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Factors of Students' Dependence on Cyberspace: The Contextual Role of Cognitive and Individual Factors and Social-Behavioral Mediators

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Abstract

Purpose: Cyberspace dependence is recognized as a form of harm in virtual communication and one of the critical factors influencing knowledge construction in everyday life. This study aims to investigate the factors contributing to students' dependence on cyberspace, with an emphasis on cognitive and individual factors as well as social-behavioral mediators.

Methodology: The research is applied in purpose and descriptive-survey in method. The statistical population comprised first secondary school students in Zanjan city during the 2022–2023 academic year (N = 20,951). Using Cochran's formula, the minimum sample size was estimated at 384, while 1,487 students ultimately completed the online questionnaire. The instrument's reliability and validity were verified through Cronbach's alpha and factor analysis. Data analysis was performed using descriptive and inferential statistics in SPSS and AMOS software.

Findings: The results indicate that contextual factors (including educational, communicational, and peer needs, as well as sociability and virtual knowledge) along with mediating variables (such as secrecy, depression, family relationship disorder, lifestyle, and isolation) play a decisive role in shaping students' cyberspace dependence. Both direct ($\beta = 0.42$) and indirect ($\beta = 0.63$) effects were observed. The proposed model was validated with $R^2 = 0.664$ ($p < 0.001$).

Conclusion: Different needs of students (except for educational needs), and awareness of virtual space both directly and through mediating factors have an effect on the dependency of virtual space.

Value: The study highlights cyberspace dependence as a significant challenge in the domain of personal knowledge production, shaped by contextual factors and socio-behavioral mediators, thereby underscoring the need for targeted interventions in educational and social contexts.

KeyWords: ***Cyberspace Dependence, Internet Addiction, Students, Lifestyle, Knowledge of Cyberspace***

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Extended Abstract

Introduction: Cyberspace dependence is increasingly recognized as a form of behavioral damage within virtual communication, which plays a critical role in knowledge construction in everyday life. Scholars argue that addiction to cyberspace, often referred to as Internet addiction, manifests in various ways such as excessive engagement in chat rooms, pornography, online gambling, and other digital activities, all of which can negatively affect interpersonal relationships, emotional health, and overall psychological well-being. Early studies have identified several uses of the Internet that contribute to cyberspace dependence, including excessive socializing through chat, email, and messaging (Young, 1998; Anderson, 2001), online gaming (Griffiths & Hunt, 1998), sexual activities such as visiting adult websites and cybersex (Greenfield, 1999), excessive web surfing and online tourism (Jerusalem et al., 2001), compulsive stock trading, gambling, shopping (Young, 1998), and even hacking or computer programming (Pratarelli, Browne, & Johnson, 1999). Further, Ko et al. (2005) conceptualized Internet addiction through indicators such as uncontrolled impulses, mental preoccupation, tolerance, isolation, time management disorder, excessive Internet effort, and impaired decision-making abilities (Masoudnia, 2020). From a broader perspective, psychological and sociological variables significantly contribute to cyberspace dependence. The model proposed by Brand, Young, and Laier (2014) highlights the interplay between individual characteristics, needs, and the mediating effects of behavioral outcomes. This study builds upon that model by incorporating more recent theoretical and empirical findings in order to provide a comprehensive framework for examining cyberspace dependence among students.

Purpose: The primary aim of this research is to investigate the determinants of students' cyberspace dependence, with particular emphasis on cognitive and individual factors, as well as social-behavioral mediators. The study considers two general categories of contextual variables: (1) individual characteristics, which include educational, communication, and peer-related needs (Wong et al., 2015; Yu et al., 2015); and (2) cognitive characteristics, focusing on sociability and lack of family awareness about virtual spaces. In addition, the study identifies mediating variables that influence cyberspace dependence, such as concealment, depression, disruption of family relationships, lifestyle, and feelings of social isolation (Yang, 1998; Lam et al., 2009; Anderson et al., 2017; Kuss et al., 2014; Shablatorova et al., 2011; Haji Hosseini, 2017).

Methodology: The research is applied in purpose and descriptive-survey in method. The population consisted of first secondary school students in Zanjan city during the academic year 2022–2023, totaling 20,951 individuals. Based on Cochran's formula, the minimum required sample size was 384 participants. However, 1,487 students ultimately completed the online questionnaire, and all responses were included in the analysis. Data analysis was conducted using SPSS and Amos software. Reliability was assessed using Cronbach's alpha, while construct validity was evaluated through confirmatory factor analysis. Hypotheses and the conceptual model were tested using bivariate regression and path analysis.

Findings: The reliability analysis demonstrated that all constructs achieved acceptable Cronbach's alpha levels (above 0.7). Specifically, reliability coefficients

were 0.878 for virtual space dependence, 0.913 for background features, and 0.933 for mediating features (Table 1).

Table 1. Reliability coefficients of research variables

Name of the construct	number of items	Cronbach's alpha coefficient
Virtual Space Dependence	8	0.878
Background features	31	0.913
Mediator features	28	0.933

To establish formal validity, the questionnaire was reviewed by domain experts and professors, and their feedback was incorporated. Construct validity was assessed through factor analysis, the results of which are summarized in Table 2. The KMO values exceeded 0.9, Bartlett's test was significant, and cumulative variance explained exceeded 50% for all constructs, indicating strong construct validity.

Table 2. Validity coefficients of research variables

Name of the construct	KMO test	Bartlett test	D.F.	Sig.	Cumulative Extraction
Virtual Space Dependence	0.921	4754.65	28	0.000	54%
Background features	0.940	17913.71	465	0.000	52.69%
Mediator features	0.949	18048.03	378	0.000	55.24%

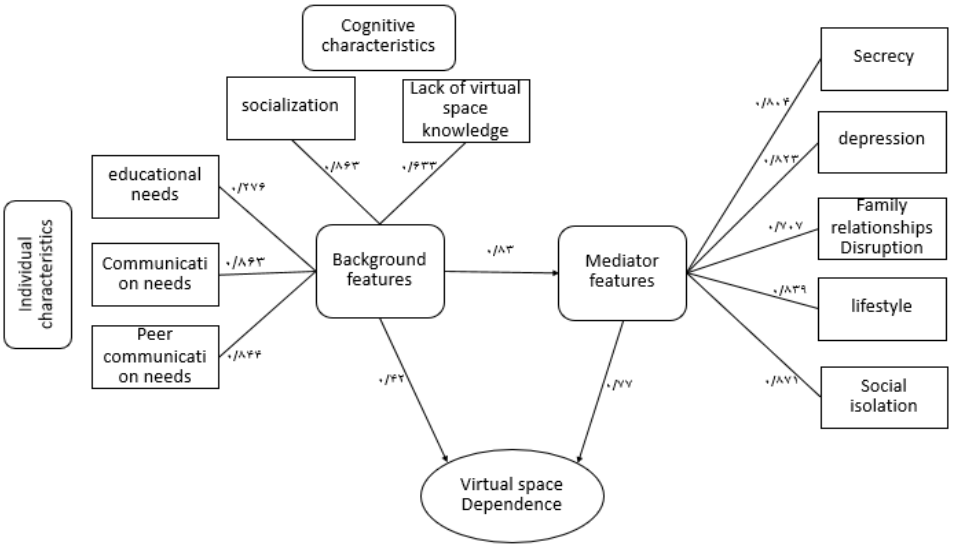

Figure 1 path coefficients and factor loadings related to the path analysis test

Factor loadings demonstrated acceptable values (above 0.3) for all dimensions except the educational needs factor, which, despite falling slightly below the expected threshold, was retained due to its theoretical and practical relevance in the student population. Path analysis further revealed that contextual factors (educational, communication, and peer needs; sociability; and family knowledge of virtual spaces), along with mediating variables (concealment, depression, family relationship disorder, lifestyle, and isolation), significantly predicted cyberspace dependence among students. Direct effects (0.42) and indirect effects (0.63) were observed, and the proposed model was confirmed with a coefficient of determination (R^2) of 0.664 and a significance level of $p < 0.001$.

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Conclusion: The findings indicate that students' individual needs (with the exception of educational needs) and their awareness of virtual space significantly influence cyberspace dependence, both directly and through mediating variables. These results corroborate prior studies and underscore the importance of addressing both personal and contextual factors in combating cyberspace dependence. The study concludes that effective strategies to reduce students' dependence on virtual spaces include fostering healthy socialization opportunities, enhancing family awareness of cyberspace, and providing meaningful responses to students' communication and peer-related needs. Such interventions can strengthen resilience against the negative consequences of cyberspace addiction and promote healthier digital engagement among students.

Value: This research contributes to the literature by refining and empirically testing a comprehensive model of cyberspace dependence that integrates cognitive, individual, and social-behavioral factors. It offers practical insights for educators, policymakers, and families to design targeted interventions that can mitigate cyberspace dependence among adolescents, thereby safeguarding their mental, social, and academic well-being.

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