

AI Dependence and Academic Motivation as Predictors of Academic Self-Efficacy Among Undergraduate Students

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ABSTRACT

Academic self-efficacy is an important psychological construct in higher education, particularly as artificial intelligence (AI) becomes increasingly integrated into students' academic experiences. This study employed a cross-sectional quantitative design to examine the levels and relationships of AI dependence, academic motivation, and academic self-efficacy, and determined whether AI dependence and academic motivation significantly predicted academic self-efficacy among undergraduate students. The sample included 228 undergraduate students from three private universities in Cebu, Philippines. Data were collected electronically using the Artificial Intelligence Dependence Questionnaire (AIDQ), Academic Motivation Scale-College Version (AMS-C 28), and General Academic Self-efficacy Scale (GASE). Descriptive statistics, Pearson product-moment correlation, and multiple linear regression were conducted to analyze the data. Results indicated moderate levels of AI dependence ($M = 2.5$, $SD = 0.601$), moderate academic motivation ($M = 3.5$, $SD = 0.401$), and high academic self-efficacy ($M = 3.8$, $SD = 0.646$). AI dependence was negatively associated with academic self-efficacy ($r = -.220$, $p < .001$), whereas academic motivation was positively associated with academic self-efficacy ($r = .377$, $p < .001$). Multiple regression analysis showed that both AI dependence ($\beta = -.169$, $p = .006$) and academic motivation ($\beta = .353$, $p < .001$) significantly predicted academic self-efficacy, collectively explaining 17% of its variance ($R^2 = .170$, $p < .001$). Overall, the results of the study underscore the relevance of both students' motivational resources and their reliance on AI in understanding academic self-efficacy in higher education. These findings highlight the importance of strengthening academic motivation and promoting balanced, responsible AI use to support students' confidence in independently accomplishing academic tasks.

Keywords: Academic Self-efficacy, AI Dependence, Academic Motivation, Undergraduate Students

INTRODUCTION

Academic self-efficacy is a significant psychological construct in higher education because it influences students' learning and academic success (Al-Abyadh & Abdel Azeem, 2022; Majeed et al., 2022; Zhang, 2025). It has consistently been associated with students' academic achievement, persistence, and engagement (Figueiredo et al., 2024; Majeed et al., 2022; Meng & Zhang, 2023; Rachmawati et al., 2021; Stravropolou et al., 2025; Zhang, 2025). In an era defined by asynchronous learning, hybrid education, and the increasing integration of artificial intelligence into academia, the teaching and learning modalities have changed substantially (Gudoniene et al., 2025; Shlomo & Rosenberg-Kima, 2024). Now, students are expected to engage more in self-directed learning, relying more on their assessment of their own capabilities than on traditionally structured classroom learning (Adigun et al., 2024; Shlomo & Rosenberg-Kima, 2024). In this context, academic self-efficacy plays an important role in how students navigate the educational system, particularly as they adapt to less-structured learning modes and maintain academic persistence amid an evolving educational environment (Huang & Wang, 2023; Jaya & Nurqamarani, 2023; Rohmani & Andriani, 2021; Yokoyama, 2024).

Globally, higher education continues to evolve through blended learning and increasing integration of technology. Students are now expected to be more flexible and independent in managing their own studies (Kuan & Lee, 2022; Shlomo & Rosenberg-Kima, 2024). The challenges that come with these learning

modalities have placed greater demands on the students' self-efficacy (Murniati et al., 2022). Students with stronger academic self-efficacy have been found to adapt better to these challenges, develop greater academic resilience, and demonstrate greater motivation, engagement, and academic performance (Huang & Wang, 2023; Jaya & Nurqamarani, 2023; Rohmani & Andriani, 2021). Given these global developments, highlighting self-efficacy in national academic contexts remains equally important.

In the Philippines, students face similar challenges associated with digitally mediated learning environments, accelerated by the transition to online learning during the COVID-19 pandemic in 2020 (Mendoza et al., 2026; Opeña & Lopez, 2025; UNESCO, 2021). Academic self-efficacy remains relevant, as students who are self-efficacious are able to better execute their academic tasks in a technologically-enhanced set-up (Liwanag & Galicia, 2023; Opeña & Lopez, 2025; Tabiolo et al., 2025).

One notable development in digital education is the integration of AI into learning. From the students' perspective, AI has increasingly become embedded in how they study, acquire information, and complete schoolwork (Office of Communications, College of Education, University of Illinois Urbana-Champaign, 2024). This is evident in the local context of Cebu City, where university students who were found to have high self-efficacy moderately use AI only as an aid to their learning (Antogop et al., 2026). Researchers have begun to distinguish between the beneficial use of AI and AI dependence (Zhou et al., 2024). As students increasingly use AI to assist their learning, responsible use and AI literacy are essential to prevent overreliance and potential loss of confidence in their academic capabilities (Ahmad & Arshad, 2025; Bermeo et al., 2025; Zhang & Xu, 2025). AI has become an increasingly prominent part of students' learning experiences, highlighting the relevance of examining whether AI dependence is related to academic self-efficacy in the local educational context.

Academic self-efficacy is a widely-investigated construct, and researchers have primarily examined it in relation to well-established factors such as academic motivation (Celcima et al., 2024; Hidajat et al., 2023; Stavropoulou et al., 2025). With the recent developments in education, AI dependence has emerged as another factor of interest investigated alongside academic self-efficacy (Estrada-Araoz et al., 2025; Morales-Garcia et al., 2025). Based on the literature reviewed, researchers have primarily investigated these relationships independently rather than within a single predictive model. Moreover, although studies have explored these relationships internationally and within the Philippines, literature remains limited in the specific context of Cebu City. Therefore, this study aims to address these gaps by examining AI dependence and academic motivation as predictors of academic self-efficacy among undergraduate students.

REVIEW OF RELATED LITERATURE

Artificial Intelligence Dependence

Artificial intelligence (AI) dependence is an individual's increasing reliance on AI tools, which may result in habitual use and reduced independence in completing tasks without AI assistance (Uyar et al., 2026).

Excessive dependence on AI is associated with reduced critical thinking (Gerlich, 2025; Lopulalan et al., 2026; Tian & Zhang, 2025). However, AI tools used to assist rather than replace human cognitive effort have been found to improve decision-making and engagement (Umar & Purwanto, 2025; Varshney & Kumar, 2026).

In the educational context, AI is increasingly utilized by students for its immediate assistance, feedback, and support, which may enhance students' academic performance, learning strategies, and engagement. Accordingly, balanced, moderated, and responsible use of AI is highlighted to mitigate the risks of overdependence (Gonzalez-Perez et al., 2025; Hussain et al., 2025; Novianti et al., 2026; Zhang et al., 2024; Zhang & Xu, 2025).

AI dependence has also raised concerns regarding students' learning autonomy and self-regulated learning (Lopulalan et al., 2026), prompting researchers to examine its relationship with academic self-efficacy.

Initial studies have examined the relationship between AI use and academic self-efficacy. One study found a

positive relationship between AI use and academic self-efficacy, with moderate use of AI associated with improved self-efficacy and learning efficiency. The study also emphasized controlling AI use and critically evaluating AI-generated information to minimize potential effects on critical thinking and creativity (Chen, 2025).

More recently, researchers have begun distinguishing AI dependence from the general use of AI. A study examining technological dependence in the context of AI and university students' self-efficacy reported that students' frequent AI usage significantly increased their self-efficacy, efficiency, and confidence. However, the findings also indicated that increased self-efficacy was accompanied by greater dependence on AI use (Zhang & Xu, 2025).

Another study found no strong direct association between academic self-efficacy and AI dependence but identified an indirect relationship mediated by academic stress. Students with lower academic self-efficacy tended to report greater AI reliance, while higher academic stress was associated with greater dependence (Zhang et al., 2024).

Academic Motivation

Academic motivation is defined as the drive that initiates and sustains students' behaviors and activities toward achieving their academic goals (Howard et al., 2021).

A study of high school students in Indonesia found that academic motivation was a significant predictor of academic performance, with academic self-efficacy as a mediator between the two variables (Shofiah et al., 2023). Another study that examined both extrinsic and intrinsic motivation found that there was a positive correlation between intrinsic motivation and student resilience, suggesting that students who were more driven to achieve their academic goals were more likely to overcome adversity and persist in their studies (Kotera et al., 2022).

Researchers have continued to investigate the relationship between academic motivation and academic self-efficacy, with previous research consistently reporting a positive relationship between the two variables (Anierobi et al., 2022; Lin & Talib, 2025). Although a substantial body of literature positively associates academic motivation and academic self-efficacy, many of the reviewed studies have examined academic self-efficacy as a predictor of academic motivation, with relatively fewer studies examining the reverse (Aljuaid, 2021; Hidajat et al., 2023). However, other studies have found that academic motivation significantly predicts academic self-efficacy (Sidekli & Uzunoğlu, 2023; Wu et al., 2020).

Academic Self-efficacy

Academic self-efficacy is a specific application of the concept of self-efficacy, introduced by Bandura, wherein it is defined as the student's belief in their capability of accomplishing academic tasks and achieving academic goals (Badreddine, 2026; Bandura, 1977; Zheng, 2024).

Numerous studies examining academic self-efficacy have found that it is significantly related to and predictive of academic achievement (Fakhrou & Habib, 2021; Meng & Zhang, 2023; Moussa, 2023). The findings of these studies suggest that students with stronger beliefs in their academic capabilities tend to demonstrate higher levels of academic achievement.

Several studies have also linked academic self-efficacy to better academic performance (Basileo et al., 2024; Figueiredo et al., 2024; Meng & Zhang, 2023; Moussa, 2023; Nair & Sutar, 2023). These studies found a positive relationship between academic self-efficacy and academic performance, with higher academic self-efficacy associated with better academic performance.

Synthesis

The reviewed literature highlights that academic self-efficacy may be associated with both students' personal characteristics and their patterns of engagement with technology in the current digital learning environment.

Academic motivation has consistently been associated with positive educational outcomes and with stronger academic self-efficacy, suggesting that students' motivational orientations are relevant to how they perceive and approach their academic capabilities. At the same time, the increasing use of artificial intelligence in education has introduced questions about how students' reliance on these tools may relate to independent learning and academic functioning.

Overall, the reviewed literature suggests that students' technological and learner-related factors may both be relevant to their academic experiences and outcomes. Academic motivation represents a learner-related psychological factor, whereas AI dependence represents a technology-related behavioral pattern. Both may therefore be relevant to students' academic self-efficacy, but they represent different dimensions of the learning experience. Examining them together may provide a more integrated understanding of the factors associated with students' confidence in their academic capabilities than examining either variable independently.

Despite these established findings, several gaps remain in the literature. While research has established relationships between academic motivation and academic self-efficacy, and emerging studies have begun to examine AI dependence in relation to students' academic functioning, these have largely been examined separately. Few studies have looked into AI dependence and academic motivation simultaneously in relation to academic self-efficacy, particularly within a single predictive model. This leaves limited understanding of how a technology-related behavioral factor and a learner-related psychological factor may jointly account for variation in students' academic self-efficacy. This gap is particularly relevant in Philippine higher education, where AI tools are increasingly integrated into students' learning experiences. Therefore, the present study examines AI dependence and academic motivation as predictors of academic self-efficacy among undergraduate students.

Research Objectives

To determine the extent to which AI dependence and academic motivation predict academic self-efficacy among undergraduate students.

- Determine the perceived levels of AI dependence.
- Determine the perceived level of academic motivation.
- Determine the perceived levels of academic self-efficacy.
- Determine the relationships between AI dependence, academic motivation, and academic self-efficacy.
- Examine whether AI dependence and academic motivation significantly predict academic self-efficacy.

THEORETICAL FRAMEWORK

The present study is anchored in Albert Bandura's Social Cognitive Theory (Bandura, 1986; Bandura, 1997). SCT provides a theoretical lens for understanding how personal and behavioral factors may be associated with students' academic self-efficacy. Rather than viewing individuals as shaped solely by internal characteristics or external circumstances, SCT proposes that human functioning develops through the dynamic interaction of personal, behavioral, and environmental factors.

This interaction is illustrated through Bandura's concept of triadic reciprocal determinism, in which personal, behavioral, and environmental factors influence one another. Personal factors include personality and cognitive factors such as beliefs and self-efficacy, while behavioral factors include an individual's thoughts and actions. Lastly, environmental factors refer to the external conditions and contexts surrounding the individual.

The present study recognizes this broader reciprocal framework, it specifically focuses on the personal and behavioral dimensions represented by academic motivation, academic self-efficacy, and AI dependence.

Within this framework, academic self-efficacy represents students' beliefs regarding their capabilities to organize and perform actions required for academic tasks (Bandura, 1997). Academic motivation may be understood as a personal factor that is reflected in students' reasons for engaging in academic activities and

their willingness to persist in those activities. In the present study, academic motivation is operationalized through the Self-Determination Index (SDI) derived from the Academic Motivation Scale–College Version (AMS-C-28), with positive scores reflecting greater self-determined forms of motivation.

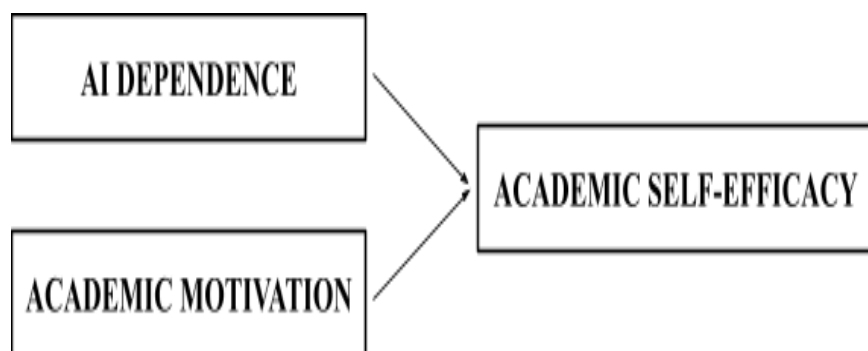
AI dependence, in contrast, is examined as a behavioral pattern involving repeated and excessive reliance on AI tools when completing academic tasks. Previous research has raised concerns that excessive reliance on AI may be associated with cognitive offloading, reduced learning autonomy, and changes in how students engage with academic work (Estrada-Araoz et al., 2025; Li et al., 2026; Lindo & Cutad, 2024; Shah et al., 2026; Yudiernawati et al., 2026). From an SCT perspective, these behavioral patterns may be considered in relation to students' perceptions of their academic capabilities, although the present study does not establish a causal pathway between AI dependence and academic self-efficacy.

Academic motivation may likewise be relevant to academic self-efficacy because students' motivational orientations can be associated with their engagement, persistence, and academic behaviors. Students who demonstrate stronger self-determined motivation may be more likely to engage actively and persistently in academic activities, which may coincide with stronger beliefs in their academic capabilities (Shofiah et al., 2023).

Overall, Social Cognitive Theory provides a theoretical foundation for examining AI dependence and academic motivation as predictors of academic self-efficacy. The theory supports the view that students' personal characteristics and behavioral patterns are relevant to understanding their academic functioning, while also recognizing that these factors exist within a broader system of reciprocal interactions. Accordingly, the present study focuses on the extent to which AI dependence and academic motivation are statistically associated with and predict academic self-efficacy among undergraduate students.

Conceptual Framework

Figure 1. Conceptual Model of AI Dependence and Academic Motivation as predictors of Academic Self-efficacy.



METHODS

Research Design

This study employed a cross-sectional quantitative design to examine the predictive relationships of AI dependence and academic motivation with academic self-efficacy among undergraduate students. Pearson correlation and multiple linear regression analyses were used to examine the relationships among the study variables and the extent to which AI dependence and academic motivation predicted academic self-efficacy and explained variance in the outcome variable. The findings were therefore interpreted as associative and predictive.

Participants

The sample consisted of 228 undergraduate students enrolled in three private universities in Cebu, Philippines, selected through non-probability quota sampling based on the proportional representation of students from

each university. The eligibility criteria included undergraduate students who are bona fide enrollees of the selected private universities for the academic year 2026-2027.

Participants ranged in age from 19 to 24 years old ($M = 21.46$, $SD = 1.60$). Of the participants, 32.9% were 19–20 years old, 36.4% were 21–22 years old, and 30.7% were 23–24 years old. The majority of the sample were female (64.5%), while males accounted for 35.5%. In terms of year level, 32.9% were first-year students, 18.9% were second-year students, 17.5% were third-year students, and 30.7% were fourth-year students. Because participants were selected through non-probability sampling from universities in a single geographical location, the findings should be interpreted with caution and may not be generalizable to the broader undergraduate population.

Instruments

Data were collected electronically using three standardized self-report questionnaires measuring AI dependence, academic motivation, and academic self-efficacy. Clear and comprehensive instructions were provided within the online survey, and the researcher's contact information was made available to address any inquiries or concerns of the participants regarding the study. The data collection lasted four weeks, from July to August 2026. Three self-report questionnaires were used: The first instrument was the Artificial Intelligence Dependence Questionnaire (AIDQ) by Akinwale et al. (2025), a 12-item self-report inventory that measures excessive use and overreliance on AI tools, specifically among undergraduate students. It is rated using a 4-point Likert scale. The second instrument was the Academic Motivation Scale - College Version (AMS-C 28) by Vallerand et al. (1992), which contains 28 items measuring the three forms of motivation: intrinsic, extrinsic, and amotivation toward education, specifically for college students. The items are subdivided into seven subscales: Intrinsic Motivation-to Know, toward Accomplishment, to Experience Stimulation, and Extrinsic Motivation-Identified, Introjected, External Regulation, and Amotivation, and are rated using a 7-point Likert scale. The overall academic motivation score is obtained by first calculating the mean score for each subscale, and applying these means to Vallerand's mathematical formula to determine the overall Self-Determination Index (SDI): $SDI = [2 \times (IM\text{-}to\text{-}Know + IM\text{-}to\text{-}Accomplishment + IM\text{-}to\text{-}Stimulation) / 3] + Identified - [(Introjected + External Regulation) / 2] - (2 \times Amotivation)$. The SDI ranges from -18 to $+18$, with higher scores indicating greater self-determination and lower scores indicating greater amotivation. For interpretation, SDI scores of -18.00 to -10.80 were classified as very low, -10.79 to -3.60 as low, -3.59 to 3.60 as moderate, 3.61 to 10.80 as high, and 10.81 to 18.00 as very high. The third instrument was the General Academic Self-Efficacy Scale (GASE) by van Zyl et al. (2022), a five-item self-report instrument that assesses academic self-efficacy, and uses a 5-point Likert scale.

Data Analysis

Descriptive statistics, including means and standard deviations, were used to summarize the study variables. Pearson product-moment correlation was used to examine the relationships between AI dependence and academic motivation with academic self-efficacy. Multiple linear regression analysis was conducted to examine the extent to which AI dependence and academic motivation statistically predicted academic self-efficacy and the proportion of variance explained by the predictors. Given the cross-sectional design, the results were interpreted as associative and predictive rather than causal.

Ethical Considerations

Participation in the study was voluntary, informed consent from the participants was obtained prior to data collection, and confidentiality and anonymity were maintained throughout the study. The data supporting the findings of this study are not publicly available due to the privacy and confidentiality considerations concerning the participants.

Conflict of interest

The author declares no conflict of interest.

RESULTS

Table 1. The demographic characteristics of the participants.

Characteristics	Frequency	Percentage
Sex		
Female	147	64.5%
Male	81	35.5%
Age		
19 - 20	75	32.9%
21 - 22	83	36.4%
23 - 24	70	30.7%
Year Level		
First Year	75	32.9%
Second Year	43	18.9%
Third Year	40	17.5%
Fourth Year	70	30.7%
N = 228		

Table 1 presents the demographic characteristics of the 228 undergraduate participants. The majority of the participants were female (64.5%), while males accounted for 35.5%. Most participants were aged 21-22 (36.4%), followed by 19-20 (32.9%), and 23-24 (30.7%). In terms of year level, most participants were first-year students (32.9%), followed closely by fourth-year students (30.7%), while 18.9% were second-year and 17.5% were third-year students.

Table 2. Descriptive statistics for Academic Self-efficacy, AI Dependence, and Academic Motivation.

Variables	SD	Mean	Interpretation
AI Dependence	0.601	2.5	Moderate
Academic Motivation	0.401	3.5	Moderate
Academic Self-efficacy	0.646	3.8	High

As presented in Table 2, participants reported a moderate level of AI dependence ($M = 2.5$, $SD = 0.601$), indicating that students reported a moderate level of reliance on AI tools in their academic tasks. Regarding academic motivation, the mean Self-Determination Index (SDI) was moderately positive ($M = 3.5$, $SD = 0.401$), indicating that participants generally exhibited moderately self-determined motivation toward their academic pursuits. Lastly, participants demonstrated high levels of academic self-efficacy ($M = 3.8$, $SD = 0.646$), reflecting generally strong confidence in their academic capabilities.

Table 3. Correlation Matrix for AI Dependence and Academic Self-efficacy with Academic Motivation.

Variables	Academic Self-efficacy		
	Pearson's r	P-value	Interpretation
AI Dependence	-0.220	<.001	Significant
Academic Motivation	0.377	<.001	Significant

As shown in the correlation matrix, academic motivation exhibited a statistically significant, positive correlation with academic self-Efficacy ($r = .377$, $p < .001$), indicating that students who possess higher academic motivation tend to demonstrate greater confidence in their academic capabilities

Conversely, AI dependence demonstrated a statistically significant, negative correlation with academic self-efficacy ($r = -.220$, $p < .001$), suggesting that greater reliance on AI tools is associated with lower levels of perceived academic self-efficacy.

Finally, a weak negative correlation was observed between AI dependence and academic motivation ($r = -.143$, $p = .031$), suggesting that higher levels of AI dependence tend to be associated with lower levels of academic motivation. Although the relationship is statistically significant, the relatively small correlation coefficient indicates that the association between the two variables is weak.

Table 4. Multiple Linear Regression Predicting Academic Self-efficacy.

Model Coefficients - Academic Self-efficacy							
		Unstandardized Coefficients	Standardized Coefficients			95% Confidence Interval	
Predictor	b	SE	β	t	p	Lower	Upper
Intercept	2.279	0.4019		5.67	<.001	1.486	3.0706
AI Dependence	-.0182	0.066	-0.169	-2.76	0.006	-0.312	-0.0521
Academic Motivation	0.568	0.0988	0.353	5.75	<.001	0.373	0.7624
R = .412, R ² = .170, F(2, 225) = 23.1, p < .001.							

The overall regression model was statistically significant, $F(2, 225) = 23.1$, $p < .001$, accounting for 17% of the variance in academic self-efficacy ($R^2 = .170$, Adjusted $R^2 = .163$).

Both predictors significantly contributed to the model. Academic motivation positively predicted academic self-efficacy ($\beta = .353$, $b = .568$, $t = 5.75$, $p < .001$), indicating that higher levels of self-determined academic motivation were associated with higher academic self-efficacy. AI dependence negatively predicted academic self-efficacy ($\beta = -.169$, $b = -.182$, $t = -2.76$, $p = .006$), indicating that greater dependence on AI tools was associated with lower academic self-efficacy.

DISCUSSION

The present study examined the relationships between academic self-efficacy, AI dependence, and academic motivation among undergraduate students. Overall, the findings indicated that students reported high levels of academic self-efficacy, as well as moderate levels of academic motivation and AI dependence.

AI dependence was significantly negatively associated with and predicted academic self-efficacy, suggesting that greater reliance on AI may be associated with lower confidence in students' ability to independently accomplish academic tasks. From the perspective of Bandura's Social Cognitive Theory, this finding is consistent with the view that behavioral patterns and personal factors are interconnected in students' academic functioning. The result also differs from the reviewed studies that examined general AI use and reported positive associations with academic self-efficacy (Chen, 2025; Zhang & Xu, 2025). However, this difference may reflect the distinction between general AI use and AI dependence, as general AI use may involve using such tools as a learning aid, whereas dependence reflects a greater degree of reliance on AI in completing academic tasks (Zhou et al., 2024). This interpretation is particularly relevant in the Philippine higher education context, where technology and the use of AI have become increasingly integrated into students' learning environments (Mendoza et al., 2026). Within Cebu, for instance, a study found that university students with high self-efficacy moderately used AI as an aid to learning rather than relying on it extensively (Antogop et al., 2026). Thus, the present findings suggest that the extent of students' reliance on AI may be relevant to their academic self-efficacy, particularly in relation to their independent engagement with academic tasks.

Academic motivation was significantly positively associated with and predicted academic self-efficacy, suggesting that students with stronger academic motivation may also report greater confidence in their academic capabilities. Consistent with Bandura's Social Cognitive Theory, academic motivation may be related to students' engagement, persistence, and perceptions of their academic capabilities. This finding is also consistent with previous research reporting positive relationships between academic motivation and academic self-efficacy (Anierobi et al., 2022; Lin & Talib, 2025), as well as studies indicating that academic motivation significantly predicts academic self-efficacy (Sidekli & Uzunoğlu, 2023; Wu et al., 2020). Although some studies have examined academic self-efficacy as a predictor of academic motivation

(Aljuaid, 2021; Hidajat et al., 2023), the present findings provide further support for examining academic motivation as a statistical predictor of academic self-efficacy. Overall, the result suggests that stronger academic motivation may be associated with greater confidence in students' ability to accomplish academic tasks.

When considered together, the regression model showed that AI dependence and academic motivation both significantly predicted academic self-efficacy among undergraduate students. The two predictors collectively explained 17% of the variance in academic self-efficacy, indicating that other factors not examined in the present study may also be associated with students' academic self-efficacy. Among the two predictors, academic motivation had the larger absolute standardized regression coefficient, indicating a stronger statistical contribution to the model than AI dependence. This suggests that understanding students' academic self-efficacy may require consideration of multiple factors beyond their academic motivation and reliance on AI.

The findings of this study have practical implications for educators, guidance counselors, and higher education institutions in supporting students' academic self-efficacy in the context of increasing AI use in education. Universities may consider incorporating responsible AI use into existing student orientation programs, academic skills seminars, or digital literacy courses by providing students with guidelines on when AI may be appropriately used as a learning aid and when independent completion of academic tasks should be prioritized. Faculty members may also design learning activities that require students to demonstrate their own reasoning, reflection, and problem-solving before or alongside the use of AI tools. Guidance counselors may incorporate goal-setting, study-planning, and motivation-focused activities into academic support programs to encourage students' engagement with academic tasks. Rather than discouraging the use of AI for academic purposes

altogether, these initiatives may emphasize balanced AI use while helping students remain actively engaged in self-directed learning.

These initiatives may provide practical avenues for supporting students' academic self-efficacy while recognizing the potential role of AI in contemporary education.

LIMITATIONS

Despite the contributions of the present study, several limitations should be considered when interpreting the findings. First, the use of non-probability quota sampling and the recruitment of undergraduate students from universities within a single geographical location may limit the generalizability of the findings to the broader undergraduate population. Although the study included participants from multiple universities in Cebu, the sample was not randomly selected and may not fully represent undergraduate students from other geographical areas or educational contexts. Therefore, the findings should be interpreted with caution when applying them beyond the population represented in the study.

Second, the study relied on standardized self-report questionnaires to measure academic self-efficacy, AI dependence, and academic motivation. Although the instruments are widely used and psychometrically validated, self-report measures may be influenced by participants' perceptions and willingness to accurately report their experiences and behaviors. Consequently, the responses may not fully capture students' academic self-efficacy, AI reliance, or academic motivation.

Third, the cross-sectional and nonexperimental nature of the study limits interpretation of the findings to associations and statistical prediction rather than causal relationships. Although AI dependence and academic motivation significantly predicted academic self-efficacy in the regression model, the design does not establish whether changes in either predictor would result in changes in academic self-efficacy. The findings should therefore be understood as reflecting the relationships observed among the variables at the time of data collection.

These limitations may provide directions for future research. Future researchers may consider probability sampling and include students from different geographical areas, institutions, and educational contexts to improve the generalizability of the findings. Longitudinal research may also be used to examine how academic self-efficacy, AI dependence, and academic motivation develop and relate to one another over time. In addition, future studies may further distinguish between general AI use and AI dependence and examine other factors that may be associated with academic self-efficacy. Such research may provide a broader understanding of the factors associated with students' academic self-efficacy in the modern educational context, where AI is increasingly integrated into students' learning environments.

CONCLUSIONS

Overall, the findings indicate that both AI dependence and academic motivation are relevant to students' academic self-efficacy, although they demonstrate different patterns of association. AI dependence was negatively associated with academic self-efficacy, while academic motivation showed a positive association. Academic motivation also showed a stronger contribution in the regression model. These findings underscore the relevance of considering students' personal factors and learning behaviors when understanding their academic self-efficacy. The findings further suggest that students' use of AI should be considered alongside their academic motivation and ability to engage independently with academic tasks. Rather than viewing the use of AI as inherently beneficial or detrimental to students' learning, attention may be given to how students incorporate AI into their learning while maintaining independence in accomplishing academic tasks.

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