

Impact of AI Dependence on Students' Academic Procrastination in Higher Education

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Abstract

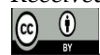
Artificial Intelligence (AI) has become an important part of higher education by providing students with quick access to information, personalized learning support, and assistance in completing academic tasks. The increasing use of AI tools has improved learning opportunities; however, concerns have also been raised about students becoming overly dependent on these technologies. Excessive dependence on AI may influence students' learning habits and encourage them to delay academic responsibilities. Therefore, this study examined the impact of AI dependence on students' academic procrastination in higher education. A quantitative research approach was adopted using a cross-sectional survey design. Data were collected from 100 higher education students through a structured questionnaire using a five-point Likert scale. The questionnaire consisted of demographic information, AI dependence items, and academic procrastination items. The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, reliability analysis, and simple linear regression were used to analyze the data. The findings indicated that AI dependence had a significant positive impact on students' academic procrastination. The study highlights the importance of encouraging students to use AI responsibly while maintaining independent learning and effective time management. The findings may help educators and higher education institutions develop policies and strategies for the ethical and balanced use of AI in academic settings.

Keywords: Artificial Intelligence, AI Dependence, Academic Procrastination, Higher Education, University Students.

Introduction

Artificial Intelligence (AI) has rapidly changed the landscape of higher education by transforming the way students learn, search for information, complete assignments, and interact with educational resources. The development of generative AI tools such as ChatGPT, Google Gemini, Microsoft Copilot, and Claude has provided students with immediate access to academic support, allowing them to generate ideas, summarize information, improve writing, and solve complex problems within a short time. As a result, AI has become an increasingly common learning tool among university students worldwide (Crompton & Burke, 2023).

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The growing use of AI has created many opportunities for improving teaching and learning in higher education. AI technologies support personalized learning, provide instant feedback, and help students access educational resources more efficiently. Many universities have started integrating AI into teaching practices because of its potential to improve learning experiences and increase students' academic engagement. Recent studies suggest that AI can enhance students' productivity and learning outcomes when it is used responsibly and ethically (Labadze et al., 2023).

Despite these educational benefits, the rapid adoption of AI has also created new challenges for higher education institutions. One of the major concerns is students' increasing dependence on AI for completing academic tasks. AI dependence refers to a situation in which students rely heavily on AI technologies instead of using their own knowledge, critical thinking, and problem-solving skills. Researchers have argued that excessive dependence on AI may reduce students' independent learning, critical thinking abilities, and academic responsibility (Kasneji et al., 2023).

Another important issue in higher education is academic procrastination, which refers to the intentional delay of academic tasks despite knowing that such delays may lead to negative academic consequences. Students often postpone studying for examinations, completing assignments, preparing presentations, or conducting research. Academic procrastination has been linked to poor academic performance, ineffective time management, increased stress, and lower learning satisfaction (Steel, 2007; Svartdal et al., 2020).

The increasing availability of AI tools has changed students' approach to completing academic work. Many students believe that AI can help them complete assignments quickly whenever needed. Although AI can support learning, excessive dependence on these technologies may encourage students to delay starting their academic tasks because they expect AI to reduce the effort required later. This changing learning behaviour has raised important questions about whether AI dependence influences students' academic procrastination.

Previous studies have mainly focused on AI adoption, students' perceptions of AI, technology acceptance, and the educational benefits of AI in higher education. However, limited empirical research has examined the impact of AI dependence on academic procrastination among higher education students. This gap in the literature highlights the need for further investigation, particularly as AI technologies continue to become more accessible in educational settings.

Therefore, the present study aims to examine the impact of AI dependence on students' academic procrastination in higher education. The findings of this study are expected to contribute to the existing literature and provide useful recommendations for educators and higher education institutions to promote responsible AI use while encouraging independent learning and effective time management.

Literature Review

Artificial Intelligence in Higher Education

Artificial Intelligence (AI) has become one of the most important technological developments in higher education. It is changing the way students learn, teachers teach, and universities deliver

educational services. AI-powered tools help students search for information, generate ideas, improve academic writing, solve problems, and receive immediate feedback. The rapid development of generative AI applications, such as ChatGPT, Google Gemini, Microsoft Copilot, and Claude, has increased students' access to learning support and changed traditional learning practices (Crompton & Burke, 2023).

Many higher education institutions have started integrating AI into teaching and learning because of its ability to improve learning efficiency and provide personalized educational support. AI enables students to learn at their own pace by offering customized explanations, instant responses, and interactive learning experiences. According to Labadze et al. (2023), AI technologies can improve students' learning experiences when they are used as educational support tools rather than substitutes for independent learning.

Researchers have also reported that AI helps students improve academic writing, organize ideas, summarize research articles, and complete routine academic tasks more efficiently. These benefits have increased the popularity of AI among university students. However, the growing use of AI has also raised concerns about students becoming too dependent on these technologies, which may reduce active participation in the learning process and weaken independent thinking (Dempere et al., 2023).

Although AI offers many educational advantages, universities are encouraged to promote responsible AI use. Students should be guided to use AI as a tool that supports learning rather than replacing their own efforts. When AI is used appropriately, it can improve learning outcomes while maintaining students' critical thinking and problem-solving abilities (Bond et al., 2024).

AI Dependence

The increasing availability of AI tools has changed the way students complete academic tasks. Many students use AI to prepare assignments, generate ideas, summarize learning materials, and solve academic problems. While these tools save time and improve efficiency, excessive dependence on AI may reduce students' confidence in completing academic work independently.

AI dependence refers to the extent to which students rely on AI technologies to perform learning activities that normally require their own knowledge, reasoning, and academic effort. Students who depend heavily on AI may gradually reduce their engagement in independent learning because they expect AI to provide quick and accurate solutions. According to Kasneci et al. (2023), AI should assist learning rather than replace students' own thinking and decision-making.

Recent studies have highlighted that excessive dependence on AI may influence students' academic behaviour. Instead of developing critical thinking and problem-solving skills, students may become more likely to rely on AI-generated responses without evaluating their accuracy. Labadze et al. (2023) emphasized that universities should encourage students to critically review AI-generated content rather than accepting it without reflection.

Researchers also suggest that responsible AI use requires students to balance technological assistance with independent learning. AI can improve academic productivity, but overdependence may reduce students' motivation to actively participate in the learning process. Therefore, understanding AI dependence has become increasingly important in higher education research.

Academic Procrastination

Academic procrastination is one of the most common challenges experienced by higher education students. It refers to delaying academic tasks even when students know that postponement may have negative consequences. Students may delay preparing for examinations, completing assignments, writing reports, or conducting research, which can affect their academic performance and increase stress (Steel, 2007).

Several factors contribute to academic procrastination, including poor time management, low academic motivation, fear of failure, lack of self-confidence, and weak self-regulation. Previous studies have shown that students with effective planning and time management skills are less likely to procrastinate than those who struggle to organize their academic work (Zimmerman, 2008).

Recent research suggests that technological developments may also influence students' academic behaviour. Although educational technologies can improve learning, they may also create new distractions or encourage students to postpone tasks if they believe technology can help them complete their work more quickly. Therefore, academic procrastination should be examined within the context of modern digital learning environments.

Impact of AI Dependence on Academic Procrastination

The rapid growth of AI technologies has created new opportunities and challenges in higher education. While AI helps students complete academic tasks more efficiently, excessive dependence on AI may influence their learning behaviour. Students who believe AI can quickly complete assignments may postpone starting their academic work because they expect technology to reduce the time and effort required later.

Dempere et al. (2023) reported that although generative AI improves students' academic productivity, excessive dependence may reduce independent learning and change students' study habits. Similarly, Kasneci et al. (2023) emphasized that AI should support students' learning rather than replace their own reasoning and critical thinking skills.

Most previous studies have focused on students' acceptance of AI, perceptions of AI, or the educational benefits of AI technologies. Comparatively fewer studies have investigated whether dependence on AI influences students' academic procrastination. This indicates a need for more empirical research to understand how AI dependence affects students' academic behaviour in higher education.

Theoretical Foundation

This study is based on Self-Regulated Learning Theory developed by Zimmerman (2008). The theory explains that successful students actively plan, monitor, and evaluate their own learning activities. Students with strong self-regulation skills are more likely to manage their time effectively, complete academic tasks on time, and achieve better academic outcomes.

In the context of this study, AI can support self-regulated learning by providing explanations, feedback, and learning resources. However, when students become highly dependent on AI, they may rely less on their own planning and problem-solving abilities. As a result, excessive AI de-

pendence may increase the likelihood of delaying academic tasks. Therefore, Self-Regulated Learning Theory provides an appropriate framework for examining the impact of AI dependence on academic procrastination.

Research Gap

The review of previous literature shows that researchers have widely examined AI adoption, students' perceptions of AI, technology acceptance, and the educational benefits of AI in higher education. Similarly, academic procrastination has been extensively studied in relation to psychological and motivational factors. However, limited empirical research has specifically examined the impact of AI dependence on students' academic procrastination, particularly among higher education students.

Furthermore, most previous studies have emphasized the positive role of AI in education, while fewer studies have investigated its possible influence on students' academic behaviour. Therefore, this study addresses this gap by examining the impact of AI dependence on academic procrastination among higher education students using a quantitative survey design.

Research Objectives

The study was conducted to achieve the following objectives:

1. To determine the AI dependence and academic procrastination among higher education students.
2. To examine the impact of AI dependence on students' academic procrastination in higher education.

Research Methodology

Research Design

This study adopted a quantitative research approach because it allows the collection and analysis of numerical data to examine the impact of AI dependence on students' academic procrastination. A cross-sectional survey design was used in this study. Data were collected from participants at one point in time through a structured questionnaire. This design was appropriate because it allowed the researcher to examine the impact of AI dependence on academic procrastination efficiently.

Population of the Study

The target population consisted of higher education students enrolled in universities. These students regularly use AI tools for learning and academic activities, making them suitable participants for this study.

Sample of the Study

The study included a sample of 100 higher education students. A convenience sampling technique was used because it allowed the researcher to collect data from students who were easily accessible and willing to participate in the survey.

Research Instrument

Data were collected through a structured questionnaire adapted from previous studies on AI use and academic procrastination. Minor modifications were made to make the questionnaire suitable for the context of higher education. The questionnaire consisted of three sections: Section A: Demographic Information, Section B: AI Dependence (10 items), and Section C: Academic Procrastination (10 items). All items were measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

Reliability Analysis

Table 1: Reliability Analysis of the Research Instrument

Variable	No. of Items	Cronbach's Alpha
AI Dependence	10	.90
Academic Procrastination	10	.91
Overall Scale	20	.92

Table 1 presents the internal consistency reliability estimates for the study variables, as measured by Cronbach's alpha coefficients. The AI Dependence subscale, comprising 10 items, demonstrated excellent internal consistency ($\alpha = .90$). Similarly, the Academic Procrastination subscale, also consisting of 10 items, showed excellent reliability ($\alpha = .91$). The overall scale, encompassing all 20 items across both subscales, yielded an excellent reliability coefficient ($\alpha = .92$).

According to established guidelines (e.g., George & Mallery, 2003), Cronbach's alpha values above .90 are considered "excellent," values between .80 and .89 are "good," and values between .70 and .79 are "acceptable." All three reliability coefficients in this study exceeded the .90 threshold, indicating that the items within each subscale, as well as the overall scale, were highly consistent in measuring their intended constructs. These results suggest that the instrument used in this study is highly reliable for assessing AI dependence and academic procrastination among the sampled population, with minimal measurement error attributable to internal inconsistency.

Data Collection Procedure

The questionnaire was created using Google Forms and distributed online to higher education students. Participants were informed about the purpose of the study before completing the questionnaire. Participation was voluntary, and all responses remained anonymous and confidential.

Ethical Considerations

Ethical principles were followed throughout the study. Participants were informed about the purpose of the research and participated voluntarily. No personal information was collected, and all responses were kept confidential. The collected data were used only for academic purposes.

Data Analysis

The collected data were entered into the Statistical Package for the Social Sciences (SPSS) for analysis. The following statistical techniques were used: Descriptive Statistics (Mean and Stand-

ard Deviation), Reliability Analysis (Cronbach's Alpha), and Simple Linear Regression. The level of significance was set at $p < .05$.

Results

Demographic Profile of Respondents

Table 2: Demographic Characteristics of Respondents ($N = 100$)

Variable	Category	Frequency	Percentage
Gender	Male	54	54.0
	Female	46	46.0
Age	18–22 years	32	32.0
	23–27 years	49	49.0
	28 years and above	19	19.0
Level of Study	BS	71	71.0
	MPhil/MS	26	26.0
	PhD	3	3.0
AI Tool Usage	Rarely	7	7.0
	Sometimes	24	24.0
	Often	20	20.0
	Very Often	12	12.0
	Daily	37	37.0

The demographic characteristics of the sample ($N = 100$) are presented in Table 2. In terms of gender, the majority of participants were male ($n = 54$, 54.0%), while females comprised a slightly smaller proportion of the sample ($n = 46$, 46.0%).

Regarding age distribution, participants between 23 and 27 years constituted the largest age group ($n = 49$, 49.0%), followed by those aged 18–22 years ($n = 32$, 32.0%). The smallest proportion of participants were 28 years of age or older ($n = 19$, 19.0%). This indicates that the sample was predominantly composed of younger adults, with nearly all participants (81.0%) under 28 years of age.

With respect to level of study, the majority of participants were enrolled in a BS program ($n = 71$, 71.0%), followed by MPhil/MS students ($n = 26$, 26.0%). PhD students represented a small minority of the sample ($n = 3$, 3.0%), suggesting the sample was largely composed of undergraduate-level students.

Finally, regarding AI tool usage frequency, the largest proportion of participants reported using AI tools daily ($n = 37$, 37.0%), followed by those who used them sometimes ($n = 24$, 24.0%) and often ($n = 20$, 20.0%). Fewer participants reported very often ($n = 12$, 12.0%) or rarely ($n = 7$, 7.0%) using AI tools. Overall, these results suggest relatively high engagement with AI tools among participants, as a majority (69.0%) reported using them often, very often, or daily.

Descriptive Statistics

Table 3: Descriptive Statistics of the Study Variables ($N = 100$)

Variable	Mean	Standard Deviation
AI Dependence	3.61	0.97
Academic Procrastination	3.26	1.14

Table 3 presents the descriptive statistics for the study variables. The mean score for AI Dependence was 3.61 ($SD = 0.97$), indicating that, on average, participants reported a relatively high level of dependence on AI tools, assuming a 5-point scale where higher scores reflect greater dependence. The standard deviation of 0.97 suggests moderate variability in responses around the mean, indicating that while most participants clustered around a moderately high level of AI dependence, there was a reasonable spread of individual differences within the sample.

Similarly, the mean score for Academic Procrastination was 3.26 ($SD = 1.14$), suggesting that participants reported a moderate level of academic procrastination on average. The relatively larger standard deviation (1.14) compared to AI Dependence indicates greater variability in procrastination scores across participants, implying that individual differences in procrastination behavior were more pronounced than differences in AI dependence within this sample.

Overall, both variables displayed mean scores above the midpoint of a typical 5-point Likert scale (i.e., 3.0), suggesting that participants in this sample generally reported moderately high levels of both AI dependence and academic procrastination. This pattern of results provides preliminary support for further inferential analysis (e.g., correlation or regression) to examine the relationship between these two variables.

Linear Regression Analysis

Table 4: Linear Regression Analysis

Predictor	β	t	p	R^2	Decision
AI Dependence	.44	4.81	< .001	.191	Accepted

A simple linear regression analysis was conducted to examine whether AI Dependence significantly predicts Academic Procrastination among students in higher education. The results of the regression analysis are presented in Table 4. The overall model was statistically significant, with AI Dependence explaining approximately 19.1% of the variance in Academic Procrastination scores, $R^2 = .191$. This indicates that while AI Dependence is a meaningful predictor, a substantial proportion of the variance in academic procrastination (approximately 80.9%) remains unexplained by this model, suggesting that other factors likely also contribute to procrastination behavior.

AI Dependence emerged as a significant positive predictor of Academic Procrastination, $\beta = .44$, $t = 4.81$, $p < .001$. Since the p-value is well below the conventional threshold of .05 (and even below .001), the null hypothesis was rejected, and the alternative hypothesis: that AI Dependence significantly predicts Academic Procrastination was accepted. The positive beta coefficient ($\beta = .44$) indicates that as students' dependence on AI tools increases, their level of academic procrastination also increases.

tionation also tends to increase. Specifically, for every one standard deviation increase in AI Dependence, Academic Procrastination increases by approximately 0.44 standard deviations, holding other factors constant. These findings support the hypothesis that greater reliance on AI tools among students in higher education is associated with higher levels of academic procrastination, lending empirical support to the notion that AI dependence may undermine students' self-regulation and time-management behaviors in academic contexts.

Discussion

The purpose of this study was to examine the impact of AI dependence on students' academic procrastination in higher education. The findings showed that AI dependence had a significant positive impact on academic procrastination. This means that students who depend more on AI tools are more likely to delay their academic tasks.

The findings are consistent with previous studies that reported both positive and negative effects of AI in education. AI helps students access information quickly, improve academic writing, and support learning activities. However, excessive dependence on AI may reduce independent learning and encourage students to rely on technology instead of developing their own knowledge and problem-solving skills (Kasneci et al., 2023).

The findings are also supported by Labadze et al. (2023), who explained that AI improves learning when it is used responsibly. The authors emphasized that students should use AI as a support tool rather than a replacement for independent learning. Similarly, Dempere et al. (2023) reported that although generative AI increases learning efficiency, excessive dependence may influence students' study habits and academic behaviour.

The findings of this study are also consistent with Self-Regulated Learning Theory (Zimmerman, 2008). The theory explains that students who effectively plan, monitor, and manage their learning are less likely to delay academic tasks. When students rely too much on AI, they may reduce their own academic effort and become less active in managing their learning, which can increase procrastination. Overall, this study suggests that AI should be used as a learning support tool rather than as a substitute for students' own thinking and academic effort. Universities and teachers should encourage responsible AI use while promoting independent learning, critical thinking, and effective time management among students.

Conclusion

This study examined the impact of AI dependence on students' academic procrastination in higher education. The findings showed that AI dependence had a significant positive impact on academic procrastination. Students who reported greater dependence on AI tools were more likely to delay their academic tasks.

Although AI provides many educational benefits, including easier access to information and academic support, excessive dependence may reduce independent learning and encourage procrastination. Therefore, students should be encouraged to use AI responsibly while maintaining their own learning, critical thinking, and time management skills. The findings of this study contribute to the growing literature on AI in higher education and provide useful information for educators and universities to develop policies that promote the ethical and balanced use of AI technologies.

Recommendations

- Universities should develop clear guidelines for the responsible use of AI in academic activities.
- Teachers should encourage students to use AI as a learning support tool instead of depending on it to complete academic tasks.
- Training workshops should be organized to improve students' awareness of ethical AI use and independent learning.
- Students should strengthen their time management and self-learning skills to reduce academic procrastination.
- Future researchers should conduct similar studies with larger samples from different universities to improve the generalizability of the findings.

Limitations of the Study

This study has several limitations. First, the study included only 100 higher education students, which may limit the generalizability of the findings. Second, data were collected using a cross-sectional survey design, so the findings represent participants' responses at one point in time. Finally, the study examined only the impact of AI dependence on academic procrastination and did not include other factors that may influence students' academic behaviour.

Future Research

Future studies may examine the impact of AI dependence on other educational outcomes such as academic performance, learning motivation, critical thinking, self-regulated learning, and academic engagement. Researchers may also use larger samples from different universities and apply longitudinal or mixed-method research designs to provide a broader understanding of AI use in higher education.

References

1. Bond, M., Khosravi, H., De Vries, P., Elliott, D., & Gašević, D. (2024). Artificial intelligence in higher education: A systematic literature review. *International Journal of Educational Technology in Higher Education*, 21(1), 1–33.
2. Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education*, 20(1), 22.
3. Dempere, J., Modugu, K., Hesham, A., & Ramasamy, L. K. (2023). The impact of ChatGPT on higher education. *Education and Information Technologies*, 28, 1–21.
4. Kasneci, E., Sessler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., Hüllermeier, E., Krusche, S., Kutyniok, G., Michaeli, T., Nerdel, C., Pfeiffer, F., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., ... Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 102274.
5. Labadze, L., Grigolia, M., & Machaidze, L. (2023). The role of artificial intelligence in higher education: Opportunities and challenges. *International Journal of Educational Technology in Higher Education*, 20(1).

6. Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of self-regulatory failure. *Psychological Bulletin*, 133(1), 65–94.
7. Svartdal, F., Dahl, T. I., Gamst-Klaussen, T., Koppenborg, M., & Klingsieck, K. B. (2020). How study environments foster academic procrastination. *Frontiers in Psychology*, 11, 540910.
8. Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal*, 45(1), 166–183.