

Article

A Randomized Controlled Trial to Evaluate the Effectiveness of a Theory of Planned Behavior-Based Educational Intervention in Reducing Internet Addiction Among Adolescent Girls in Southern Iran

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Abstract

Internet addiction among adolescents has emerged as a significant global health issue, contributing to social isolation, academic difficulties, and emotional disorders, with excessive use of social networks further intensifying these challenges. This study evaluated the effectiveness of an educational intervention grounded in the Theory of Planned Behavior (TPB) in reducing Internet addiction and enhancing academic performance among adolescent girls in southern Iran. A randomized controlled trial was conducted with 370 female students aged 15–16 years, selected through two-stage cluster random sampling and divided equally into intervention and control groups. The intervention group participated in a five-week TPB-based program, incorporating lectures, group discussions, and parent–teacher meetings, while the control group received unrelated health education. Data were collected using the Yang Internet Addiction Test (IAT), a TPB-based questionnaire, and academic performance scores (grade point average, GPA) before and after the intervention. A repeated measures ANOVA revealed significant improvements in attitudes, subjective norms, perceived behavioral control, and intentions to reduce Internet use ($p < 0.001$). Internet addiction scores significantly declined, and GPA improved in the intervention group compared to the control group ($p < 0.001$, Cohen's $d = 0.950$). The findings support TPB-based interventions as effective tools for reducing Internet addiction and improving academic outcomes among adolescents. This study was registered with the Iranian Registry of Clinical Trials (IRCT20131014015015N18).

Keywords: Theory of Planned Behavior; educational intervention; Internet addiction; academic performance; adolescents; behavioral change; randomized controlled trial



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1. Introduction

The rapid spread of Internet usage in recent years has created significant concern about Internet addiction, especially among adolescents. It is linked to numerous adverse outcomes such as social conflicts, physical health problems, academic struggles, and emotional, as well as behavioral, abnormalities [1–3]. In 2023, approximately five billion

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Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki, and was approved by the Ethics Committee of Shiraz University of Medical Sciences (protocol code IR.SUMS.REC.1396.176 and date of approval 18 February 2018).

Informed Consent Statement: Written informed consent to participate was obtained from the parents of all participants. Participation was voluntary, and participants could withdraw at any time without consequences.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.

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Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Sümen, A.; Evgin, D. Social media addiction in high school students: A cross-sectional study examining its relationship with sleep quality and psychological problems. *Child Indic. Res.* **2021**, *14*, 2265–2283. [CrossRef]
2. Ying Ying, C.; Awaluddin, S.M.; Kuang Kuay, L.; Siew Man, C.; Baharudin, A.; Miaw Yn, L.; Sahril, N.; Omar, M.A.; Ahmad, N.A.; Ibrahim, N. Association of internet addiction with adolescents' lifestyle: A national school-based survey. *Int. J. Environ. Res. Public Health* **2020**, *18*, 168. [CrossRef] [PubMed]
3. Pereira, F.S.; Bevilacqua, G.G.; Coimbra, D.R.; Andrade, A. Impact of problematic smartphone use on mental health of adolescent students: Association with mood, symptoms of depression, and physical activity. *Cyberpsychol. Behav. Soc. Netw.* **2020**, *23*, 619–626. [CrossRef]
4. Petrosyan, A. Countries with the Highest Number of Internet Users 2023. Statista. 30 August 2023. Available online: <https://www.statista.com/statistics/271411/number-of-internet-users-in-selected-countries/> (accessed on 15 November 2024).
5. Ferri, F.; Grifoni, P.; Guzzo, T. Online learning and emergency remote teaching: Opportunities and challenges in emergency situations. *Societies* **2020**, *10*, 86. [CrossRef]
6. Solimannejad, T.; Ebrahimi, M.; Solimannejad, M. Exploring the factors affecting violence among Iranian male adolescents. *BMC Public Health* **2022**, *22*, 2228. [CrossRef] [PubMed]
7. Ge, M.-W.; Hu, F.-H.; Jia, Y.-J.; Tang, W.; Zhang, W.-Q.; Zhao, D.-Y.; Shen, W.-Q.; Chen, H.-L. The relationship between loneliness and internet or smartphone addiction among adolescents: A systematic review and meta-analysis. *Psychol. Rep.* **2023**, *128*, 1429–1451. [CrossRef]
8. Chemnad, K.; Aziz, M.; Abdelmoneium, A.O.; Al-Harabsheh, S.; Baghdady, A.; Al Motawaa, F.Y.; Hassan, D.A.; Ali, R. Adolescents' Internet addiction: Does it all begin with their environment? *Child Adolesc. Psychiatry Ment. Health* **2023**, *17*, 87. [CrossRef] [PubMed]
9. Chou, W.J.; Huang, M.F.; Chang, Y.P.; Chen, Y.M.; Hu, H.F.; Yen, C.F. Social skills deficits and their association with Internet addiction and activities in adolescents with attention-deficit/hyperactivity disorder. *J. Behav. Addict.* **2016**, *6*, 42–50. [CrossRef]
10. Kuss, D.J.; Kristensen, A.M.; Lopez-Fernandez, O. Internet addictions outside of Europe: A systematic literature review. *Comput. Hum. Behav.* **2021**, *115*, 106621. [CrossRef]
11. Zheng, M.-R.; Wu, X.-D.; Chen, P.; Si, T.L.; Rao, S.-Y.; Zhu, H.-Y.; Su, Z.; Cheung, T.; Ng, C.H.; Xiang, Y.-T. Prevalence of internet addiction among Chinese adolescents: A comprehensive meta-analysis of 164 epidemiological studies. *Asian J. Psychiatry* **2025**, *24*, 104458. [CrossRef]
12. World Health Organization Regional Office for Europe. Teens, Screens and Mental Health: New WHO Report Indicates Need for Healthier Online Habits Among Adolescents. 2024. Available online: <https://www.who.int/europe/news/item/25-09-2024-teens--screens-and-mental-health> (accessed on 16 April 2025).
13. Hamed, F.; Shaabani, N.; Mahdavi, F.; Nezamdoust, S.; Arshian, S.; Mohammadi, A.Z. Prevalence of Problematic Internet Use (PIU) After the COVID-19 Pandemic in Iranian Adolescent: A Systematic Review. *J. Arch. Mil. Med.* **2023**, *13*, e160299. [CrossRef]
14. Niskier, S.R.; Snaychuk, L.A.; Kim, H.S.; da Silva, T.T.; de Souza Vitale, M.S.; Tavares, H. Adolescent screen use: Problematic internet use and the impact of gender. *Psychiatry Investig.* **2024**, *21*, 18–27. [CrossRef] [PubMed]
15. Abolfathi, M.; Dehdari, T.; Zamani-Alavijeh, F.; Taghdisi, M.H.; Ashtarian, H.; Rezaei, M.; Irandoost, S.F. Identification of the opportunities and threats of using social media among Iranian adolescent girls. *Heliyon* **2022**, *8*, e09224. [CrossRef] [PubMed]