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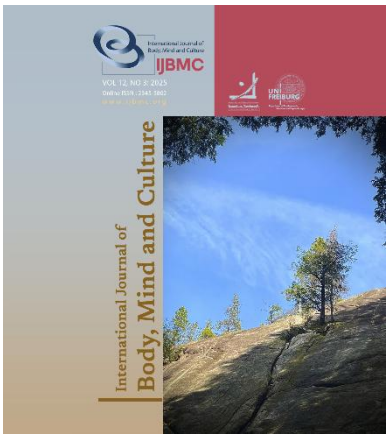
Academic Emotions as a Mediator Between Basic Psychological Needs, Internet Addiction, and Academic Engagement Among High School Students Post-COVID

Parisa. Torkaman[1], Zohreh. Sadeghi Afjeh[2]*, Afsaneh. Ghanbari Panah[3]

1 PhD Student, Department of Educational Psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran.
2 Assistant Professor, Department of Psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran.
3 Assistant Professor, Department of Psychology, Central Tehran Branch, Islamic Azad University, Tehran, Iran.

Corresponding author email address: zsadeghi540@gmail.com



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ABSTRACT

Objective: This study examines the mediating role of academic emotions in the relationship between basic psychological needs, internet addiction, and academic engagement among high school students in the post-COVID period.

Methods and Materials: This study employed a descriptive-correlational design, utilizing structural equation modeling (SEM). A total of 428 high school students in Tehran were selected using a cluster random sampling method. Data were collected through validated questionnaires on academic engagement, internet addiction, basic psychological needs, and academic emotions. Reliability and validity were confirmed using Cronbach's alpha and confirmatory factor analysis. Data analysis was conducted using SEM in AMOS software.

Findings: The findings indicated that internet addiction negatively influenced academic engagement both directly and indirectly through increased negative academic emotions (β= -0.07, p<0.01). Basic psychological needs did not directly affect academic engagement (p > 0.05), but had an indirect positive effect mediated by positive academic emotions (β = 0.14, p < 0.01). Positive emotions were positively associated with engagement (β = 0.39, p < 0.01), while negative emotions had a detrimental effect (β = -0.18, p < 0.01).

Conclusion: Internet addiction reduces academic engagement by increasing negative emotions, while fulfilling basic psychological needs enhances engagement through positive emotions. Schools should promote strategies to reduce internet dependency and foster supportive environments that meet students' psychological needs, thereby improving their engagement.

Keywords: Internet Addiction Disorder, Students, Emotions, COVID-19.

Introduction

One of the concepts that researchers have increasingly utilized in recent years is academic engagement. Academic engagement is considered a prerequisite for learning, as it gives intensity and direction to learning behaviors and supports learners in maintaining their efforts (Lee & Chung, 2025). In essence, engagement provides learners with energy and guides their activities (Li et al., 2025). Academic engagement refers to the cognitive, emotional, and behavioral investment made in pursuit of educational progress,

based on learning objectives (Mashraki, 2025). Engaged students strive to derive meaning from their learning and utilize higher-order thinking skills, such as analyzing information and solving problems, in academic tasks. From this perspective, engagement is closely associated with active learning, as students recognize that learning is a dynamic process of integrating new information with prior knowledge to create meaning (Almurumudhe et al., 2024; Anierobi et al., 2024).

Academic engagement is essential for achieving better learning outcomes among students, as it represents a psychological investment and directed effort to learn and master the skills taught in schools (Fatimah et al., 2024). Higher academic engagement increases persistence in solving academic tasks, fosters a striving for mastery, and leads to the formation of stronger emotional connections to tasks (Shakerami et al., 2017). Numerous studies have explored the factors influencing academic engagement from various perspectives. Recent research emphasizes a multi-dimensional and systematic approach to understanding these factors, aiming to identify environmental and personal variables that predict academic engagement. Therefore, this study examines the mediating role of academic emotions in the relationship between basic psychological needs and internet addiction with students' academic engagement during the post-COVID era.

One of the key factors affecting students' academic engagement is academic emotions (Bayanfar et al., 2021; Carmona-Halty et al., 2021; Saati Masoomi et al., 2021; Xu et al., 2023). The term "academic emotions" was first introduced by Pekrun et al. (2002) in the field of education. Academic emotions can be positive (e.g., pride, joy, hope) or negative (e.g., fatigue, anger, anxiety) and may be active (e.g., enjoyment, pride, or anger) or passive (e.g., shame). These emotions are experienced in various academic contexts, including before, during, and after attending class, studying, or taking exams (Pekrun et al., 2002).

Pekrun et al. (2002) described emotions as a set of interrelated psychological processes involving affective, cognitive, motivational, and physiological components (Pekrun et al., 2002). According to Pekrun et al. (2005), academic emotions are emotions directly linked to achievement-related activities or their outcomes. For instance, joy derived from learning, fatigue caused by classroom activities, and frustration resulting from challenging tasks are examples of emotions associated with academic activities (Pekrun et al., 2005). Academic emotions directly correspond to academic activities and their outcomes (Pekrun, 2006). Researchers expect positive, pleasant emotions, such as enjoyment, to have a positive influence on academic achievement. Conversely, unpleasant and inactive emotions, such as fatigue, may reduce motivation and disrupt information processing (Camacho-Morles et al., 2021; Carmona-Halty et al., 2021; Datu et al., 2022).

Another variable affecting students' academic engagement is internet addiction (Aznar-Díaz et al., 2020; Buzzai et al., 2021; Geravand & Sabzian, 2022; Manjazi & Heidari, 2023; Sun et al., 2023; Teimoorzadeh et al., 2021). The internet has become a recognized platform for exchanging information, conducting academic research, providing entertainment, facilitating communication, and facilitating commerce. In recent years, the exponential growth of internet use has been observed worldwide. According to global internet statistics, the number of internet users worldwide increased from 360 million (December 2000) to 4.536 billion (June 2019) (Kumari et al., 2022). Despite its positive aspects, excessive internet use may be accompanied by signs of addiction. Internet addiction is a pathological process of internet usage that creates psychological conditions leading to cognitive and behavioral disruptions. Internet addiction results in serious problems, including physical and mental health issues, and disruptions in an individual's social and academic functioning. It can also lead to neglect of social activities, communication, health, work responsibilities, and academic duties (Evren et al., 2019).

Adolescents often use the internet for beneficial purposes such as communication, education, and entertainment. However, excessive internet use has been found to result in pathological behaviors such as neglecting daily activities and insomnia (Baturay & Toker, 2019; Evli & Şimşek, 2022; Singh, 2019). Excessive internet use has been highlighted as a significant issue among adolescents (D'Angelo & Moreno, 2020). During the COVID-19 pandemic, reliance on virtual platforms for education exacerbated this issue, with its consequences extending into the post-COVID period. As a result, one of the challenges parents face in the post-COVID era is their children's dependence on the internet and its educational and developmental consequences. Excessive

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internet use can waste students' time and prevent them from focusing on academic tasks, which may hinder their academic success. Research findings also indicate the negative impact of internet addiction on students' academic engagement (Aznar-Díaz et al., 2020; Buzzai et al., 2021; Geravand & Sabzian, 2022; Nasiri et al., 2022; Sun et al., 2023; Teimoorzadeh et al., 2021).

Another concept considered in this study, which research evidence confirms is related to academic engagement, is basic psychological needs (Bordbar & Yousefi, 2016; Gao et al., 2023; Sadeghi & Barzegar Bafrooei, 2019; Samadieh et al., 2023; Zhen et al., 2017). Basic psychological needs can be explained using the theory of self-determination. According to this theory, basic psychological needs form the foundation of self-determination, providing the energy necessary for active engagement with the environment, skill development, and healthy growth. These needs include autonomy, competence, and relatedness (Deci & Ryan, 2011, 2013). Fulfillment of psychological needs fosters feelings of confidence and self-worth in individuals. In contrast, the lack or incomplete fulfillment of these needs leads to fragile, negative, alienated, and self-critical perceptions (Chen & Jang, 2010). Autonomy refers to the desire to initiate one's activities, be the cause of one's actions, and not be under external control (Deci & Ryan, 2013). Competence refers to the ability to perform tasks effectively while engaging optimally with the environment (Johnston & Finney, 2010). Relatedness refers to the need to form close emotional bonds and have warm social interactions and relationships with others (Reeve, 2013).

Failure to meet these basic psychological needs in school can lead to disorders, maladjustments, and academic failures (Tian et al., 2016). Unmet psychological needs reduce intrinsic motivation, leading to negative emotions toward school and lower academic engagement among students. Research also shows that fulfilling psychological needs increases positive academic emotions (Sadeghi & Barzegar Bafrooei, 2019; Zhen et al., 2017) and academic engagement (Benlahcene et al., 2020; Eskandari & Sadoughi, 2020; Mirzaei Fandocht et al., 2020; Wang et al., 2019).

In summary, the online education experience during the COVID-19 pandemic led to an increased dependence on the internet among students, which has created challenges in the post-COVID period. While the internet is an essential tool, its misuse and overuse can lead to internet addiction, which causes social and psychological harm. Online activities, like other technologies, can encourage physical inactivity, waste time, and lead to potential physical problems, such as back pain, visual impairment, weight gain, and academic issues, including falling behind in lessons and reduced academic engagement. Internet addiction has become a significant problem in societies, and the role of virtual education during the COVID-19 era and beyond has reduced academic engagement, limiting the achievement of educational objectives. Providing evidence to support the role of internet addiction in academic engagement is crucial, as it highlights the importance of addressing this issue. According to previous research, internet addiction and basic psychological needs significantly influence students' academic emotions and, consequently, their academic engagement. Thus, this study aims to examine whether internet addiction and basic psychological needs, mediated by academic emotions, are related to academic engagement among students in the post-COVID era.

Methods and Materials

Study Design and Participants

This study employed a descriptive-correlational research design, utilizing structural equation modeling (SEM), to investigate the mediating role of academic emotions in the relationship between basic psychological needs, internet addiction, and academic engagement among high school students in the post-COVID period.

The target population included all high school students enrolled in the Tehran education system. A multi-stage cluster random sampling method was used to ensure a diverse sample while maintaining feasibility. Tehran was divided into five geographical regions: north, south, central, west, and east. One district from each region was randomly selected, and within each selected district, two educational institutions (one for male students and one for female students) were chosen. The study initially targeted 450 students, but after removing incomplete questionnaires, 428 valid responses were included in the final analysis.

Although cluster random sampling improves representation, selecting only five districts within one

city may limit the generalizability of the findings to students in different socioeconomic or cultural contexts. Future studies should consider expanding the sample to multiple cities or incorporating additional demographic variables for a more comprehensive understanding.

Data collection was conducted through paper-based questionnaires administered in school settings under the supervision of the researcher. Participants were assured of anonymity and confidentiality to minimize social desirability bias. However, as the study relied entirely on self-report measures, there remains a risk of response bias and subjective self-perception errors, particularly regarding internet addiction. Incorporating objective behavioral data, such as actual internet usage logs, could improve measurement accuracy in future studies.

Instruments

Academic Engagement: To measure academic engagement, the Reeve Academic Engagement Questionnaire (2013) was utilized. This questionnaire consists of 17 items covering four dimensions: behavioral engagement (4 items, 1–4), emotional engagement (4 items, 14–17), cognitive engagement (4 items, 10–13), and agentic engagement (5 items, 5–9). The items are rated on a 5-point Likert scale ranging from "Strongly Disagree (1)" to "Strongly Agree (5)." Reeve (2013) reported the reliability coefficients using Cronbach's alpha as follows: behavioral engagement (0.86), emotional engagement (0.90), cognitive engagement (0.84), and agentic engagement (0.86). Bardbar and Yousefi (2015) confirmed the validity of the questionnaire using confirmatory factor analysis and reported factor loadings above 0.47 as significant ($p<0.001$). Ramazani and Khamsan (2017) also confirmed its validity using confirmatory factor analysis (Ramazani & Khamsan, 2017). In this study, the Cronbach's alpha coefficients for behavioral, emotional, cognitive, and agentic engagement subscales were 0.74, 0.79, 0.76, and 0.81, respectively, with an overall reliability of 0.83. The confirmatory factor analysis (CFA) indices for this scale (GFI = 0.963, NFI = 0.903, CFI = 0.913, RMSEA = 0.028) indicate good model fit.

Internet Addiction: To measure internet addiction, the Young Internet Addiction Questionnaire (1998) was employed. This questionnaire contains 20 items rated on a Likert scale ranging from "Never (0)" to "Always (5)," with scores ranging from 0 to 100. Higher scores indicate greater internet dependence and associated problems. Young et al. reported an internal consistency reliability of 0.92, and test-retest reliability was also significant. In the study by Ganji et al. (2016), Cronbach's alpha for this questionnaire was 0.84 (Ganji et al., 2016). In this study, Cronbach's alpha for the questionnaire was calculated as 0.86. The CFA indices for this scale (GFI = 0.921, NFI = 0.915, CFI = 0.923, RMSEA = 0.078) indicate good model fit.

Basic Psychological Needs: To measure basic psychological needs, the Basic Psychological Needs Scale by LaGuardia et al. (2000) was used. This scale comprises 21 items, measuring autonomy (7 items), competence (6 items), and relatedness (8 items). Responses are rated on a 7-point Likert scale ranging from "Not at all true (1)" to "Completely true (7)." Reverse-scored items include items 3, 4, 7, 11, 15, 16, 18, 19, and 20. Deci et al. (2001) reported Cronbach's alpha for the total scale as 0.89 in an American sample and 0.83 in a Bulgarian sample, with subscale reliabilities ranging from 0.57 to 0.85. In Heidari et al.'s (2017) study in Iran, Cronbach's alpha ranged from 0.74 to 0.79, indicating good reliability (Heidari et al., 2018). In this study, Cronbach's alpha coefficients for autonomy, competence, and relatedness subscales were 0.71, 0.76, and 0.79, respectively, with an overall reliability of 0.81. The CFA indices for this scale (GFI = 0.902, NFI = 0.904, CFI = 0.911, RMSEA = 0.064) indicate good model fit.

Academic Emotions: The Academic Emotions Questionnaire, developed by Pekrun et al. (2005), was used. This questionnaire consists of 43 items covering seven subscales: enjoyment (5 items), pride (5 items), anger (4 items), anxiety (5 items), hopelessness (4 items), shame (8 items), and fatigue (11 items). Responses are rated on a 5-point Likert scale ranging from "Strongly Disagree (1)" to "Strongly Agree (5)." Pekrun et al. (2005) reported Cronbach's alpha coefficients for subscales ranging from 0.75 to 0.95, indicating acceptable reliability. This questionnaire was localized in Iran by Kadivar et al. (2009), who confirmed its validity and reliability (Kadivar et al., 2009). In this study, Cronbach's alpha coefficients for positive and negative academic emotions were calculated as 0.79 and 0.85, respectively. The CFA indices for this scale (GFI = 0.975, NFI = 0.944, CFI = 0.958, RMSEA = 0.078) indicate good model fit.

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Data Analysis

Data were analyzed using structural equation modeling (SEM) in AMOS software. Descriptive statistics, including mean, standard deviation, skewness, and kurtosis, were used to assess normality assumptions. Pearson correlation coefficients were used to examine the relationships between study variables before proceeding with SEM. While SEM allows for the testing of complex relationships, the study does not control for confounding variables, such as socioeconomic status, parental supervision, or prior academic performance, which may influence both internet addiction and academic engagement. Future research should include these factors as covariates to strengthen causal inferences. Finally, although SEM can demonstrate statistical associations, this study remains correlational. The discussion and conclusion sections should avoid causal language when interpreting findings. Future research should consider longitudinal or experimental designs to establish stronger causal claims regarding the impact of internet addiction and psychological needs on academic engagement.

Findings and Results

The descriptive statistics for the key research variables, including mean, standard deviation, skewness, and kurtosis, are presented in Table 1. Skewness and kurtosis values fall within the acceptable range of ±2, indicating that the variables are normally distributed. This confirms the suitability of using structural equation modeling (SEM) for further analysis.

Table 1

Descriptive Statistics of Research Variables

Variables	Mean	Standard Deviation	Skewness	Kurtosis	Normality Threshold (±2)
Basic Psychological Needs	63.81	6.45	-0.12	0.25	Acceptable
Internet Addiction	58.45	8.83	-0.11	0.59	Acceptable
Positive Academic Emotions	24.23	15.21	0.79	-1.10	Acceptable
Negative Academic Emotions	95.56	23.58	-0.01	1.47	Acceptable
Academic Engagement	53.77	7.91	0.56	-1.10	Acceptable

Table 2 presents the Pearson correlation coefficients among the research variables. Significant correlations were found, particularly between internet addiction and negative academic emotions ($r = 0.41$, $p < 0.01$) and positive academic emotions and academic engagement ($r = 0.35$, $p < 0.01$). None of the correlations exceeds 0.70, suggesting no severe multicollinearity issues. Future studies should confirm this by calculating the Variance Inflation Factor (VIF) values.

Table 2

Correlation Matrix with Significance Level

Variables	Internet Addiction	Basic Psychological Needs	Positive Academic Emotions	Negative Academic Emotions	Academic Engagement
Internet Addiction	1.00	-0.21	-0.16	0.41	-0.20
Basic Psychological Needs	-0.21	1.00	0.31	0.01	0.14
Positive Academic Emotions	-0.16	0.31	1.00	-0.25	0.35
Negative Academic Emotions	0.41	0.01	-0.25	1.00	-0.24
Academic Engagement	-0.20	0.14	0.35	-0.24	1.00

The results of direct effects are summarized in Table 3, showing that Internet addiction has a direct negative impact on academic engagement (β = -0.18, p < 0.01). Basic psychological needs do not significantly predict academic engagement directly (β = 0.07, p = 0.254). Positive emotions significantly enhance engagement (β = 0.39, p < 0.01), while negative emotions have a negative impact, reducing engagement (β = -0.18, p < 0.01).

Table 3

Direct Effects of SEM Path Analysis

Pathway	Path Coefficient (β)	t-statistic	p-value
Internet Addiction → Academic Engagement	-0.18	-2.78	0.01*
Basic Psychological Needs → Academic Engagement	0.07	1.14	0.254
Positive Academic Emotions → Academic Engagement	0.39	5.23	0.01*
Negative Academic Emotions → Academic Engagement	-0.18	-2.69	0.01*
Internet Addiction → Positive Academic Emotions	-0.15	-3.33	0.01*
Basic Psychological Needs → Positive Academic Emotions	0.35	6.30	0.01*
Internet Addiction → Negative Academic Emotions	0.41	9.45	0.01*
Basic Psychological Needs → Negative Academic Emotions	-0.09	-2.07	0.05*

Table 4 presents indirect effects, confirming that Internet addiction negatively impacts engagement via both positive and negative emotions. Basic psychological needs enhance engagement through increased positive emotions. Confidence intervals (CI) for indirect effects confirm statistical robustness, especially for the effect of basic psychological needs on engagement via positive emotions (0.07, 0.21).

Table 4

Indirect Effects and Mediation Results

Pathway	Path Coefficient (β)	t-statistic	Confidence Interval (95%)	p-value
Internet Addiction → Academic Engagement (via Positive Emotions)	-0.06	-2.81	[-0.09, -0.03]	0.01*
Basic Psychological Needs → Academic Engagement (via Positive Emotions)	0.14	4.02	[0.07, 0.21]	0.01*
Internet Addiction → Academic Engagement (via Negative Emotions)	-0.07	-2.59	[-0.11, -0.03]	0.01*
Basic Psychological Needs → Academic Engagement (via Negative Emotions)	0.02	1.64	[-0.01, 0.05]	0.101 (n.s.)

The goodness-of-fit indices for the tested structural model are presented in Table 5. The values indicate an acceptable fit with GFI = 0.957, RMSEA = 0.064, χ^2/df = 2.77, all within established cut-off criteria.

Table 5

Goodness-of-Fit Indices

Fit Indices	Obtained Value	Acceptable Threshold
GFI	0.957	>0.90
AGFI	0.919	>0.80
SRMR	0.045	<0.05
CFI	0.934	>0.90
NFI	0.919	>0.90
NNFI	0.908	>0.90
χ^2/df	2.77	<3
PNFI	0.76	>0.60
RMSEA	0.064	<0.08

The findings confirm that internet addiction has a negative influence on academic engagement, both directly and indirectly through its impact on academic emotions. In contrast, basic psychological needs enhance engagement indirectly through the experience of positive academic emotions. The structural model demonstrates a strong fit, supporting the proposed relationships.

Discussion and Conclusion

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This study investigated the mediating role of academic emotions in the relationship between basic psychological needs, internet addiction, and academic engagement among high school students in Tehran during the post-COVID period. The findings provide critical insights into the psychological and behavioral mechanisms that influence student engagement, revealing both expected and unexpected patterns.

The results confirmed that internet addiction is negatively associated with academic engagement, both directly and indirectly through negative academic emotions. This aligns with previous research suggesting that excessive internet use interferes with students' cognitive and emotional investment in learning (Buzzai et al., 2021; Manjazi & Heidari, 2023). Prolonged internet use, particularly for non-academic purposes, may lead to distraction, sleep disturbances, and decreased motivation, ultimately reducing student engagement. However, it is essential to note that the study is correlational, meaning we cannot infer causality. Rather than concluding that internet addiction causes lower engagement, we can state that students who report higher internet addiction tendencies also exhibit lower levels of academic engagement.

The study also found that basic psychological needs did not directly predict academic engagement, contradicting some earlier findings (Wang et al., 2019; Zhen et al., 2017). However, these needs indirectly influenced engagement through positive academic emotions. This suggests that fulfilling students' autonomy, competence, and relatedness needs does not immediately translate into higher engagement but rather fosters positive emotional experiences (e.g., joy, interest, pride), which in turn drive engagement. This finding is consistent with Self-Determination Theory (Deci & Ryan, 2011), which posits that fulfilling psychological needs enhances intrinsic motivation and well-being, leading to better academic outcomes. However, the non-significant direct effect raises essential questions: Could contextual factors, such as school environment, teacher-student relationships, or peer influence, moderate this relationship? Future research should explore these possibilities.

The strong positive association between positive academic emotions and engagement reinforces existing literature on the role of emotions in learning (Carmona-Halty et al., 2021; Pekrun, 2006; Pekrun et al., 2002). Students who experience joy, pride, or excitement in their academic activities are more likely to persist, exert effort, and engage deeply in their studies. Conversely, negative emotions (e.g., anxiety, frustration) were found to hinder engagement, highlighting the importance of emotional regulation in academic settings. Schools should focus on creating emotionally supportive learning environments that foster enthusiasm and resilience.

A key implication of these findings is that reducing internet addiction alone may not be sufficient to enhance engagement. Instead, interventions should simultaneously focus on promoting positive academic emotions and fulfilling students' psychological needs. For instance, teachers and school counselors can implement self-regulation programs to help students monitor and manage their internet use while also fostering an environment that supports their need for autonomy (e.g., student-driven projects), competence (e.g., mastery-oriented learning), and relatedness (e.g., peer collaboration).

Based on the findings, several practical recommendations can be made: Digital Well-Being Programs: Schools should provide awareness campaigns, self-monitoring tools, and parental guidance to help students regulate their internet use. Encouraging scheduled, purposeful technology use rather than unrestricted access may help mitigate adverse effects. Emotional Regulation Training: Given the impact of academic emotions on engagement, teachers should integrate mindfulness techniques, stress management strategies, and classroom discussions on emotions into their pedagogy. Motivational Learning Environments: Schools should enhance student autonomy by offering choice in assignments, increasing competence through challenging but attainable tasks, and strengthening relatedness by fostering collaborative learning and positive teacher-student relationships. Parental Involvement: Parents should be educated on the risks of excessive internet use and the importance of providing emotional support and fulfilling their children's psychological needs in their academic journey.

While this study provides important insights, several limitations must be acknowledged: Data were collected through self-reported questionnaires, which are susceptible to social desirability bias. Future studies should include objective behavioral measures (e.g.,

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screen time tracking, teacher evaluations of engagement). Factors such as socioeconomic status, parental supervision, and prior academic achievement were not taken into account. These variables could influence both internet addiction and academic engagement and should be considered in future research. This study captures only a snapshot in time, making it impossible to establish causal relationships. Longitudinal studies tracking students over time would provide deeper insights into how psychological needs, emotions, and internet use evolve and influence engagement. The study was conducted among high school students in Tehran, which limits its generalizability to other regions or age groups. Future studies should examine different educational levels and cultural contexts.

This study highlights the complex interplay between psychological needs, internet addiction, academic emotions, and engagement. The findings emphasize that internet addiction is negatively associated with educational engagement, both directly and indirectly through increased negative emotions. Meanwhile, basic psychological needs enhance engagement indirectly by fostering positive emotions. These insights reinforce the importance of balancing digital consumption with psychological well-being and underscore the need for emotionally supportive, motivational learning environments. To improve student engagement, efforts should move beyond restricting internet use and instead focus on enhancing emotional well-being and fulfilling students' psychological needs. By implementing educational policies that prioritize emotional support, digital literacy, and self-regulation, schools and families can help students develop healthy academic habits and achieve sustainable academic success in the post-COVID era.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Declaration of Helsinki, which provides guidelines for ethical research involving human participants. Ethical considerations in this study included the fact that participation was entirely optional.

Transparency of Data

By the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contribute to this study.

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