agree with those of a study conducted in Pakistan, which found that excessive internet use negatively affected students' grades: Arslan et al., (2018), Islam et al., (2017), Nabela et al., (2017). It is also consistent with the distraction-conflict concept to find a negative correlation between IAT scores and academic performance. The distraction-conflict theory (Sanders, 1981) suggests that when people are confronted with challenging events or activities, such college courses or lectures, higher levels of distraction relate to inferior levels of learning or competency. According to the research on distraction-conflict theory (Nicholson et al., 2005), students will have a harder time with complex tasks when more distractions are present and also decreases learning outcomes (Sanders, 1981). Having one's mind wander to the most recent social media post or other internet-related activities can be just as distracting as having the gadget itself in plain sight in the classroom. According to rational addiction theory (Becker & Murphy, 1988), students will rather use technology than engage in productive activities like studying. A student may put Internet use and other forms of technology above academic achievement if they value playing a video game or interacting on social media more than doing well on an assignment or passing a course. It is important to note that rational addiction theory assumes people are not oblivious to the potential outcomes of their actions but are instead planning accordingly (Becker & Murphy, 1988; Gruber & Koszegi, 2001). Therefore, students with a higher degree of Internet addiction are aware of the academic consequences of prioritizing technological pursuits above academic ones. In terms of internet dependency, male and female students did not differ much. Prior research has indicated that males exhibit a higher level of online dependency compared to females (Ostovar et al., 2016; Adiele & Olatokun, 2014; Tsitsika et al., 2009). However, our findings present a contrasting perspective. Nevertheless, the findings are consistent with past investigations that suggest problematic internet use is unaffected by sexual orientation (Ha & Hwang, 2014; Yadav et al., 2013). Lack of in-person social relationships has been linked to the emergence or worsening of PIU in both sexes. Due to the required school lockout, several schools have opted for online or at-home schooling instead (Donohue & Miller, 2020). Adolescents in Australia are spending more time online as a result of their hunger for e-learning than the government recommends (Hoare et al., 2016). This is so because the typical length of a school day was three hours. Unsupervised adolescent internet use has been linked to exposure to age-inappropriate content (Tahirolu et al., 2008; Hoare et al., 2016). Male and female young people may have been equally susceptible to PIU because of the rising prevalence of internet use for e-learning, communication, and information searching.

When assessing the study's findings and making plans for future research, a few caveats should be kept in mind. Due to the lack of follow-up data, cross-sectional research cannot determine whether or not there is a causal relationship between excessive Internet use and poor math performance. The results of the study are based on previous studies rather than the present examination. Therefore, future researchers should consider about doing in-depth, longitudinal investigations of the informal ties our study reveals. Because we relied solely on student self-reports to assess Internet use and abuse, we cannot rule out the possibility of response biases such as social desirability biases (Larson, 2018). Therefore, more objective methods of data collection from students will need to be used in future studies to increase their validity and reliability. Due to the small size of our sample, we cannot say whether or not our results hold true for pupils in other parts of Pakistan or other countries. This suggests that future research might benefit from being spread out throughout a greater number of geographical areas. Despite the drawbacks I've already noted, the present research does have a few noteworthy benefits. This is the first study to evaluate the correlation between teens' internet use and their performance in school during a pivotal stage in their development, when they are striving for greater independence. The academic achievement of children and adolescents is explored in relation to their method of engaging with the environment. The results bolster existing information about the impact of internet addiction on performance outcomes and pave the way for further research into more subtle links across stages of development. We call for additional research into the causes and effects of internet dependence on academic performance in all fields. While quantitative and survey methods were mostly employed in the present investigation, qualitative methods, such as focus group discussions and interviews, can be used to learn more about a subject from both faculty and students. Polling the student population on the factors that impact academic accomplishment using online surveys, forums, and group discussions can raise awareness and improve knowledge of the issue. In order to reach a wider audience and deepen their comprehension of the problem, these might be held via social networking sites. Additional research, ideally conducted by teachers and students from other institutions, is required to pinpoint the precise reasons and variables that impact academic achievement, find a solution, and generalize the study's findings. The question of whether or not internet addiction has an effect on academic success of the students belonging to institutions where well trained psychologists were hired to look after the behavioral issues is novel, and this study sheds light on that question. Almost 80% of the pupils in this study are under the care of a school psychologist, making this study very relevant. Even at educational institutions with a dedicated team of behaviour specialists, a watchful administration, well-trained teachers, and well-informed parents, the detrimental effects of internet use on pupils are difficult to mitigate. More research is needed to find ways to influence pupils' online habits. Future studies should focus on two main areas: 1) developing age-specific techniques for all stakeholders to help kids make the best use of the internet, and 2) identifying children at risk for developing internet addiction at a young age.3) investigating the moderating role of counseling services in educational institutions in the link between internet addiction and academic achievement in math and other domains.

**References**

- Adiele, I., & Olatokun, W. (2014). Prevalence and determinants of internet addiction among adolescents. *Computers in Human Behaviour, 31*, 100-110.
- Ahmer, Z., & Tanzil, S. (2018). Internet addiction among social networking sites users: Emerging mental health concern among medical undergraduates of Karachi. *Pakistan journal of Medical Sciences, 34* (6), 1473
- Bai, Y.M., Lin, C.C., & Chen, J.Y. (2001) Internet addiction disorder among clients of a virtual clinic. *Psychiatric Services, 52* (10), 1397.
- Bandura, A., & Walters, R. H. (1977). *Social learning theory (Vol. 1)*. Englewood Cliffs, NJ: Prentice-hall
- Becker, G. & Murphy, K. (1988). A Theory of Rational Addiction. *Journal of Political Economy, (96)4*, 675-699.
- Brunborg, G. S., Mentzoni, R. A., & Frøyland, L. R. (2014). Is video gaming, or video game addiction, associated with depression, academic achievement, heavy episodic drinking, or conduct problems? *Journal of Behavioral Addictions, 3*(1), 27–32. <https://doi.org/10.1556/jba.3.2014.002>
- Choo, H., Gentile, D. A., Sim, T., Li, D., Khoo, A., & Liau, A. K. (2010). Pathological video- gaming among Singaporean youth. *Annals of the Academy of Medicine, Singapore, 39*(11), 822–829.
- Donohue, J. M., & Miller, E. (2020). COVID-19 and school closures. *JAMA, 324*(9), 845. <https://doi.org/10.1001/jama.2020.13092>
- Echeburúa, E. (2013). Overuse of social networking. In *Elsevier eBooks* (pp. 911–920). <https://doi.org/10.1016/b978-0-12-398336-7.00092-9>
- Gentile, D. A., Choo, H., Liau, A. K., Sim, T., Li, D., Fung, D., & Khoo, A. (2011). Pathological video game use among Youths: A Two-Year Longitudinal Study. *Pediatrics, 127*(2), e319–e329. <https://doi.org/10.1542/peds.2010-1353>
- Griffiths, M. (1998). Internet addiction: Does it really exist? In J. Gackenbach (Ed.), *Psychology and the Internet* (pp.61–75). New York: Academic Press.
- Griffiths, M. (2000). Internet addiction—Time to be taken seriously? *Addiction Research, 8*, 413–418.
- Gruber J., & Koszegi, B. (2001). Is Addiction Rational? Theory and Evidence. *The Quarterly Journal of Economics, 116*(4), 1261-1303.
- Haagsma, M. C., Pieterse, M. E., & Peters, O. (2012). The prevalence of problematic video gamers in the Netherlands. *Cyberpsychology, Behavior and Social Networking, 15*(3), 162–168. <https://doi.org/10.1089/cyber.2011.0248>
- Hagbin, M., Mohamadi, F., Hosseinzadeh, D., & Griffiths, M. D. (2013). A brief report on the relationship between self-control, video game addiction and academic achievement in normal and ADHD students. *Journal of Behavioral Addictions, 2*(4), 239–243. <https://doi.org/10.1556/jba.2.2013.4.7>

- Ha, Y. M., & Hwang, W. J. (2014). Gender differences in internet addiction associated with psychological health indicators among adolescents using a national web-based survey. *International Journal of Mental Health and Addiction*, 12 (5), 660-669.
- Hoare, E., Millar, L., Fuller-Tyszkiewicz, M., Skouteris, H., Nichols, M., Malakellis, M., Swinburn, B., & Allender, S. (2016). Depressive symptomatology, weight status and obesogenic risk among Australian adolescents: a prospective cohort study. *BMJ Open*, 6(3), e010072. <https://doi.org/10.1136/bmjopen-2015-010072>
- Huang, R., Lu, Z., Liu, J. J., You, Y., Pan, Z., Wei, Z., He, Q., & Wang, Z. Z. (2009). Features and predictors of problematic internet use in Chinese college students. *Behaviour & Information Technology*, 28(5), 485-490. <https://doi.org/10.1080/01449290701485801>
- Hughes, J., & Kwok, O. (2007). Influence of student-teacher and parent-teacher relationships on lower achieving readers' engagement and achievement in the primary grades. *Journal of Educational Psychology*, 99(1), 39-51.
- Ilesanmi, O. S., Afolabi, A. A., & Adebayo, A. M. (2021). Problematic Internet Use (PIU) Among Adolescents during COVID-19 Lockdown: A Study of High School Students in Ibadan, Nigeria. *The African Journal of Information and Communication*, 27. <https://doi.org/10.23962/10539/31373>
- Islam, S., Malik, M. I., Hussain, S., Thursamy, R., Shujahat, M., & Sajjad, M. (2017). Motives of excessive Internet use and its impact on the academic performance of business students in Pakistan. *Journal of Substance Use*, 23(1), 103-111. <https://doi.org/10.1080/14659891.2017.1358305>
- Jackson, L. A., von Eye, A., Biocca, F. A., Barbatsis, G., Fitzgerald, H. E., & Zhao, Y. (2003). Personality, cognitive style, demographic characteristics, and Internet use - Findings from the HomeNet Too project. *Swiss Journal of Psychology*, 62(2), 79-90. <https://doi.org/10.1024//1421-0185.62.2.79>.
- Javaeed, A., Jeelani, R., Gulab, S., & Ghauri, S. K. (2019f). Relationship between internet addiction and academic performance of undergraduate medical students of Azad Kashmir. *Pakistan Journal of Medical Sciences*, 36(2). <https://doi.org/10.12669/pjms.36.2.1061>
- Kraut R, Kiesler S, Boneva B, Cummings J, Helgeson V, & Crawford A. (2002). Internet Paradox Revisited. *Journal of Social Issues*, 58, 49-74.
- Kubey, R., Lavin, M., & Barrows, J. (2001). Internet Use and Collegiate Academic Performance Decrements: Early findings. *Journal of Communication*, 51(2), 366-382
- Larson, R. B. (2018). Controlling social desirability bias. *International Journal of Market Research*, 61(5), 534-547. <https://doi.org/10.1177/1470785318805305>
- Lee, Y.S., Han, D.H., Yang, K.C., Daniels, M.A., Na, C., Kee, B.S., et al. (2008) Depression like characteristics of 5HTTLPR polymorphism and temperament in excessive internet users. *Journal of Affective Disorders*, 109, 165-169. doi:10.1016/j.jad.2007.10.020
- Lindenberg, K., Halasy, K., Szász-Janócha, C., & Wartberg, L. (2018). A phenotype classification of internet use disorder in a Large-Scale High-School study. *International Journal of Environmental Research and Public Health*, 15(4), 733. <https://doi.org/10.3390/ijerph15040733>



- Mentzoni, R. A., Brunborg, G. S., Molde, H., Myrseth, H., Skouverøe, K. J. M., Hetland, J., & Pallesen, S. (2011). Problematic Video Game Use: Estimated Prevalence and Associations with Mental and Physical Health. *Cyberpsychology, Behavior, and Social Networking*, 14(10), 591–596. <https://doi.org/10.1089/cyber.2010.0260>
- Mößle, T., & Rehbein, F. (2013). Predictors of problematic video game usage in childhood and adolescence. *Sucht*, 59(3), 153–164. <https://doi.org/10.1024/0939-5911.a000247>
- Nabila, S., Kalimin, K.M., Mohd, K., Aizat, A., & Yusof, K. (2017). The effect of internet addiction on students emotional and academic performance. *Academia Journal*, 6, 86–98.
- Nalwa, K. & Anand, A. (2003). Internet Addiction in Students: A Cause of Concern *CyberPsychology & Behaviour*, 6(6), 653–656.
- Nicholson, D. B., Parboteeah, D. V., Nicholson, J. A., and Valacich, J. S. 2005. "Using Distraction Conflict Theory to Measure the Effects of Distractions on Individual Task Performance in a Wireless Mobile Environment," in *Hawaii International Conference on System Sciences*, pp. 1–9.
- Orton, A., & Frobisher, L. (2004). *Insights into teaching mathematics*. A&C Black. 0/02673843.2019.1674
- Ostovar, S., Allahyar, N., Aminpoor, H., Moafian, F., Nor, M. B. M., & Griffiths, M. D. (2016). Internet addiction and its psychosocial risks (depression, anxiety, stress, and loneliness) among Iranian adolescents and young adults: A structural equation model in a cross-sectional study. *International Journal of Mental Health and Addiction*, 14(3), 257–267. <https://doi.org/10.1007/s11469-015-962>
- Rehbein, F., Kleimann, M., & Mößle, T. (2010). Prevalence and risk factors of video game dependency in adolescence: Results of a German nationwide survey. *Cyberpsychology, Behavior and Social Networking*, 13(3), 269–277.
- Rehbein, F., Kliem, S., Baier, D., Mößle, T., & Petry, N. M. (2015). Prevalence of internet gaming disorder in German adolescents: Diagnostic contribution of the nine DSM-5 criteria in a state-wide representative sample. *Addiction*, 110(5), 842–851. <https://doi.org/10.1111/add.12849>
- Rumpf, H.-J., Vermulst, A. A., Bischof, A., Kastirke, N., Gürtler, D., Bischof, G., et al. (2014). Occurrence of internet addiction in a general population sample: A latent class analysis. *European Addiction Research*, 20(4), 159–166. <https://doi.org/10.1159/000354321381>
- Sanders, G. S. (1981). Driven by distraction: An integrative review of social facilitation theory and research. *Journal of Experimental Social Psychology*, 17(3), 227–251.
- Secherer, K. (1997). College life on-line: healthy and unhealthy Internet use. *Journal of College and Student Development*, 38(6), 655–663.
- Strage, A., & Brandt, T. S. (1999). Authoritative parenting and college students' academic adjustment and success. *Journal of Educational Psychology*, 91(1), 146–156. <https://doi.org/10.1037/0022-0663.91.1.146>
- Strittmatter, E., Kaess, M., Parzer, P., Fischer, G. J., Carli, V., Hoven, C. W., Wasserman, C., Sarchiapone, M., Durkee, T., Apter, A., Bobes, J., Brunner, R., Cosman, D., Sisask, M., Värnik, P., & Wasserman, D. (2015). Pathological Internet use among adolescents: Comparing

- gamers and non-gamers. *Psychiatry Research*, 228(1),128-135. <https://doi.org/10.1016/j.psychres.2015.04.029>
- Tahiroğlu, A. Y., Çelik, G., Uzel, M., Özcan, N. K., & Avcı, A. (2008). Internet use among Turkish adolescents. *Cyberpsychology & Behavior*, 11(5), 537-543. <https://doi.org/10.1089/cpb.2007.0165>
- Tsitsika, A., Critselis, E., Louizou, A., Janikian, M., Freskou, A., Marangou, E., Kormas, G., & Kafetzis, D. (2011). Determinants of Internet Addiction among Adolescents: A Case-Control Study. *The Scientific World Journal*, 11, 866-874
- Ukeje, B.O. (2005). Production and retention of mathematical sciences teachers for Nigeria educational system (II). In S.O. Ale, & L.O. Adetula (Eds.), *Reflective and intellectual position papers on mathematics education issues* (pp. 80-93).Abuja: Marvelous Mike Ventures Ltd.
- Waqas, A., Rehman, A., Malik, A., Aftab, R., Yar, A. A., Yar, A. A., & Rai, A. B. S. (2016). Exploring the association of ego defence mechanisms with problematic internet use in a Pakistani medical school. *Psychiatry Research*, 243, 463-468
- Weinstein, A., & Lejoyeux, M. (2010). Internet addiction or excessive internet use. *American Journal of Drug and Alcohol Abuse*, 36(5), 277-283. <https://doi.org/10.3109/00952990.2010.491880>
- Yadav, P., Banwari, G., Parmar, C., & Maniar, R. (2013). Internet addiction and its correlates among high school students: a preliminary study from Ahmadabad, India. *Asian Journal of Psychiatry*, 6 (6), 500-505
- Young, K.S. (1998) *Caught in the net*. John Wiley & Sons, New York.
- Young, K. S. (1996a). Psychology of Computer Use: XL. Addictive Use of the Internet: A Case that Breaks the Stereotype. *Psychological Reports*, 79,899-902. *Human Behaviour*, 89,299-307