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The role of mindfulness in treating gaming addiction in high school students: A case study in Vietnam

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Abstract: The objective of this study is to understand how mindfulness heals gaming addiction among high schoolers in Vietnam by sampling 200 individuals. The analyses thus performed are robust enough to reveal that multiples of psychological constructs related to mindfulness can influence the reduction of self-control, alleviation, related stress, and further emotional control, social and emotional skills, enhancement of focus and attention, motivation for a healthier diet, and reduction of dopamine dependence. The present results also show that this holds the functioning of mindfulness as a significant mediator in healing from gaming addiction, with additional correlations found among constructs. In this study, the increased break was found to contribute more to self-control, emotional regulation, and attention enhancement. This analysis shows that the model is valid and reliable, such that mindfulness interventions tend to mainstreamably nudge adolescents toward engaging in better behaviors. This study points out the necessity of incorporating mindfulness training in the treatment of gaming addiction and promises insights relevant to educators, policymakers, and mental health professionals that will be beneficial in aiding youth in their digital-age challenges with gaming.

Keywords: *Gaming addiction, High school students, Mindfulness, Psychological constructs, Recovery, Vietnam.*

1. Introduction

The rising prevalence of gaming addiction among children and adolescents is now fast becoming an urgent public health issue in the world (Bozzola et al., 2022; Imataka et al., 2022). The World Health Organization (WHO) defines gaming disorder as a pattern of gaming behavior characterized by impaired control over gaming, increasing priority given to gaming over other activities, and continuation or escalation of gaming despite negative consequences (WHO, 2019).

As Gentile observes, video game addiction can cause significant impairment or distress in personal, social, and academic functioning, imposing a grave risk to children's development (Perkel, 2022). The harmful effects emanating from gaming to excess are not limited to psychological disorders such as anxiety and depression but also include social withdrawal and declined accomplishments in the academic field (Lemmens et al., 2011). So, it is requisitely important to understand and deal with the multi-faceted nature of gaming addiction for the care of holistic child well-being.

In Vietnam, the challenge of gaming addiction is pronounced. In the wake of the ongoing digitalization and the open and extensive accessibility of online gaming platforms, children in Vietnam are becoming ever more attracted to the virtual space. Latest statistics indicate that about 40% of Vietnamese children 10-17 years old are currently gaming for more than three hours a day, several of them displaying exhibition symptoms of addiction (Kohoutek et al., 2022). This is reinforced by cultural expectations that give glamor to gaming as a socially defining form of entertainment, thus obscuring the potential risks posed by excessive gaming. According to Alter (2017), the cultural embrace of gaming can obscure quite grave ramifications it has for children's mental health, thereby creating a hidden epidemic of addiction. The decrease in mental health availability spells doom for many children needing the required help to manage gaming addiction (Kelly, 2014).

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More literature comes out regarding gaming addiction, but there is still a notable gap in research regarding Vietnamese-oriented effective intervention strategies. Traditional modalities of treatment, like CBT, have been extensively researched, whereas mindfulness, on the other hand, has not been duly researched as an intervention modality (Van Gordon et al., 2015). Mindfulness is the practice of being nonjudgmentally aware of the present moment, and it has proven its efficacy in a variety of behavioral and psychological issues, including addiction (Wilson et al., 2017). Childs (2007) describes mindfulness as not a technique but rather a state of being. This all-encompassing perspective is one that would promote self-awareness and emotional regulation, which could be handy for children battling gaming addiction problems. However, the exact context of how mindfulness interventions are implemented when treating gaming addiction among children in Vietnam is not adequately researched (Tran et al., 2017). This study will thus fill this much-needed gap of getting on how mindfulness interventions may be applied to treating gaming addiction in children in Vietnam.

The main purposes are to evaluate the efficiency of mindfulness programs in relieving symptoms of gaming addiction, as well as to understand the subjective experiences of those children taking mindfulness practices. This study uses a case study methodology to analyze in depth the challenges and successes of incorporating mindfulness into therapeutic interventions for gaming addiction.

In short, the study attempts to offer a think-tank service for policymakers, teachers, and mental health practitioners in Vietnam. As the nation faces the complexity of navigating a highly digitalized environment, mapping the possible implications of mindfulness in addressing gaming addiction may furnish the stakeholders with practical ways to intervene and promote healthier gaming habits among children (Tharumiya et al., 2024). Moreover, this may assist in developing culturally sensitive knowledge that can be factored in while addressing decision-making in the lives of children's engagements with digital media (Henderson et al., 2017). With the increasing number of cases of gaming addiction in children, attempts to identify fresh and culturally appropriate modes of intervention are essential (Throuvala et al., 2019). The focus of this research is to unravel the potentiality of mindfulness as a viable approach to addressing gaming addiction in Vietnam while providing broader insights into addressing child mental health and well-being in this digital age. Conclusively, by addressing this problem, we seek to increase our understanding of efficient treatment modalities that can enable the healthy growth of children and minimize the harm caused by gaming addiction.

2. Literature Reviews

2.1. Improved Self-Control and Impulse Management

Self-control and impulse management are, above all, essential to solving children's problem of gaming addiction (Zhou & Xing, 2021; Duckworth et al., 2014). Self-control refers to the capacity to think, feel, and act after some delay in response to immediate temptations (Duckworth & Steinberg, 2015). Studies have shown that children with low self-control are significantly more likely to develop problem-gaming habits (Gentile et al., 2011), which is an important consideration in the improvement of self-regulation as it guards against excessive gaming behaviors.

Mindfulness practices have been shown to be effective in self-control and impulse management. For example, Zeidan et al. (2010) confirmed that mindfulness mediation enhances emotion regulation, where mindfulness enables a pause for reflection before acting on an impulse. It is this capacity that would lend itself to benefiting children who are vulnerable to gaming addiction, as it allows them to realize and work on their cravings for gaming, steering alternative beneficial choices, with yoga being one other option in this respect (Kuss, 2013; Griffiths, 2008).

Khoury et al. (2015) analyzed the effect of mindfulness-based interventions on self-regulation across different populations. Qualitative research conducted by Mettler et al. (2020) suggests that children participating in mindfulness programs reported higher awareness of their gaming habits and improved impulse control, which consequently reduced their gaming and increased their engagement in alternative activities.

In a quick glance, improvement in both areas of self-control has proved to be the backbone of addressing gaming addiction in the childhood population. This research thus aims to demonstrate that

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the inclusion of mindfulness practices within therapeutic intervention would ultimately be a means to bolster healthy gaming practices.

2.2. Reduction of Stress and Anxiety

Stress and anxiety play the prime determinants in child addiction to gaming (Milani et al., 2020). Stressful and anxious children are reported to engage in hours of gaming in order to cope with their challenges. Further, Gentile et al. (2011) have advocated that care be taken to point to the major emotional problems, as problematic gaming has been associated with using it as an escape from the challenges faced in everyday life.

Mindfulness practices lower the levels of stress and anxiety; hence, we can begin to treat those debilitating conditions. In a meta-analysis by Goyal et al. (2014), participants showed reductions in anxiety or stress significantly owing to mindfulness-based interventions relative to one another (Kim et al., 2027). Mindfulness consists of being fully conscious of the present moment but fosters healthier coping mechanisms-translating into people's liberation in enabling them to balance inner peace and not having to depend on the gaming itself for venting emotions (Tharumiya et al., 2024).

Keng et al. (2011) have further pointed out that mindfulness allows for the modulation of emotional expression and builds resilience in children. Throughout mindfulness programs, children reported reduced anxiety and greater stress-coping skills, thereby reducing the chances of gaming as an escape mechanism. Qualitative findings by Semple et al. (2020) indicated that children reported increased emotional stability and no longer have cravings for games after completing mindfulness practices.

Therefore, this study hopes to demonstrate how mindfulness strategies integrated into treatment may beneficially influence gaming behaviors and emotional well-being through low contributions toward the alleviation of stress and anxiety.

2.3. Enhancement of Emotional Regulation

Emotional regulation still stands as a pivotal element in positive game addiction treatment practices in children (Young, 2009; Macklem, 2007). It properly speaks to an acceptable way of dealing with storing and responding to emotional experiences, thus being quite crucial for young ones, considering their underdevelopment in dealing with emotions contracted from gaming behavior (Reynard et al., 2022). Studies have shown that children with impaired control over their emotions are more vulnerable to the craving for gaming since they exactly use this as an escape to numb their negative emotions (Gentile et al., 2011).

Mindfulness practice has been found to be a tender spot for tweaking emotional regulation (Hafenbrack, 2017; Nairn & Regan-Addis, 2019). The evidence that has been amassed around mindfulness training demonstrates that this approach cultivates a greater awareness of the emotional state and promotes healthier responses to emotions (Tang & Braver, 2020). A meta-analysis by Keng et al. (2011) demonstrated that mindfulness-based interventions improve emotional regulation skills significantly across diverse populations, including children. By fostering nonjudgmental awareness, mindfulness enables individuals to observe their emotions without becoming caught in emotional overdrive so they may exercise adaptive choices in response to stressors (Daugherty, 2014).

Beyond that, such mindfulness practices, as indicated by Zeidan et al. (2010), have left intact the capacity to manage hard emotions behind which the use of gaming might be sought as a resort. Qualitative findings presented by Moloney (2016) complement findings from this study by noting that children engaging in mindfulness were found to exhibit improved emotional stability, thus, more capable with stressors selected in spontaneous, unmediated, and careful ways than needed excessive gaming.

In summary, emotional regulation is of great importance in the treatment of addictive gaming in children. Embedding mindfulness strategies in the therapeutic interventions pursued by this study aims to illustrate that improved emotional regulation can lead to the promotion of appropriate gaming behaviors and general emotional being.

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2.4. Increased Focus and Attention

These sessions are now gaining further attention due to the need to grapple with gaming addiction in children as a simple starting point. Research has indicated that children struggling more with attention control often suffer more severe drawbacks from gaming addiction; they receive greater gratification from their ability to concentrate on gaming activities to offset problems faced in everyday life. This is further backed up by research by Gentile et al. (2011), indicating that defective attention was really significantly related to problematic gaming behavior, thereby giving rise to developing interventions toward those ends of enhancing focus and cognitive control.

Mindfulness shows promise in raising attention and the ability to concentrate. Mindfulness training increases concentration but also significantly increases cognitive flexibility (Zenner et al., 2014). Mindfulness cultivates a sense of awareness of the present moment (Anālayo, 2019). In this way, children would be distracted from other temptations, which could lead to a greater ability to exert control over their excesses with gaming and reduce engagement in excessive gaming altogether (Tirch, 2010).

Some studies have demonstrated that mindfulness improves performance in academic pursuits among children, hence fostering better attention, which has implications for cognitive improvement. Felver et al. (2016) argued in this respect that children engaged in mindfulness programs would better sustain attention on academic tasks and would ultimately develop safer gaming habits.

The qualitative inquiry conducted by Gagne & Nwadinobi (2018) consistently supported some of these findings, where children reported that with certain mindfulness practices, they had better focus and greater self-control over temptations. Participants were said to have become aware of their choices, thereby empowering their capacity to choose healthier activities over gaming (Galla & Duckworth, 2015).

In sum, increased focus and concentration through mindfulness strategies in therapeutic interventions appear to be crucial to treating gaming addiction among children. This research depicts focus-enhanced cognition involved in altering the assistant's gaming behavior.

2.5. Promotion of Healthy Habits

Fundamentally, instilling awareness of healthy habits is indispensable in such a way as to counteract gaming addiction in this population (Pinder et al., 2018). Going in for active, balanced lifestyles with physical activity in tandem with socialization and diverse recreational pursuits can reduce the chances of overindulgence in gaming. Healthy children are, therefore, less likely to indulge in problematic gaming behavior because they become channels for constructive forms of engagement and achievement (Gentile et al., 2011). Mindfulness exercises have proved to ease the path toward the formation of healthy habits (Galla & Duckworth, 2015). Mindfulness interventions involving children can help children understand the importance of combining gaming with other activities through self-reflection and mindful decision-making (Zelazo et al., 2018).

The 2014 meta-analysis by Goyal et al. conducted consolidation training in relation to mindfulness with positive health behaviors such as increased physical activity and improved nutrition; thereby, it underscored the universality of a holistic sense of health by promoting an attitude towards constructive self-regulation and health (Goyal et al., 2014). Besides, mindfulness practices have been associated with better emotional health, which could even further bolster the development of healthy habits.

According to the authors Keng et al. (2011), children utilizing mindfulness programs reported more satisfaction with their daily endeavors and less gaming time for entertainment. This shift in cognition would help provide some very conducive elements for the promotion of good habits. These qualitative findings from Flook et al. (2010) further corroborated these conclusions, where children involved with mindfulness training experienced an increased awareness of their healthy living choices and showed a significantly higher inclination toward other activities outside of gaming. Participants noted that they felt a greater motivation to engage in sports, arts, and social interactions, thereby reducing their gaming time (Przybylski et al., 2010).

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In summary, establishing healthy habits is foundational to treating childhood gaming addictions. The research looks to prove that integration of mindfulness strategies into treatments promotes healthy behaviors leading to balanced lifestyles, leading moreover to a diminished reliance and consequential improvement in overall well-being.

2.6. Reduction of Dopamine Dependency

Dopamine detoxing becomes a great weapon injected into the armory against gaming addiction among kids. A neurotransmitter known to stimulate pleasure and reward, it permitted gaming to be addictively attractive (Darvas et al., 2014). Evidence shows that excessive play may cause an increase in dopamine release, a self-perpetuating cycle of dependence, driving compulsive gaming behavior (Kuss & Griffiths, 2012). This may lead to a desensitization to natural rewards, hence making it much more difficult for children to derive enjoyment from whatever else is required, befitting an antidote to their gaming habit (Kardaras, 2022). Mindfulness works this out of dopamine dependency (Hoppes, 2006).

While offering an awareness of one's thoughts and feelings, mindfulness tends to orient a person to the activities that provide intrinsic satisfaction as opposed to gaming activities, which extrinsically reward the person. Mindfulness meditation can increase people's capacity to experience enjoyment and find meaning in ordinary activities, decreasing reliance on gaming for its online titillation (Zeidan et al., 2010). More importantly, it may also provide tools whereby children engage in healthier behaviors to deal with their cravings. Training and mindfulness foster emotional regulation and self-control, which constitute the very foundation necessary to consider and reject playing video games for pleasure (Keng et al., 2011). By adequately tuning children's reward systems, they could work toward reducing their dependency on dopamine-based gaming experiences.

Qualitative findings by Li et al. (2017) further sustain this notion whereby children indicated that the mindfulness program significantly reduced their cravings for gaming. In summary, participants expressed that mindfulness allowed them to appreciate simpler, non-gaming activities, fostering a sense of satisfaction earlier overshadowed by their gaming habits.

To sum up, it is crucial for the child to be freed from dependence on dopamine before being treated for gaming addiction. Mindfulness strategies are to be incorporated into the therapy to show how the medicating /mod degeneration of dopamine-fueled game players can form the basis for a healthy lifestyle as well as a yin-yang attitude towards pleasure and reward.

Based on literature reviews, the following hypotheses are proposed:

Hypothesis$_1$: Improved self-control and impulse management have a positive and meaningful impact on treating gaming addiction in high school students.

Hypothesis$_2$: Reduction of stress and anxiety has a positive and meaningful impact on treating gaming addiction in high school students.

Hypothesis$_3$: Enhancement of emotional regulation has a positive and meaningful impact on treating gaming addiction in high school students.

Hypothesis$_4$: Increased focus and attention positively and meaningfully impact treating gaming addiction in high school students.

Hypothesis$_5$: Promoting healthy habits positively and meaningfully impacts treating gaming addiction in high school students.

Hypothesis$_6$: Reduction of dopamine dependency has a positive and meaningful impact on treating gaming addiction in high school students.

3. Methodology

This study investigates the role of mindfulness in treating gaming addiction among high school students in Vietnam. The research was conducted during the summer of 2024, focusing on students participating in mindfulness classes at meditation monasteries located in Quang Ninh, Vinh Phuc, Ninh Binh, and Ha Nam provinces.

The questionnaire was developed based on a comprehensive literature review related to mindfulness, gaming addiction, and adolescent mental health (Rheingold, 2008). To capture a broad understanding of the constructs under study, the instrument incorporated both scaled items and open-

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ended questions, enriching the data collected and allowing for a multifaceted exploration of the issues at hand (Artino et al., 2014).

Prior to the main data collection, a pre-pilot study was conducted with 30 participants to ensure the clarity, relevance, and reliability of the questionnaire items. Feedback from these participants informed revisions to the wording of questions and improved the overall coherence of the instrument (Antony et al., 2019). Through this iterative process, the final questionnaire was refined to align closely with the research objectives, ensuring that participants understood the questions being asked.

Participants were randomly selected from young individuals attending mindfulness classes at the meditation monasteries. The sample included a diverse range of demographic characteristics, as outlined in Table 1. Among the 200 participants surveyed, a breakdown of their grade levels shows representation from 10th, 11th, and 12th grades, with ages ranging from 15 to 17 years old. The gender distribution also reflects a mix, with both male and female participants contributing to the data.

Data collection was conducted using paper-based questionnaires, which facilitated participants' responses and maximized response rates (Antony et al., 2019). This method also ensured the accuracy of the data collected. Ethical considerations were paramount throughout the research process. Participants were informed about the study's purpose, the voluntary nature of their involvement, and the confidentiality of their responses. An institutional review board reviewed and approved the study protocol to safeguard participants' rights and welfare.

In summary, this methodology section outlines a structured approach to investigating the impact of mindfulness on gaming addiction, emphasizing the rigorous development of the questionnaire, adherence to ethical standards, and the careful selection of participants, as detailed in Table 1.

Table 1.
Demographic characteristics of survey participants.

		Grade_Level					
		10th Grade		11th Grade		12th Grade	
		Count	Row N %	Count	Row N %	Count	Row N %
Age	15 years old	14	21.9%	34	53.1%	16	25.0%
	16 years old	11	22.4%	24	49.0%	14	28.6%
	17 years old	21	24.1%	32	36.8%	34	39.1%
Gender	female	24	29.3%	40	48.8%	18	22.0%
	male	22	18.6%	50	42.4%	46	39.0%
Location	Rural	13	29.5%	17	38.6%	14	31.8%
	Suburban	3	9.4%	18	56.2%	11	34.4%
	SUrban	4	20.0%	8	40.0%	8	40.0%
	Urban	26	25.0%	47	45.2%	31	29.8%
Gaming_addiction	0 3 months	11	39.3%	9	32.1%	8	28.6%
	4-6 months	7	17.5%	24	60.0%	9	22.5%
	7-9 months	24	21.1%	49	43.0%	41	36.0%
	More than 12 months	4	22.2%	8	44.4%	6	33.3%
Mindfulness_practice	1 2 months	21	29.2%	29	40.3%	22	30.6%
	1 2 weeks	7	25.0%	11	39.3%	10	35.7%
	3 4 weeks	17	21.5%	41	51.9%	21	26.6%
	3 months or more	1	4.8%	9	42.9%	11	52.4%

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4. Results and Discussion

4.1. Results

4.1.1. Reliability Analysis

In this study, Cronbach's alpha was used to assess the reliability of the survey instrument, focusing on the internal consistency of the scales included in the research questionnaire (George & Mallery, 2018). Cronbach's alpha is one of the most common measures of reliability in the social sciences, particularly used for psychometric instruments. The values of the coefficient fall between the intervals of 0-1; the higher the values are, the greater the reliability (Agbo, 2010). The constructs that assessed various dimensions of how mindfulness was related to the treatment of gaming addiction include improved self-control, reduction of stress and anxiety, improvement of emotional regulation and focus/provide attention, healthy habit steadiness, and decrease in dopamine dependency.

Internal consistency reliability of these scales was assessed; all Cronbach's alpha values exceeded the commonly accepted cutoff of 0.70, thus establishing high internal consistency across the measures. The coefficients of reliability for the various scales were as follows: ISCI_Management, Improved Self-Control, and Impulse Management, looked at α=0.805; SA_Reduction scored α=0.783; ER_Enhancement; α=0.756; FA_Increase α=0.782; DD_Reduction α=0.816; GAC_Treating, recorded α=0.794.

As noted earlier, these reliability coefficients (with a minimum total variable correlation found from .548 to .612) provide strong evidence that the survey instrument used for this study has adequate reliability. The high internal consistency gives confidence in the measurements taken and confirms that the examined constructs of mindfulness can influence the treatment of gaming addiction in adolescents. Thus, this reliability sets a solid ground for the analysis of the data and the subsequent findings, as summarized in Table 2.

Table 2.
Summary of reliability.

Scales	Number of variables observed	Reliability coefficients (Cronbach Alpha)	The correlation coefficient of the smallest total variable
Improved self-control and impulse management (ISCI_Management)	4	0.805	0.560
Reduction of stress and anxiety (SA_reduction)	4	0.783	0.558
Enhancement of emotional regulation (ER_Enhancement)	4	0.756	0.548
Increased focus and attention (FA_Increase)	4	0.782	0.572
Reduction of dopamine dependency (DD_Reduction)	4	0.816	0.612
Treating gaming addiction (GAC_Treating)	4	0.794	0.568

4.2. Factor Analysis

In the study, EFA played a role in understanding the structural organization of the data acquired from the questionnaire, clarifying the latent constructs of how mindfulness affects gaming addiction in high school students. EFA is a powerful statistical method that is capable of reducing the data dimensions and drawing the relationships between variables, hence providing the theoretical constructs with empirical validation (Stapleton, 1997). The adequacy of the data for factor analysis was determined by calculating the KMO measure of sampling adequacy, with the resultant 0.902, far above the criterion of 0.60. Besides that, Bartlett's Test of Sphericity was statistically significant, meaning the observed

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variables were correlated enough for EFA to be concluded. It confirmed the appropriateness of the data for further analysis (Shrestha, 2021).

EFA was performed using the Principal Component Analysis (PCA) with the varimax rotation to enhance the appropriateness and interpretation of results (Corner, 2009). Several factors were extracted based on eigenvalues more than one explaining a sufficiently large proportion of variance in the dataset. The analysis disclosed distinct factors aligned with these specified dimensions of mindfulness in treating gaming addiction, including accelerated self-control, lowered stress and anxiety, enhancement in emotional regulation, increased focus and attention, and encouragement in healthy habits.

The factor loading coefficients for all variables exceeded a threshold of 0.5, thus indicating the validity of the factor analysis. The extracted factors accounted for variance of 62.654%, denoting that these factors significantly account for variance in the data. All of the initial eigenvalues of the extracted factors were greater than one, thus confirming their relevance. All in all, the factor structure produced through EFA supports the conceptual framework forthcoming from this study and will, therefore, form an excellent basis for further analytical testing. The emerging factors will serve to study the role that mindfulness plays in recovery from gaming addiction and increasing the general state of well-being for adolescents. A summary of the findings from the factor analysis is contained in Table 3, which affirms the reliability and validity of the research questionnaire in use.

Table 3.
Result of factor analysis.

Rotated component matrix[a]							
	Component						
	1	2	3	4	5	6	7
HH_Promotion1	0.773						
HH_Promotion3	0.731						
HH_Promotion2	0.723						
HH_Promotion4	0.673						
DD_Reduction4		0.773					
DD_Reduction2		0.727					
DD_Reduction1		0.720					
DD_Reduction3		0.701					
ISCI_Management 1			0.752				
ISCI_Management 3			0.750				
ISCI_Management 2			0.693				
ISCI_Management 4			0.681				
GAC_Treating4				0.732			
GAC_Treating2				0.698			
GAC_Treating3				0.666			
GAC_Treating1				0.645			
ER_Enhancement1					0.709		
ER_Enhancement2					0.708		
ER_Enhancement3					0.701		
ER_Enhancement4					0.634		
FA_Increase3						0.706	
FA_Increase2						0.683	
FA_Increase1						0.660	
FA_Increase4						0.633	

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SA_Reduction4							0.740
SA_Reduction2							0.717
SA_Reduction1							0.693
SA_Reduction3							0.624
Extraction method: Principal component analysis.							
Rotation method: Varimax with kaiser normalization.							
Rotation converged in 6 iterations.							
Kaiser-Meyer-Olkin measure of sampling adequacy (KMO)= 0.902							
Bartlett's test of sphericity (Chi-Square =2183.293; df=378; sig.=0.000)							
Initial Eigenvalues =1.140; Extraction sums of squared loadings = 62.654							

4.3. Correlation Analysis

Pearson correlation was carried out to analyze the linear interactions between the key dimensions of mindfulness and gaming addiction. The key dimensions involved in the diagnostic of association included ISCI_Management, SA_Reduction, ER_Enhancement, FA_Increase, DD_Reduction, and GAC_Treating. The significant relationships between these natures and the direction of the relationships positively correlated. An example is provided by the highly correlated ER_Enhancement and SA_Reduction, suggesting the possible simultaneous influence of those two components on gaming addiction (Schober et al., 2018).

These correlations represent a nice starting point for the regression analysis because the causal links are well-established for subsequent modeling. The statistically significant nature of these correlations is depicted in Figure 1 and serves as validation of their strength for further analysis. This preliminary analysis adds weight to the conclusions of this study but also establishes the basis for a much deeper exploration into the role of mindfulness in mitigating gaming addiction among high school students in Vietnam.

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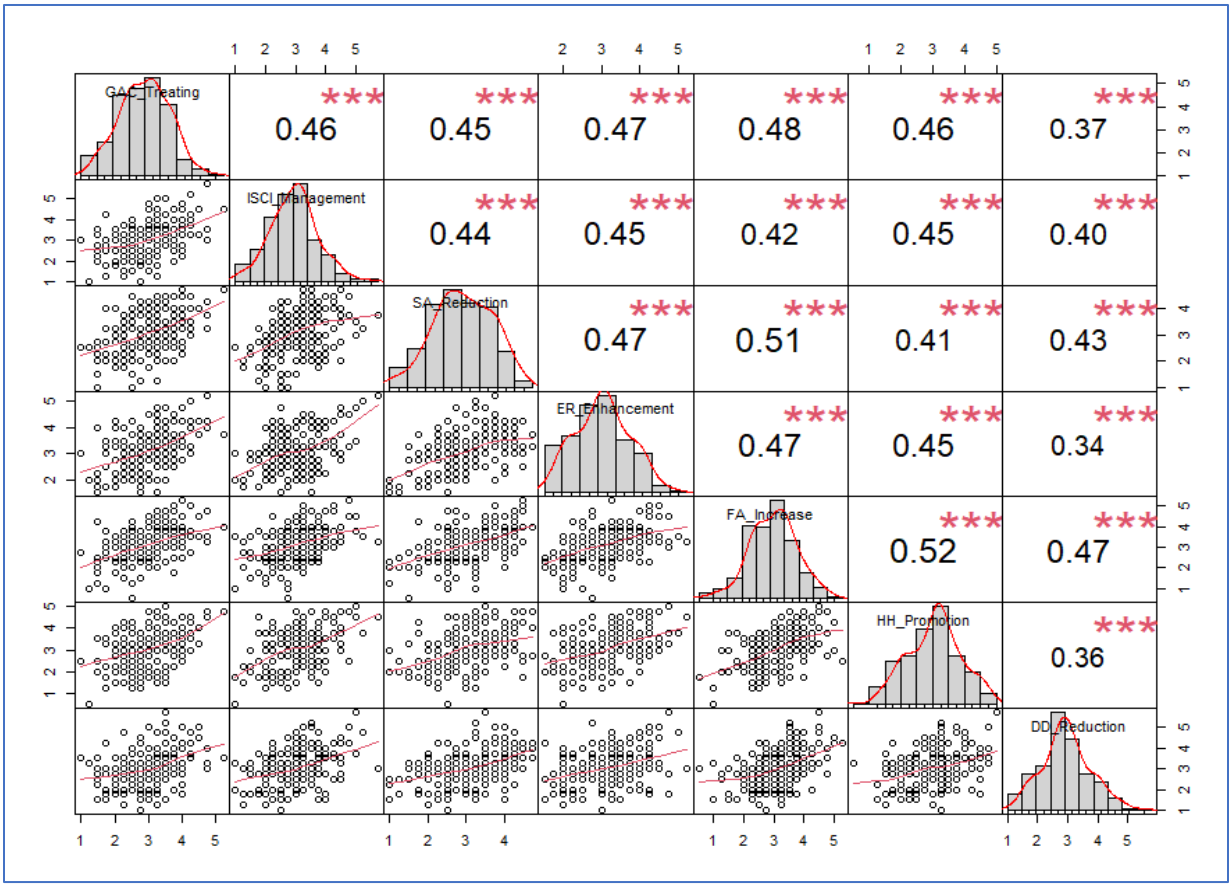

Figure 1.
Correlation analysis results.

4.4. Multivariate Linear Regression Analysis

In this study, multivariate linear regression analysis was conducted, testing the posited hypotheses regarding mindfulness influences on the gaming addiction qualities of high school students in Vietnam. Six independent variables were considered: ISCI_Management, SA_Reduction, ER_Enhancement, FA_Increase, DD_Reduction, and GAC_Treating. The choice of these variables was predicated upon previously established significant positive correlations between the constructs that connoted either independence or possible synergistic effect (Schober et al., 2018).

The results of regression analysis suggested that all dimensions positively affect the treatment of gaming addiction, with a strong effect indicated through ER_Enhancement, ISCI_Management, and FA_Increase; the significance of these mechanisms is accentuated for effective recovery via mindfulness practices (Goy et al., 2014).

Adjusted R-squared = 0.490 reflects that the model holds considerable explanatory power and that mindfulness functionalities hold additional support in recovery from gaming addiction among adolescents (Gentile, 2011). This analysis provides additional empirical evidence supporting targeted mindfulness interventions to promote engagement in healthy behaviors.

The results of the multivariate linear regression analysis in Table 4 provide some evidence for the validity of the regression model based on the statistically significant F-test (p = .000) (Hair et al., 2019). Additionally, there was no multicollinearity among the variables, as the maximum variance inflation factor equaled 2.1. This implies variables lack strong correlations, thus estimating regression coefficients with acceptable accuracy (Kelley & Maxwell, 2003).

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Finally, the result from this multivariate linear regression supports the relevance of mindfulness in curing gaming addiction, providing fertile ground for future research and intervention strategies aimed at enhancing the overall well-being of adolescents experiencing these issues.

Table 4.
Results of regression analysis.

Dependent variable:	
GAC_Treating	
Model	
ISCI_Management	0.159** (0.066)
SA_Reduction	0.116* (0.069)
ER_Enhancement	0.180** (0.072)
FA_Increase	0.149** (0.072)
HH_Promotion	0.132** (0.068)
DD_Reduction	0.060 (0.060)
Constant	0.543*** (0.233)
Observations	200
R2	0.505
Adjusted R2	0.490
Residual Std. Error	0.545 (df = 193)
F Statistic	32.868*** (df = 6; 193)
VIF:	ISCI_Management = 1.51 , SA_Reduction = 1.62, ER_Enhancement = 1.55, FA_Increase = 1.179, HH_Promotion = 1.58, DD_Reduction =1.143

Note: *p<0.1; **p<0.05; ***p<0.01.

4.5. Hypothesis Test

First, the regression analysis results (Table 4) show that self-control and impulse control affect the treatment of gaming addiction positively and significantly, supported by a regression coefficient of β = 0.159 with a significant p-value of 0.001 at a 95% confidence level. This helps support the acceptance of Hypothesis 1, whereby it seems that invested interventions into self-control could go hand-in-hand with a decrease in gaming addiction among high school students. This further illustrates the importance of self-regulatory skills in adolescents to enable them to moderate their gaming behavior successfully.

Second, self-control plays out in its simplest terms as one's ability to say "no" to the lure of a game, especially when faced with competing demands for time or emotional triggers. Second, further examination demonstrated the importance of lower stress and anxiety in the treatment of video game addiction, with a regression coefficient of β = 0.116 and a p-value of 0.050. Hence, Hypothesis 2 is accepted. In this case, it means that mindfulness practices, which often highlight stress reduction and anxiety management, are critical to mitigating the compulsive behaviors related to gaming addiction. While stress and anxiety reduce the odds that adolescents will use gaming as a coping mechanism, they open the way too much healthier behavior patterns.

Third, the outcome further establishes that the enhancement of emotional regulation brings great improvement to the treatment of gaming addiction, shown by the regression coefficient β =0.180 and a highly significant p-value of 0.001, which emphasizes the importance of emotional intelligence and emotion regulation in gaming addiction. Hence, Hypothesis 3 is accepted and gives credence to emotional wellness as the most important aspect of the recovery process from gaming addiction. Mindfulness practices can impart skills for processing and handling emotion, thus reducing the chances of gaming being used to seek refuge from negative states of self.

Fourth, your investigation shows that increased focus and attention would most influence the treatment for gaming addiction, obtaining a regression coefficient of β=0.149 with an insignificant p-value at 0.001. This means, therefore, that Hypothesis 4 is confirmed and thus denotes the significance of attentional training in the framework of mindfulness interventions. This shows that mindfulness

training improves attentional control and cognitive flexibility and enables students to switch from playing games to more productive daily activities. The idea is that enhanced attention capacity during the adolescent period would prioritize schoolwork and other healthy pursuits, while mechanisms to reduce gaming-related behavior were less prioritized over other adolescent pursuits.

Fifth, the regression analysis showed that promoting healthy habits correlates positively and significantly with the treatment of gaming addiction, with a regression coefficient of $\beta=0.132$ and a p-value of 0.001. Hypothesis 5 is, therefore, accepted in favor of the opinion that facilitating healthy habits is very important in the fight against gaming addiction among adolescents. This calls for the active promotion of a lifestyle rich in social interaction and wholesome physical exercise besides gaming. The practice of mindfulness helps an individual cultivate an awareness of one's behaviors and motivates a conscious choice for more healthy habits. Lastly, the regression coefficient $\beta=0.060$ associated with the findings of reduced dopamine dependence had its $p>0.050$, that is, $p=0.329$. Thus, Hypothesis 6 is also nullified. This implies that, though dopamine dependence is a vital variable in understanding game-use behavior, such dependency does not thus seem adequate to interact positively enough to affect gaming addiction treatments in this population.

5. Discussion

The present study investigates how the above variables of mindfulness work together to reduce problems resulting from excessive video gaming among adolescents. Our results suggest that five constructs of mindfulness, including enhanced self-control, reduced stress and anxiety, enhanced emotional regulation, increased attentional engagement, and greater positive health and habit formation, significantly contribute to reducing video gaming problems in adolescents.

First, adolescents with greater self-control and impulse regulation are expected to monitor and regulate their gaming engagement more effectively, as previous research indicates direct relationships between self-regulation ethic and some deleterious addictive behaviors, including PVGD (Duckworth & Steinberg, 2015; Galla & Duckworth, 2015). Self-control strategies help adolescents' re-channel themselves from a potential addiction, particularly when gaming is stimulated by psychological stress or perceived threats to their economic, emotional, and social security (Alter, 2017).

Second, when adolescents are able to manage stress and anxiety through mindfulness, they may reduce the probability of using video games as negative reinforcement (Keng et al., 2011; Goyal et al., 2014), and instead task-shift to more positive and prosocial activities that make them feel productive and fulfilled. This finding is consistent with prior studies that advocate for mindfulness as an effective approach to relieving psychological distress and promoting emotional health during stressful situations (Khoury et al., 2015).

Third, mindfulness turns out as a substantial resilience-building capability to promote emotional variety and manageability, thus increasing the possibility of reducing gaming problems. Equipped with mindfulness practices, adolescents are expected to leverage better acceptance and a wider range of positive emotional resources to avoid being trapped in negative and time-consuming behaviors like video gaming (Tharumiya et al., 2024). This is reinforced by previous research findings on the substantial importance of emotion differentiation and regulation in addiction recovery (Hoppes, 2006; Macklem, 2007).

Finally, mindfulness and increased power of concentration may go a long way in treating gaming addiction. Further, concentration skills can help prevent adolescents from spending too much time on games and redirect their focus to more useful areas. This aligns with the available literature that is in favor of mindfulness enhancing attentional control and cognitive flexibility (Flook et al., 2010; Zeidan et al., 2010). Increased control repertoires allow children to commit their attention to academic armors to note down assignments and prepare for examinations in school or simply allow conversations or active engagements with their peers, thus taking their minds away from gaming. The emerging promotion of health habits was another crucial element in the treatment of gaming addiction. Mindfulness practices create a non-judgemental awareness of one's own behavior, engaging oneself in physical activity and social life (Mettler et al., 2020; Bozzola et al., 2022).

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A holistic view of health not only combats gaming addiction but also assures overall well-being during adolescence. Our analysis did not show any significant influence in reducing dopamine dependency. This finding suggests that while dopamine dependency is central to understanding addictive behaviors, it may not significantly affect gaming addiction treatment within our study population (Darvas et al., 2014; Kuss & Griffiths, 2012). Further investigations into the multifaceted implications of the role of dopamine in gaming addiction ought to be undertaken to understand its impact across varied contexts better. There is ample substantiation for the idea that mindfulness does indeed seem effective as a multifactorial strategy in addressing gaming addiction in adolescents.

This study underscores the relevance of self-control, stress reduction, emotion control/focus, and healthy habits, thus contributing to the body of literature that advocates holistic approaches to treating addiction (Kuss, 2013; Throuvala et al., 2019). This knowledge can set standards for developing interventions incorporating mindfulness practices and safeguarding healthier behaviors in the context of improving adolescent well-being. The conclusions reveal that mindfulness is very instrumental in dealing with gaming addiction among high school students in Vietnam. Discussion in this vein sheds light on many psychological underpinnings linked to gaming addiction, which stand to provide dots for future research and intervention strategies should improve adolescent mental health and promote recovery from addictive behaviors.

6. Conclusion

The current research contributes to the psychological understanding of the health hazards of gaming disorder. The public is now aware of parental concerns about high schoolers' health. The findings of this research inform on the effects of gaming addiction among high school students and bring an understanding of mindful mechanisms, which can be applied to promote the resolution of gaming. The finding of the present study contributes directly to testing and promoting constructs of enhancing self-control, reducing stress and anxiety, improving emotion regulation, attention and focus, and healthy behavior in response to the inclination of a gaming disorder. This goal matters, especially when we realize that gaming addiction among adolescents has gained the attention of researchers and social attention.

Similar to previous studies, this serious problem can become a public health challenge for teenagers and young adults in Vietnam. This study conducted a unique emphasis that the research was initiated to contribute to addressing a public health problem in the high school population in Vietnam High school students were likely to indicate declining behavior to play video games, and further understanding through the constructs of mindfully psychological axes could help in forming cure in order to improve treatment of such a public health issue in the public. This study can provide insightful evidence to educational, psychological, and public health professionals who are interested in examining how to overcome the challenges of high school gaming disorder.

The findings indicate that mindfulness is helpful as an intervention to decrease gaming addiction and contribute to the development of related programs in promoting healthy behaviors among adolescents. Further, inclusion of mindfulness practices into educational settings would thus promote emotional well-being and equip students with the skills to regulate gaming tendencies.

However, the present study is not without constraints. The sample was confined to high school students in Vietnam, thus impeding the generalizability of the results to other populations and cultural settings. The self-report measures used may be prone to response bias and thus limit the validity of responses. Future studies may need to lessen these constraints and undertake more diversified research in different populations and cultures. Recommendations for longitudinal studies involve that such investigation is necessary to provide an in-depth perspective of how mindfulness abates gaming addiction while promoting resilience to new addictive behaviors. In addition, further exploration of the mediating role of mindfulness in diverse psychological constructs such as social support and peer influences would allow gaining a basis of an informed approach to decrease gaming addiction in adolescents.

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Appendix

Questionnaire

Your profile: Please select ONE answer from each statement that best describes you:

Age: ☐15 years old ☐16 years old ☐17 years old

Gender: ☐Male ☐Female

Grade Level: ☐10th Grade ☐11th Grade ☐12th Grade

Location: ☐Urban ☐Suburban ☐Rural

How long did you struggle with gaming addiction before quitting?:…../months

How long have you practiced mindfulness since quitting gaming?:…./ months

Support System During Recovery:

☐Family

☐Friends

☐School Counselor

☐Mindfulness Instructor

This survey examines the role of mindfulness in treating gaming addiction in high school students. There is no correct or incorrect response on this scale. Please read each statement carefully and indicate your level of agreement using a 5-point Likert scale, where 1 corresponds to "Strongly Disagree" and 5 corresponds to "Strongly Agree."

ISCI_Management	Improved self-control and impulse management					
ISCI_Management1	I can easily resist the urge to play games when I need to focus on something else.	(1)	(2)	(3)	(4)	(5)
ISCI_Management2	I find it easy to manage my gaming time and not let it interfere with other activities.	(1)	(2)	(3)	(4)	(5)
ISCI_Management3	I am good at controlling my cravings for gaming when I have other responsibilities.	(1)	(2)	(3)	(4)	(5)
ISCI_Management4	I can say no to gaming when I know I should be doing something else.	(1)	(2)	(3)	(4)	(5)
SA_Reduction	Reduction of stress and anxiety					
SA_Reduction1	Practicing mindfulness helps me feel less anxious about my daily life.	(1)	(2)	(3)	(4)	(5)
SA_Reduction2	I feel calmer and more relaxed after practicing mindfulness.	(1)	(2)	(3)	(4)	(5)
SA_Reduction3	Mindfulness helps me manage my stress when I feel overwhelmed.	(1)	(2)	(3)	(4)	(5)
SA_Reduction4	I have noticed a decrease in my anxiety levels since I started practicing mindfulness.	(1)	(2)	(3)	(4)	(5)
ER_Enhancement	Enhancement of emotional regulation					
ER_Enhancement1	Mindfulness helps me control my emotions better than before.	(1)	(2)	(3)	(4)	(5)
ER_Enhancement2	I find it easier to express my feelings appropriately since practicing	(1)	(2)	(3)	(4)	(5)

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	mindfulness.					
ER_Enhancement3	I am better at handling difficult emotions due to my mindfulness practice.	(1)	(2)	(3)	(4)	(5)
ER_Enhancement4	Practicing mindfulness helps me stay calm in stressful situations.	(1)	(2)	(3)	(4)	(5)
FA_Increase	Increased Focus and Attention					
FA_Increase1	Mindfulness practices have improved my ability to concentrate on schoolwork.	(1)	(2)	(3)	(4)	(5)
FA_Increase2	I can focus on tasks for longer periods since I started practicing mindfulness.	(1)	(2)	(3)	(4)	(5)
FA_Increase3	I feel less distracted by gaming when I need to concentrate on other activities.	(1)	(2)	(3)	(4)	(5)
FA_Increase4	Mindfulness helps me maintain my attention during lessons and activities.	(1)	(2)	(3)	(4)	(5)
HH_Promotion	Promotion of healthy habits					
HH_Promotion1	I have adopted healthier daily routines since practicing mindfulness.	(1)	(2)	(3)	(4)	(5)
HH_Promotion2	Mindfulness encourages me to participate in activities other than gaming.	(1)	(2)	(3)	(4)	(5)
HH_Promotion3	I have made better choices about my diet and exercise since practicing mindfulness.	(1)	(2)	(3)	(4)	(5)
HH_Promotion4	I spend more time outdoors and with friends since I started mindfulness.	(1)	(2)	(3)	(4)	(5)
DD_Reduction	Reduction of dopamine dependency					
DD_Reduction1	I have enjoyed non-gaming activities more since I began practicing mindfulness.	(1)	(2)	(3)	(4)	(5)
DD_Reduction2	Mindfulness has helped me feel satisfied without needing to play games.	(1)	(2)	(3)	(4)	(5)
DD_Reduction3	I can better find joy in everyday activities that do not involve gaming.	(1)	(2)	(3)	(4)	(5)
DD_Reduction4	After practicing mindfulness, I feel less dependent on gaming to feel happy or entertained.	(1)	(2)	(3)	(4)	(5)
GAC_Treating	Treating gaming addiction					
GAC_Treating1	I feel that my gaming habits have improved since I started practicing mindfulness.	(1)	(2)	(3)	(4)	(5)
GAC_Treating2	Mindfulness has positively changed my relationship with gaming.	(1)	(2)	(3)	(4)	(5)
GAC_Treating3	I believe mindfulness can help other children who struggle with gaming addiction.	(1)	(2)	(3)	(4)	(5)
GAC_Treating4	I feel more in control of my gaming behavior because of mindfulness.	(1)	(2)	(3)	(4)	(5)

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