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AI chatbot distractions and academic triumphs: a mediation approach with self-control and coping skills

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Abstract
Research aims: This study investigates self-control and coping skills in academic performance moderated by AI Chatbot addiction.
Design/Methodology/Approach: This study used an online survey and archival method and included 153 accounting student respondents as the final sample. Structural Equation Modelling using Smart-PLS was employed to estimate the relationship between variables.
Research findings: The findings underscore the significant impact of self-control in mitigating addictive tendencies, highlighting the susceptibility of individuals with lower self-control to develop addictive behaviors toward AI Chatbots. In comparison, coping skills were not found to have a substantial effect on reducing AI Chatbot addiction.
Theoretical contribution/Originality: This research demonstrates that self-control and coping skills play a crucial role in controlling the dependence on AI-based chatbots, ultimately contributing to a better understanding of the relationship between these psychological abilities and managing AI addiction in university accounting students (Chassignol et al., 2018; Sollosy & McInerney, 2022).
Practitioner/Policy implication: The findings have implications for chatbot designers and developers. Understanding the potential for addictive behavior allows for the implementation of behavior detection and prevention mechanisms within chatbot designs.
Research limitation/Implication: This study overlooked diverse forms of self-control and coping skills, along with other factors that contribute to AI Chatbot addiction. Recommending the exploration of various self-control strategies and coping skills could be a valuable opportunity for future research.
Keywords: Self-Control; Coping; AI Chatbot; Addiction.

Introduction

This study examines the relationship between psychological abilities, specifically self-control and coping skills, and the academic performance of accounting students, particularly in the context of the mediating influence of AI Chatbot addiction. The presence of Artificial Intelligence (AI) has reshaped various aspects of life. AI has found extensive applications across different sectors, from industry and business to education (Chassignol et al., 2018; Saka et al., 2023; Sollosy & McInerney, 2022). This advancement has brought about a notable transformation in human interactions with the world, offering substantial potential to

improve effectiveness and productivity in both organizational and individual settings (Cohen et al., 2022; Grové, 2021). Meanwhile, the transformation in the digital world has resulted in the importance of self-control processes and coping skills in controlling the use of Chatbot AI. Thus, this research explores the self-control and coping skills to mitigate AI Chatbot addiction and consequently influence academic performance.

The use of AI in businesses has opened up new opportunities for innovation and efficiency that have never been seen before. In this context, AI is used to automate routine tasks, make data-driven decision-making, and predict business trends. Companies that adopt this technology are generally more competitive and adaptable in a rapidly evolving market (Y. Chen & Yuan, 2007; Mikalef & Gupta, 2021; Turel et al., 2011). Similarly, education has experienced a significant revolution with the introduction of AI, which enhances the learning experience (Chassignol et al., 2018; X. Chen et al., 2020; Cohen et al., 2022). One aspect of AI that is gaining attention in education is Conversational AI/AI Chatbots. The use of AI Chatbots has the potential to positively impact academic performance. Although the use of AI Chatbot has shown positive effects on various aspects of academic performance, it is essential to consider various types of self-control and stress management skills that students may have, as well as other factors that may contribute to their susceptibility to AI addiction (Dekker et al., 2020; Liu & Zhang, 2023).

Now, delving into the role of Human-Computer Interaction (HCI), HCI principles applied to the design of AI Chatbot may inadvertently lead to excessive user engagement, as features designed to enhance user experience and interaction may encourage prolonged and frequent use, potentially leading to addictive behavior (Baumann et al., 2023; Brey & Søraker, 2009; S. Lee, 2022). Additionally, HCI-informed interface design optimized for seamless interaction and engagement may inadvertently encourage users to spend more time interacting with AI Chatbots, potentially leading to addictive patterns of usage. Moreover, HCI-driven personalization and adaptation strategies, while aiming to enhance user experience, may inadvertently lead to heightened user dependency and reliance on AI Chatbot, potentially resulting in addictive behaviors (X. Chen et al., 2020; Saka et al., 2023; Honken et al., 2016).

Conversational AI is a branch of AI that focuses on developing human-machine communication systems capable of interacting with humans in natural language (Mariani et al., 2023). In the educational context, AI Chatbots can provide personalized learning and support, enriching the academic experience (Alshater, 2022). Although the AI Chatbot has the potential to be a powerful tool for enhancing academic performance, individual factors, such as self-control and coping skills, play a crucial role in academic success. Self-control involves an individual's ability to regulate themselves, control impulses, and maintain focus on long-term goals (De Boer et al., 2015; Duckworth et al., 2019; Tangney et al., 2004), whereas coping skills encompass the ability to manage stress and maintain emotional balance when facing demanding academic tasks (Barczak & Eklund, 2020; Vizoso et al., 2019; White, 1974). On the other hand, the problem of AI Chatbot addiction in the context of academic performance arises from the potential overreliance on AI Chatbots, leading to decreased self-control and coping skills among students. This addiction can negatively impact academic performance by diverting students' attention and time away from traditional learning methods and essential academic tasks.

Therefore, this research explores the roles played by self-control and coping skills in enhancing the academic performance of accounting students who use AI Chatbots as a supporting tool at the Faculty of Economics and Business (Mariani et al., 2023; Mohamed & Lashine, 2003). The authors argue that the use of AI Chatbot itself occurs because of their psychological response and intention to seek convenience to produce satisfactory value (Nicolescu & Tudorache, 2022). The research used a quantitative research design using a survey and archival method to document the mediating role of AI Chatbot addiction in the relationship between self-control, coping skills, and academic performance. Participants were selected from the accounting students of the Faculty of Economics and Business who voluntarily participated in the study. The study employed a survey questionnaire, including demographic questions assessing age, gender, and year of education. The researchers measured the levels of self-control, coping skills, and AI Chatbot addiction for each participant using a Likert scale. A structural equation modeling (SEM) PLS analysis was conducted to examine the relationships between these variables and academic performance.

This study seeks to contribute to the literature on the psychological factors influencing academic performance and the role of AI Chatbot addiction in this relationship. On the other hand, this study also demonstrates the novelty of accounting behavior relying on contribution, specifically in accounting students. Firstly, the study reveals that dependence on AI Chatbots negatively affects students' skills. Moreover, this reliance on AI Chatbots stems from the low level of control functions and supervision at the students' cognitive level. Secondly, this research demonstrates that the matrix between self-control and coping skills serves as a reliable evaluative tool to alleviate negative behavior (Brey & Søraker, 2009; Cohen et al., 2022; Duckworth et al., 2019).

Furthermore, this article analyzes the understanding of the interaction between humans and AI in accounting education, enabling the development of more effective learning models and investigations into their effectiveness. Practically, it sheds light on how AI Chatbot can offer concrete solutions to students with limited learning resources, given the right understanding and development of self-control and coping skills, to help students harness the full potential of AI Chatbot in their academic endeavors. On the other hand, this research contributes to the formulation of guidelines or practices for responsible AI use within the scope of education. Also, it advocates for enhanced supervision and control functions by instructors in the deployment of AI. Thus, the role of AI is leveraged as a tool for optimal knowledge acquisition.

Literature Review and Hypothesis Development

Human-Computer Interaction (HCI) Theory

Human-Computer Interaction (HCI) theory is defined as interactions between individuals (users) and computers through the design, evaluation, and implementation of user interfaces that are responsive to users' needs and habits (Brey & Søraker, 2009). Users interact with computer systems through user interfaces, which comprise both hardware

and software components, facilitating user input, system manipulation, and information output. HCI has expanded to incorporate a diverse range of academic disciplines, including social and organizational computing, accessibility considerations for older people and those with cognitive and physical challenges, and a commitment to inclusivity for all individuals (Breideband et al., 2023; Chignell et al., 2023; Sáiz-Manzanares et al., 2023).

The active utilization of smarter technologies, which understand human life, has led to a paradigm shift in the way humans interact with computers, as exemplified by AI. AI leverages computational capabilities to make computer-based products or systems more intelligent. Hence, HCI can be extended into the realm of human-AI interaction (S. Lee, 2022). It posits that human-AI interaction design creates interactive products or systems that enable people to communicate and interact in their daily lives and work situations. This relationship is applicable across multidisciplinary domains, including education, where the interaction between humans and AI can enhance the learning process and improve students' engagement with educational materials (X. Chen et al., 2020; Saka et al., 2023).

Self-Control and AI Chatbot

The idea of self-control theory is that individuals tend to avoid actions where the long-term costs outweigh the immediate or short-term benefits (Tangney et al., 2004; Tibbetts & Myers, 1999). In the context of criminality, strong self-control restrains individuals from engaging in criminal activities due to the potential long-term negative consequences. Tangney et al. (2004) define self-control as the ability to overcome or modify one's responses, cease unwanted behavior tendencies, and refrain from deviant actions. This concept encompasses four main domains, including control over thoughts, emotions, impulses, and performance.

In essence, self-control forms an integral part of an individual's affective regulation, involving managing thoughts, resisting unwanted urges, maintaining discipline, sustaining motivation, and persevering through challenges. Individuals with strong self-control demonstrate better behavioral adjustments, interpersonal control, and emotional responsiveness. Those with weaker self-control are more prone to neglect ethical considerations in their actions, opting for rational choices that bring immediate satisfaction (Baumann et al., 2023). Various literature sources highlight the positive impact of self-control on individual performance. Individuals with strong self-control tend to make wise decisions and manage situations effectively, resulting in positive outcomes (Baumann et al., 2023; De Boer et al., 2015; Honken et al., 2016). Thus, self-control can enhance productivity by enabling individuals to resist distractions and focus on tasks that require sustained attention and effort.

When applied in the context of academic performance, students with good self-control are more likely to have good academic performance. Individuals with high levels of self-control are better able to regulate their behavior, manage their time effectively, and prioritize tasks, leading to increased productivity. Furthermore, individuals' levels of self-control play a crucial role in their susceptibility to AI Chatbot addiction. Research has shown that high self-control is associated with positive outcomes, such as increased

academic achievement and the ability to resist impulsive behaviors (Alhadabi et al., 2023; Choi et al., 2018; Honken et al., 2016; Nielsen & Bauer, 2019). On the other hand, individuals with low self-control are more likely to succumb to addictive behaviors, including Internet addiction (Carver, 2014; M. H. L. Lee et al., 2023; Sumiyana et al., 2022).

Moreover, individuals with low self-control are highly impulsive and seek immediate gratification. This impulsive behavior can lead to addictive patterns, as seen in the case of AI Chatbot addiction. Additionally, self-control can help individuals resist impulsive behaviors and make wise decisions, leading to better outcomes and increased productivity. Therefore, the hypothesis that there is a positive and significant relationship between individuals' levels of self-control and their academic performance is not conflicting, as self-control can enhance productivity and academic performance.

H_{1a}: There is a positive and significant relationship between individuals' levels of self-control and their academic performance.

H_{1b}: There is a negative and significant relationship between individuals' levels of self-control and their propensity for AI Chatbot addiction.

Coping Skills and AI Chatbot

In a simplified definition, coping mechanisms refer to the adaptive processes individuals employ when faced with challenging situations (White, 1974). Holahan et al. (1996) provide a comprehensive definition of coping as a stability factor aiding individuals in maintaining psychosocial adaptation during stressful periods. Coping includes cognitive and behavioral efforts to reduce or eliminate stress and associated emotional distress. Similarly, Snyder (1999) defines coping as responses aimed at alleviating the physical, emotional, and psychological burdens associated with stressful life events.

Effectiveness in coping is associated with an individual's dual ability to reduce psychosocial distress and, ultimately, enhance long-term psychological stability. Strong coping skills enable individuals to tackle challenges, even under pressure, resulting in optimal performance. Previous literature has demonstrated that effective coping mechanisms correlate with optimal task performance, reducing burnout and ensuring maximal academic performance among students (Freire et al., 2020; Rabenu et al., 2017; Tummers, 2017; Vizoso et al., 2019). Moreover, coping skills play a crucial role in an individual's susceptibility to AI Chatbot addiction.

According to several studies, individuals with strong coping skills are better equipped to handle stressful situations and reduce emotional distress (Freire et al., 2020; Góngora-Coronado & Vásquez-Velázquez, 2018; Rabenu et al., 2017). This ability to manage stress and emotional burdens can act as a protective factor against developing addictive behaviors, such as AI Chatbot addiction. Individuals lacking adequate coping abilities may be more inclined to pursue immediate satisfaction and resort to unhealthy coping methods, which can contribute to the emergence of addictive behaviors (Barczak & Eklund, 2020; M. H. L. Lee et al., 2023; Liu et al., 2022).

H₂ₐ: There is a positive and significant relationship between individuals' coping skills and their academic performance.

H₂ᵦ: There is a negative and significant relationship between individuals' coping skills and their likelihood of developing AI Chatbot addiction.

Lower levels of self-control can have a notable impact on academic performance and the development of addiction to AI Chatbots. Duckworth et al. (2019) and Schmeichel and Zell (2007) posit that the crucial role that self-control plays in academic success is that high levels of self-control are connected to improved grades and academic attainment. On the other hand, low self-control has been associated with adverse psychological and behavioral outcomes, including addictive tendencies (Alhadabi et al., 2023; Mei et al., 2016; Tangney et al., 2004; Tibbetts & Myers, 1999).

In this understanding of the context of AI Chatbot addiction, it becomes evident that lower levels of self-control could lead to higher levels of AI Chatbot addiction. Conversational AI addiction can negatively affect academic performance by diverting students' time and attention away from their studies (Haque & Rubya, 2023; Liu et al., 2022; Turel et al., 2011). Instead of focusing on academic tasks and responsibilities, students may become consumed by their addiction to Conversational AI. This can result in decreased time and effort devoted to studying, leading to poor academic performance.

Furthermore, the impact of low coping skills should not be underestimated (Hewett et al., 2018). As clarified by various research investigations, lower levels of coping skills can indeed lead to higher levels of AI Chatbot addiction, subsequently impacting academic performance adversely (Barczak & Eklund, 2020). The inability to effectively cope with stress and emotional burdens may drive individuals to seek solace in addictive behaviors such as AI Chatbot interaction, thus diverting their attention from academic responsibilities (Abouammoh et al., 2020; Freire et al., 2020; M. H. L. Lee et al., 2023). Additionally, the reliance on Conversational AI as a source of emotional support and instant gratification can create a cycle of addiction that further hinders academic performance.

H₃ₐ: Lower levels of self-control lead to higher levels of AI Chatbot addiction, subsequently impacting academic performance adversely.

H₃ᵦ: Lower levels of coping skills lead to higher levels of AI Chatbot addiction, subsequently impacting academic performance adversely.

Based on the theoretical discussion and formulated hypotheses, this research introduced a research model, as illustrated in Figure 1.
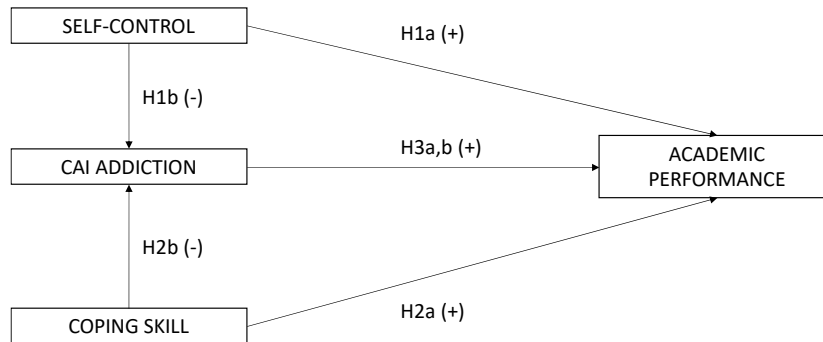
Figure 1 Research Model

Research Method

This research employed a quantitative research design with a survey and archival method. Participants selected for this study were students from the Department of Accounting at the Faculty of Economics and Business who voluntarily followed the prescribed procedures. In this case, the rapid advancement of technology necessitates a positive response from accounting students as an opportunity to expand their knowledge. Simultaneously, ethical and responsible attitudes are crucial for accounting students, given the high emphasis on ethics in the practical world (Iorga et al., 2013; Mohamed & Lashine, 2003). Therefore, it is essential to examine compliance with ethics and honesty among accounting students in the midst of technological advancements.

The selection of respondents was based on predetermined criteria. After collecting the responses, the researchers administered a questionnaire through Google Forms. The questionnaire included demographic questions assessing age, gender, and year of education. The researchers then measured the levels of self-control, coping skills, and AI Chatbot addiction for each respondent. By measuring the three variables, the researchers could determine the influence of individual characteristics on academic performance. The Likert scale was used to measure each variable. Then, by operating Smart-PLS 3.0, this study tested the hypotheses of models 1 and 2 using Structural Equation Modeling (SEM) to identify cause-and-effect relationships between variables built in this research model.

Moreover, this study measured independent variables, namely self-control and coping skills. The researchers formulated questions in the questionnaire related to these two variables. The measurement of self-control was dependent on Tangney et al. (2004), where a higher score indicates better self-control. For measuring an individual's coping skills, the researchers adopted the measurement from Vizoso et al. (2019), in which the higher the level of stress an individual experiences, the lower their coping skill score. In other words, when an individual can effectively manage problems, they can cope with various challenges and achieve their intended goals. The available response options are: (1) Never, (2) Rarely, (3) Occasionally, (4) Often, and (5) Always.

The mediating variable used in this study was AI Chatbot addiction. The measurement of AI Chatbot addiction aimed to assess how often an individual uses a specific technology or technology platform. To measure AI Chatbot addiction, the researchers adopted the measurement developed by X. Chen et al. (2020). This study developed an appropriate measure for individuals with frequent use and addiction to social media. The scale used in this study is as follows: 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly agree.

Further, the dependent variable in this study was academic performance. The measurement of this variable was adopted from Vizoso et al. (2019), where academic performance was measured through the average grade point at the end of the semester (GPA). The researchers used the GPA measurement standard based on the grades completed last semester. It is assumed that when an individual's score is at level 4, their academic performance is maximum.

After collecting the data, this study examined the data's validity and reliability. In addition, the statistical test of this study also considered the validity and reliability of the questionnaire items through Confirmatory Factor Analysis (CFA) (Abrahim et al., 2019; Aiken, 1980). Furthermore, the items in each questionnaire indicated to be valid and reliable were used to test the correlation further. To gauge validity, the researchers assessed loading factor values, categorizing each item as valid when its loading factor exceeded 0.5. Convergent validity was evaluated through Average Variance Extracted (AVE) values for each variable, and discriminant validity was confirmed when the sum of square roots of AVE values was lower than factor loadings.

The study also considered the proportion of variance explained by the latent variable indicator, assuming support for both discriminant and convergent validity when it surpassed half of the variance. Reliability was examined using Cronbach's alpha, with values above 0.5 indicating reliable data collection for each variable. Composite reliability was employed to measure the realism of representing investor behavior, and values exceeding 0.5 were considered reflective of reliability. Finally, the research analyzed relationships between variables in all models, ensuring that validity and reliability met established normative criteria (Babin & Svensson, 2012; F. Hair Jr et al., 2014).

Lastly, this research provided key descriptive statistics for respondents, including minimum, maximum, mean, and standard deviation values. Skewness and kurtosis were examined to ensure the statistical normal distribution of each variable. The emphasis on these descriptive measures is crucial in establishing that the research data adhere to standard statistical criteria. This comprehensive approach proposes to substantiate each hypothesis and research model constructed (F. Hair Jr et al., 2014; Hu et al., 2019).

Result and Discussion

Descriptive Statistics

This research collected responses over one month and conducted cumulative data checks to examine the obtained results. Absolutely, the researchers acquired 168 respondents, reflecting the behaviors, characteristics, and academic performance of accounting students. The researchers excluded 15 responses, specifically from first-semester students who had not yet obtained GPA results. Consequently, the final sample for the study comprised 153 responses. Finally, the demographic information of respondents is in Table 1.

Table 1 Demographic Data

Respondent Data	Frequency	Percentage (%)
Gender		
Male	68	44
Female	85	56
Age		
< 20 years old	12	8
20-25 years old	113	74
26-30 years old	17	11
> 30 years old	11	7
N: 153		

Table 2 presents the descriptive statistics of the research model. The collected data represented measurements of individual characteristics and behaviors, with values ranging from a minimum of 1 to a maximum of 5 for each variable. Meanwhile, the GPA had a minimum value of 2.13 and a maximum of 3.97. The data indicates that the variables had a mean value ranging from 2.4 to 3.9. On the other hand, the mean academic performance of students was 3.53, reflecting optimal academic performance during their study (Alyahyan & Düştegör, 2020; Mohamed & Lashine, 2003).

Additionally, self-control and coping skills exhibited standard deviations of 0.94 and 0.93, with means of 3.34 and 3.96, respectively (see Table 2). The statistical findings indicate that each individual could exercise self-control in addressing various challenges and achieving commendable academic outcomes. Finally, this study asserted that all variables exhibited statistically normally distributed, as indicated by the quality of mode and median values.

Table 2 Descriptive Statistics

	Mean	Min	Max	Standard Deviation	Excess Kurtosis
Self-Control	3.34	1.00	5.00	0.94	-0.57
Coping Skill	3.96	1.00	5.00	0.93	0.74
AI Chatbot Addiction	2.44	1.00	5.00	1.02	-0.60
Academic Performance (GPA)	3.53	2.13	3.97	0.35	2.55

Furthermore, the authors tested the levels of validity, reliability, convergence, and discrimination of each item using the standard criteria generated by the simultaneous

model in Table 3. Firstly, the outcomes of assessing common method bias (CMB) demonstrated that the single-factor variance accounted for 43.2% of the total variance. This suggests no evident issue with common method bias (F. Hair Jr et al., 2014). Secondly, testing of outer model test results revealed that the factor loading values for each item used were above 0.5, allowing the conclusion that each questionnaire item was valid. Moreover, the reliability test results demonstrated that all variables had values above 0.7, confirming that all items were reliable and consistently exhibited strong reliability.

Regarding the Average Variance Extracted (AVE) values, each variable yielded values exceeding 0.6, indicating that the convergent validity meets the criteria (F. Hair Jr et al., 2014). In other words, latent variables could explain more than half of the variance in their indicators. AVE values were obtained by summing the squares of factor loadings divided by the error. Therefore, the test results conclude that the measurements in each model were highly reliable, convergent, and discriminant variables. However, the researchers eliminated item CS3 to achieve standard measurements. Finally, all statistical results indicated valid and reliable indicators, and the variables aligned with the designed model.

Table 3 Results of the Validity and Reliability Test

Variable	Item	Loading	AVE	Discriminant Validity	Cronbach's Alpha	Composite Reliability
Self-Control	SC1	0.875	0.899	0.948	0.991	0.991
	SC2	0.996				
	SC3	0.925				
	SC4	0.858				
	SC5	0.971				
	SC6	0.952				
	SC7	0.988				
	SC8	0.929				
	SC9	0.957				
	SC10	0.989				
	SC11	0.970				
	SC12	0.948				
	SC13	0.955				
Coping Skill	CS1	0.732	0.632	0.795	0.909	0.923
	CS2	0.849				
	CS4	0.763				
	CS5	0.849				
	CS6	0.776				
	CS7	0.847				
	CS8	0.737				
AI Chatbot Addiction	CAI1	0.896	0.743	0.862	0.912	0.935
	CAI2	0.895				
	CAI3	0.916				
	CAI4	0.842				
	CAI5	0.752				

Notes: N = 153 for all the variables, factor loadings (pattern matrix) and unique variance.

Moreover, the findings of the cross-loading analysis illustrated demonstrate discriminant validity (see **Table 4**). It was determined that the loading value of each item on its designated construct surpassed that of any other construct. Thus, it concludes that the model was affirming the assumption of discriminant validity.

Table 4 Goodness-of-Fit

	Academic Performance	Chatbot Addiction	Coping Skill	Self-Control
Academic Performance	1.000			
Chatbot Addiction	0.143	0.862		
Coping Skill	0.234	-0.104	0.795	
Self-Control	0.067	-0.340	0.410	0.948

Subsequently, Table 5 shows that the NFI (Normed Fit Index) value for the research model was 0.693, greater than 0.1. In other words, the model constructed in this study is considered a good fit. Furthermore, the SRMR (Standardized Root Mean Square Residual) value obtained from this research model was 0.102, indicating that the research model met the appropriate standards (Abrahim et al., 2019; F. Hair Jr et al., 2014). Thus, it is concluded that the constructed model was suitable for further statistical testing.

Table 5 Goodness-of-Fit

	Saturated Model	Estimated Model
SRMR	0.102	0.102
d_ULS	3.637	3.637
d_G	4.447	4.447
Chi-Square	2462.050	2462.050
NFI	0.693	0.693

Further, the analysis revealed different results, particularly regarding the hypothesized positive association between self-control and academic performance (H1a). Contrary to the hypothesis, the regression coefficient was 0.029 (Table 6), and at the 1% significance level, failed to support the anticipated positive link (p = 0.728). On the other hand, the negative association posited between self-control and AI Chatbot addiction (H1b) garnered robust support, with a significant coefficient of -0.358 at the 1% level (p = 0.000). This indicates that higher levels of self-control correspond to diminished tendencies toward AI Chatbot addiction (Alhadabi et al., 2023; Choi et al., 2018).

Table 6 Statistical Results

Hypotheses	Causalities	Coeff.	P-value	Results
H1a (+)	SC → AP	0.029	0.728	Not supported
H1b (-)	SC → CA	-0.358	0.000***	Supported
H2a (+)	CS → AP	0.240	0.003***	Supported
H2b (-)	CS → CA	0.043	0.667	Not supported
H3a (+)	SC → CA → AP	-0.064	0.030***	Supported
H3b (+)	CS → CS → AP	0.008	0.702	Not supported

Notes: ***Significant at level < 1%; ** 5%; *10%, n: 153 respondents; SC for self-control, CS for coping skills, and AP for academic performance.

The other results Uncovered that the positive relationship between coping skills and academic performance (H2a) found empirical support, as evidenced by a significant coefficient of 0.240 at the 1% level (p = 0.003) (Table 6). Conversely, the anticipated negative link between coping skills and AI Chatbot addiction (H2b) was not substantiated, with a non-significant coefficient of 0.043 at the 1% level (p = 0.667). The sequential hypotheses (H3a and H3b) proposed a mediated effect of AI Chatbot addiction on self-control, coping skills, and academic performance. The findings supported the sequential negative relationship in H3a, with a significant coefficient of -0.064 at the 1% level (p = 0.030), while H3b did not find empirical support, yielding a non-significant coefficient of 0.008 at the 1% level (p = 0.702). With a robust sample size of 153 respondents, these statistical results provide substantive contributions to the understanding of the intricate dynamics between self-control, coping skills, AI Chatbot addiction, and academic performance.

Discussion

The findings from the analysis highlight the complexity of the relationship between self-control, coping skills, AI Chatbot addiction, and academic performance. Specifically, the results indicate that higher levels of self-control are associated with lower tendencies toward AI Chatbot addiction, which suggests that individuals with better self-control are less likely to become addicted to Conversational AI platforms. The significance of this discovery extends widely, providing insights into the potential influence of self-control on usage patterns and addictive behaviors associated with emerging technologies (Abrahim et al., 2019; Cohen et al., 2022; Taylor et al., 2020). These findings are consistent with previous research that has emphasized the importance of self-control in alleviating addictive tendencies, expanding beyond conventional domains to include contemporary technological platforms.

It is also important to highlight that the findings suggest that self-control plays a significant role in mitigating addictive tendencies towards emerging technologies such as Conversational AI platforms (Carver, 2014; Sumiyana et al., 2022). Furthermore, the impact of self-control on academic performance might not be as substantial. While a positive relationship was observed between coping skills and academic performance, the significance of this relationship did not manifest in the context of self-control. The expected negative association between coping skills and AI Chatbot addiction was not supported, suggesting that possessing coping skills did not decrease the likelihood of AI Chatbot addiction (Abouammoh et al., 2020; Labrague, 2023).

Furthermore, the significant mediated effect of AI Chatbot addiction on self-control and academic performance suggests that AI Chatbot addiction plays a detrimental role in academic performance, acting as a mediator between self-control and academic success. This implies that individuals with lower levels of self-control are more susceptible to developing AI Chatbot addiction, which in turn negatively impacts their academic performance (Mei et al., 2016; Tibbetts & Myers, 1999; Vizoso et al., 2019). These findings support prior research that has highlighted the negative effects of technology addiction on academic performance.

Meanwhile, the link between coping skills and academic performance remains unclear in the context of AI Chatbot addiction (Freire et al., 2020). It becomes evident that developing and enhancing coping skills may not directly impact the reduction of AI Chatbot addiction. Contrary to initial expectations, the presence of coping skills did not display a significant correlation with a decreased likelihood of developing addictive behaviors towards Conversational AI platforms (Barczak & Eklund, 2020; Góngora-Coronado & Vásquez-Velázquez, 2018; Hewett et al., 2018). Instead, the focus should be on the significant role of self-control in influencing addictive behaviors, particularly in the context of emerging technologies like AI Chatbots.

This study provides the implications for theoretical and practical personality psychology and AI's development related to academic performance. The impact of addiction to AI usage is mitigated by control and supervision functions. It is essential to realize that low self-control contributes to addictive behavior in students, teaching strategies that manage impulses, regulate behavior and maintain focus. Some of these strategies empower individuals to resist addictive tendencies toward AI Chatbot platforms. In summary, this study offers theoretical insights into the connection between self-control, coping skills, addictive behaviors toward AI Chatbot platforms, and academic performance. These insights have implications for both academic theory and practical interventions aimed at addressing technology addiction and fostering positive academic outcomes.

Conclusion

This study investigates the mediating role of AI Chatbot addiction in the relationship of self-control and coping skills with academic performance. The findings shed light on the crucial role of self-control in mitigating addictive tendencies towards emerging technologies, such as AI Chatbots. The results support the notion that individuals with lower levels of self-control are more susceptible to developing addictive behaviors towards Conversational AI platforms, which subsequently negatively impacts their academic performance. While coping skills were found to have a positive relationship with academic performance, their role in reducing AI Chatbot addiction was not substantiated. This demonstrates the importance of addressing self-control as a key factor in understanding and addressing addictive behaviors related to emerging technologies (Mei et al., 2016; Sumiyana et al., 2022; Taylor et al., 2020). Therefore, chatbot designers and developers must be aware of these potential addictive behaviors and implement proper behavior detection and prevention mechanisms in their design to mitigate AI Chatbot addiction (Nicolescu & Tudorache, 2022; Sáiz-Manzanares et al., 2023; Vancouver, 2008)

This study makes significant contributions to academic literature and its practical implications. In academia, it is recommended that universities establish robust curricula and ethical standards to monitor students' unethical behavior. Moreover, in practical terms, universities can introduce a diverse range of assignments to provoke critical thinking. Additionally, the university's role can involve organizing initiatives to educate about the risks of excessive dependence on AI Chatbot, alongside emphasizing the importance of nurturing self-control and coping skills in every student (Ibrahim et al.,

2023; Sáiz-Manzanares et al., 2023). Another contribution of this study is identifying a new framework for controlling chatbot addiction. These frameworks expand literature with the disciplines of psychology, education, and human-computer interaction, providing a conceptual basis for understanding the complex interplay of factors involved.

This study is not entirely exhaustive in capturing the characteristics determining AI Chatbot addiction. It highlights limitations by not considering various types of self-control and coping skills, as well as other antecedents of AI Chatbot addiction. As such, future research can explore these factors to gain a more comprehensive understanding of the impact of AI-based chatbots on academic performance. Measuring GPA as an academic achievement may not fully reflect students' academic performance. Future research can also consider experimental studies to explore the impact of AI Chatbot addiction on a broader range of academic performance measures.

Acknowledgment

Appendix

Table 7 Variables and Questionnaire Items

Variable	Questionnaires Item
Self-Control (Tangney et al., 2004)	1. I engage in certain behaviors that are harmful tis, even if they are enjoyable.
	2. I struggle to break bad habits.
	3. I am unmotivated to study or attend classes.
	4. I act without considering all alternatives.
	5. I am adept at resisting the worst temptations that disrupt lectures.
	6. I reject things that are harmful tis.
	7. I can work effectively to achieve long-term goals.
	8. People would say that I have high self-discipline.
	9. Pleasure and excitement hinder me from completing tasks.
	10. I have difficulty concentrating.
	11. I wish I had more self-discipline.
	12. I cannot resist the urge to do something, even though I know tis wrong for me.
	13. I say inappropriate things.

Table 7 Variables and Questionnaire Items (cont')

Variable	Questionnaires Item
Coping Skills (Vizoso et al., 2019)	1. I make an effort to solve problems related to lectures or in challenging situations. 2. I convince myself that everything is not as bad as it seems. 3. I engage with my feelings and let them go. 4. I found someone who is a good listener. 5. I avoid thinking about or doing anything about unfavorable situations in lectures. 6. I hope unfavorable situations in lectures or the environment will pass or end. 7. I blame myself. 8. I avoid socializing with others.
AI Chatbot Addiction (X. Chen et al., 2020)	1. I intend to continue using AI Chatbots (such as ChatGPT, Google Bard, Bing Chat, and others) to complete academic tasks. 2. I use AI Chatbots to address academic issues and enhance learning outcomes. 3. Despite attempts, I find it challenging to reduce interactions with AI Chatbots. 4. I feel anxious when I am unable to use AI Chatbots for academic tasks. 5. I need to manage my time wisely when using AI Chatbots.

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