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Academic self-efficacy and dependence on artificial intelligence in a sample of university students

Autoeficácia acadêmica e dependência da inteligência artificial em uma amostra de estudantes universitários

Autoeficacia académica y dependencia de la inteligencia artificial en una muestra de estudiantes universitarios

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Academic self-efficacy inversely relates to dependence on artificial intelligence among Peruvian university students, underscoring the importance of educational programs that strengthen self-efficacy and promote balanced use of AI tools as academic support.
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The results of the experiment gave grounds to compare the identified advantages and disadvantages of the observed approaches to mentoring. It was determined that the appropriate approach and types of mentoring should be chosen depending on the specific environment of the organization, its goals, the mentees' goals, and available opportunities.

ABSTRACT

This research aimed to determine whether there is a relationship between academic self-efficacy and dependence on artificial intelligence in a sample of Peruvian university students. A quantitative, non-experimental, correlational, and cross-sectional study was conducted. The sample consisted of 186 students of both sexes, selected through probabilistic sampling, who were administered the Specific Academic Situations Perceived Self-Efficacy Scale and the Artificial Intelligence Dependence Scale, instruments that showed adequate metric properties. The results showed that the level of academic self-efficacy was medium, while the dependence on artificial intelligence was moderate. Furthermore, it was found that men and students between the ages of 25 and 34 had slightly higher levels of academic self-efficacy. In comparison, those between the ages of 16 and 24 experienced higher levels of dependence on artificial intelligence. On the other hand, the Pearson correlation coefficient (r) between both variables was -0.299 ($p<0.05$). It was concluded that there is an inverse and significant relationship between academic self-efficacy and dependence on artificial intelligence in the sample of Peruvian university students. In other words, as academic self-efficacy increases, the level of dependence on artificial intelligence tools decreases.

Keywords: artificial intelligence; dependence; academic self-efficacy; university students; information and communications technology.

RESUMO

O objetivo desta pesquisa foi determinar se existe uma relação entre a autoeficácia acadêmica e a dependência da inteligência artificial em uma amostra de estudantes universitários peruanos. Foi desenvolvido um estudo quantitativo, não experimental, correlacional e transversal. A amostra foi composta por 186 estudantes de ambos os sexos, selecionados por meio de amostragem probabilística, a quem foram aplicadas a Escala de Autoeficácia Percebida em Situações Acadêmicas e a Escala de Dependência de Inteligência Artificial, instrumentos que apresentaram propriedades métricas adequadas. Os resultados mostraram que o nível de autoeficácia acadêmica era médio, enquanto a dependência da inteligência artificial foi categorizada como moderada. Além disso, foi encontrado que os homens e os estudantes com idades entre 25 e 34 anos apresentaram níveis ligeiramente superiores de autoeficácia acadêmica, enquanto aqueles com idades entre 16 e 24 anos experimentaram maiores níveis de dependência da inteligência artificial. Por outro lado, determinou-se que o coeficiente de correlação de Pearson (r) entre ambas as variáveis foi de -0,299 ($p<0,05$). Concluiu-se que existe uma relação inversa e significativa entre a autoeficácia acadêmica e a dependência da inteligência artificial na amostra de estudantes universitários peruanos. Ou seja, à medida que a autoeficácia acadêmica aumenta, diminui o nível de dependência em relação às ferramentas de inteligência artificial.

Palavras-chave: inteligência artificial; dependência; autoeficácia acadêmica; estudantes universitários; tecnologias da informação e comunicação.

RESUMEN

El objetivo de la presente investigación fue determinar si existe una relación entre la autoeficacia académica y la dependencia de la inteligencia artificial en una muestra de estudiantes universitarios peruanos. Se desarrolló un estudio cuantitativo, no experimental, correlacional y transversal. La muestra estuvo conformada por 186 estudiantes de ambos sexos, seleccionados mediante un muestreo probabilístico, a quienes se les administraron la Escala de Autoeficacia Percibida Específica de Situaciones Académicas y la Escala de Dependencia de la Inteligencia Artificial, instrumentos que presentaron adecuadas propiedades métricas. Los resultados mostraron que el nivel de autoeficacia académica era medio, mientras que la dependencia de la inteligencia artificial se categorizó como moderada. Además, se encontró que los hombres y los estudiantes de entre 25 y 34 años presentaron niveles ligeramente superiores de autoeficacia académica, mientras que aquellos de entre 16 y 24 años experimentaron mayores niveles de dependencia de la inteligencia artificial. Por otro lado, se determinó que el coeficiente de correlación r de Pearson entre ambas variables fue de -0.299 ($p<0.05$). Se concluyó que existe una relación inversa y significativa entre la autoeficacia académica y la dependencia de la inteligencia artificial en la muestra de estudiantes universitarios peruanos. Es decir, a medida que aumenta la autoeficacia académica de los estudiantes, disminuye su nivel de dependencia hacia herramientas de inteligencia artificial.

Palabras clave: inteligencia artificial; dependencia; autoeficacia académica; estudiantes universitarios; tecnologías de la información y comunicación.

INTRODUCTION

University education is a fundamental stage in the lives of students, where not only the foundations of their professional development are forged, but also their personal growth (Torres, 2019). This process prepares them to face the challenges of the working world and gives them the opportunity to make contributions to society (Bernate & Vargas, 2020). In this context, students are faced with the task of adapting to new academic demands, which require the development of critical skills and the effective management of their time and resources (Duche et al., 2020). As academic demands become more complex, the path to success is not only based on acquired cognitive skills, but also on psychological aspects, such as academic self-efficacy (Hayat et al., 2020). Confidence in their abilities can be a determining factor for students to overcome obstacles and feel empowered in their educational path (Shengyao et al., 2024).

Academic self-efficacy is a construct based on the self-efficacy theory proposed by Bandura (1977), who defines it as a person's belief in his or her ability to organize and execute actions necessary to reach certain achievements or results. In the academic context, academic self-efficacy focuses on students' beliefs about their abilities to face and overcome challenges in the university setting (Høigaard et al., 2015). It is a specific dimension of general self-efficacy, applied to the educational context, and represents the confidence that the student has in his or her ability to successfully perform academic activities (Zamfir et al., 2020). Currently, it is argued that this perception of self-efficacy directly influences performance, since students with a high sense of academic self-efficacy tend to make more effort, persist in the face of difficulties, and develop effective learning strategies (Rosales & Hernández, 2020).

Self-efficacy theory identifies four key sources for its development: mastery experience (previous achievements that reinforce confidence), vicarious experience (observation of success in others), verbal persuasion (positive comments from close figures), and physiological and emotional states (that affect the perception of competence). These sources are relevant in the academic environment, where self-efficacy acts as a mediator in the adoption of goal-oriented behaviors (Bandura, 1986).

Several factors can influence academic self-efficacy, such as social support, personal goals and expectations, and previous experiences. Social support from family, friends, and academic figures can have a determining influence, since it provides the student with an environment of trust and security (González et al., 2020). In addition, students who establish clear and attainable goals tend to present higher self-efficacy, as they can visualize the path to their goals more concretely (Saks, 2024). Previous experience with academic tasks is also important, as familiarity and success with difficult topics and tasks reinforce confidence in the ability to solve similar problems in the future (Fokkens et al., 2020). According to Schunk (1991), the use of learning strategies, such as planning and self-assessment, is also associated with higher levels of self-efficacy, suggesting that students develop a greater capacity for self-assessment and adjustment in their study methods.

Academic self-efficacy has a significant impact on students' performance and classroom behavior (Meng & Zhang, 2023). Those with high levels of self-efficacy tend to show greater persistence and resilience to failure, as they are confident in their ability to overcome difficulties (Sabouripour et al., 2021). In addition, self-efficacy contributes to the adequate management of academic stress, which allows students to face pressure with a positive attitude (Thionata & Soetjiningsih, 2023). Zimmerman (2000) argues that self-efficacy motivates students to actively engage in their learning, promoting both achievement and emotional well-being.

As academic self-efficacy drives students to confidently face educational challenges, it is also important to consider how these advances might be influenced using technological tools, in particular, artificial intelligence (AI). In the search for efficiency and support in their studies, many students are increasingly turning to AI, which offers instant access to information, personalized recommendations, and assistance in problem solving (Estrada et al., 2024a). However, while AI has a potential to facilitate learning and strengthen self-efficacy, the constant and dependent use of these technologies may, in some cases, generate a dependency that impacts students' confidence and autonomy in their own learning process (Huang et al., 2024).

Reliance on AI is an emerging theme in academic research, especially in the educational context (Ahmad et al., 2023). With the increasing availability of AI-powered tools, such as virtual assistants, adaptive learning platforms, content generators, and personalized tutoring applications, students have an unprecedented level of support (Gligorea et al., 2023). However, the intensive use of these tools also poses challenges and risks, such as overdependence, which can negatively impact their academic development and their self-regulation and problem-solving skills (Kamalov et al., 2023). AI dependence can be defined as the constant and compulsive need to use AI tools to perform academic tasks or solve problems, without exploring alternative methods or trusting their own abilities (Morales et al., 2024). This dependence implies a lack of confidence in one's own ability to cope with academic tasks without technological assistance and is characterized by a preference to use AI as the first and only source of help (Del Cisne et al., 2024).

Several factors may contribute to the reliance on AI in education. The accessibility and convenience of AI tools, available around the clock and designed to be intuitive, provide a quick and easy solution to answer questions or solve problems, which, over time, can diminish a student's drive to independently seek solutions (Chan & Zary, 2019). In addition, lack of confidence in one's own abilities may cause students with low academic self-efficacy to see AI as a resource that gives them immediate answers, thus reducing the need to face challenges on their own and reinforcing the idea that they are dependent on this technology, especially under conditions of academic pressure or stress (Rodriguez et al., 2024). Finally, academic pressure stemming from workload and high expectations in university education leads many students to seek efficient methods to save time, and AI tools offer quick and effective solutions, thus fostering a habit of dependence (Seo et al., 2021).

The excessive and dependent use of AI in academia can negatively impact the development of fundamental skills in students, such as self-regulation and critical thinking (Zhai et al., 2024). By relying on technology to solve problems and make decisions, students may be reduced in their ability to manage their learning and adjust their study methods, which is essential according to Zimmerman (2000). In addition, the tendency of AI to provide simplified answers may limit the development of critical and creative thinking (Lin & Chen, 2024). Also, the constant use of AI can generate emotional dependence and anxiety before autonomous tasks, decreasing confidence in their own abilities (Shanmugasundaram & Tamilarasu, 2023).

Education has an important role to play in preventing students from over-reliance on AI (Ahmad et al., 2023). Universities can help young people find a balance between using these tools and relying on their own skills (Lee et al., 2024). It is not only about teaching them how to use technology, but also about motivating them to think critically about when and how to do so. Through digital learning strategies and promoting self-regulation, educators can guide students to understand that AI is a valuable aid, but not a replacement for their own abilities (Darvishi et al., 2024).

This research is relevant because it addresses a topical issue given the growing presence of AI in education. Academic self-efficacy, understood as confidence in one's own abilities to face and overcome learning challenges, is important for academic performance and persistence. However, the frequent use of AI tools could influence this perception of self-efficacy, given that they offer quick and accessible solutions that can reduce the need for autonomous problem solving. Understanding this relationship will not only identify whether AI strengthens or weakens students' confidence in their abilities, but will also provide guidance for a balanced use of technology, ensuring that it promotes skill development and academic growth in a healthy and autonomous way.

Finally, the objective of the present research was to determine whether there is a relationship between academic self-efficacy and AI dependence in a sample of Peruvian university students.

METHODS

Design

The study adopted a quantitative approach, as it allowed the collection and analysis of numerical data to explore and describe the relationship between the study variables. The design was non-experimental, since the variables were not intentionally manipulated; instead, observations and records were made in their natural context. In addition, the study was of a cross-sectional correlational type, since it sought to identify and analyze the possible relationship between academic self-efficacy and AI dependence, collecting data at a single point in time.

Population and sample

The population consisted of 1400 students enrolled in the 2024-II cycle in the branch of a private university in the city of Puerto Maldonado (Peru), while the sample consisted of 186 students, selected by non-probabilistic convenience sampling. Table 1 shows that, of the total number of participants, 63.4% were female and 36.6% were male. In addition, 89.2% were between 16 and 24 years old, while 10.8% were between 25 and 34 years old.

Table 1. Distribution of the sample.

Variables	Sociodemographic characteristics	n= 186	%
Sex	M	68	36.6
	F	118	63.4
Age	Between 16 and 24 years old	166	89.2
	Between 25 and 34 years old	20	10.8

Note. Authors' development with the research data

Instruments

Regarding the instruments used for data collection, they were structured in a form of the Google Forms platform. In the first section of this form, students were asked to provide sociodemographic information, which included variables such as gender and age.

In the second section, the Academic Situations Specific Perceived Self-Efficacy Scale (ASSPSE) was administered. This single-factor scale evaluates students' confidence in their abilities to handle specific situations within the academic setting and consists of 10 Likert-type items with 4 response alternatives (never, sometimes, quite often and always). The psychometric properties of the questionnaire were evaluated in a previous study conducted in Peru by Domínguez (2016), which showed that the instrument presented high internal consistency ($\alpha = 0.800$).

In the third section, the Artificial Intelligence Dependence Scale (Morales et al., 2024) was applied, which assesses the degree to which students depend on AI in their daily academic activities, taking into account factors such as frequency of use, trust in the recommendations offered by the technology, and the impact of this dependence on decision making. The single-factor scale consists of 5 items with 5 response alternatives ranging from 1 (completely false for me) to 5 (describes me perfectly). The authors of the instrument determined that the internal consistency was adequate ($\alpha = 0.870$).

Procedures

A structured and systematic process was followed for data collection. First, authorization was requested from the university authorities to carry out the research. Once approval was obtained, students were invited to participate in the study through the *WhatsApp* messaging platform. In the invitation message, a link to the survey was included, the purpose of the research was explained, and detailed instructions on how to answer the questions were provided. When the participation of the 186 students required for the sample was achieved, access to the survey was deactivated.

Data analysis

The statistical analysis was carried out using descriptive and inferential statistical techniques. First, descriptive statistics were calculated at the level of variables, dimensions and items. Then, Student's t-test was applied to identify statistically significant differences in relation to academic self-efficacy and AI dependence, considering sociodemographic variables such as gender and age. In addition, Cohen's d was calculated to assess the effect size of the observed differences. Subsequently, a correlation analysis was performed using Pearson's r coefficient, with a significance level set at $p < 0.05$ to determine the statistical significance of the results.

Ethical aspects

This research was conducted following the principles established in the Declaration of Helsinki. Students were provided with clear and detailed information on the objective and nature of the study, and their informed consent was obtained on a voluntary basis, respecting their autonomy and their right to withdraw at any time. In addition, measures were implemented to protect the privacy and confidentiality of the data, guaranteeing the anonymity of the participants and secure handling of the information collected.

RESULTS AND DISCUSSION

Table 2 shows that the mean of the variable academic self-efficacy was 25.03 (SD=5.421), which, when compared with the maximum and minimum possible values, could be categorized at a medium level. Regarding the AI dependence variable, the mean was 13.08 (SD=3.742), which could be categorized at a moderate level. On the other hand, it is observed that the skewness and kurtosis coefficients of both variables are within the range of ±2, which indicates that the data distribution is close to normality (Gravetter & Wallnau, 2014).

Table 2. Descriptive statistics of the variables

Variable	M	SD	Asymmetry	Kurtosis	Valuation
Academic self-efficacy	25.03	5.421	0.888	0.469	Medium
Dependence on artificial intelligence	13.08	3.742	-0.021	-0.024	Moderate

Note. Authors' development with the research data

Table 3 shows the rating of the items of the Academic Situations Specific Perceived Self-Efficacy Scale (ASSPSE). Among them, item 7 (M= 2.94) stands out, which reflects a strong confidence in the participants' ability to obtain a good

academic performance when they set their minds to it. In addition, item 6 (M= 2.59), which shows that participants perceive themselves as quite capable and competent in their academic life. Finally, item 10 (M= 2.58) indicates that participants feel prepared and capable of achieving academic success.

Table 3. Descriptive results of the Academic Situations Specific Perceived Self-Efficacy Scale (ASSPSE)

Items		M	SD
1.	I consider myself capable enough to cope successfully with any academic task.	2.54	0.714
2.	I think I have enough ability to understand well and quickly in a subject.	2.48	0.722
3.	I feel confident to approach situations that test my academic ability.	2.48	0.751
4.	I have the conviction that I can do excellent exams.	2.40	0.652
5.	It is not of utmost importance to me that teachers are demanding and harsh, as I am very confident in my own academic ability.	2.36	0.767
6.	I believe I am a fairly skilled and competent person in my academic life.	2.59	0.725
7.	If I put my mind to it, I believe I have enough ability to perform well academically.	2.94	0.813
8.	I think I can pass the courses quite easily and even get good grades.	2.45	0.713
9.	I am one of those people who don't need to study hard to pass a subject or pass the whole course.	2.23	0.780
10.	I believe that I am prepared and quite capable of achieving many academic successes.	2.58	0.748

Note. Authors' development with the research data

Table 4 presents the descriptive results of the AI Dependence Scale. Items 3 (M= 2.77), 4 (M= 2.70) and 5 (M= 2.64) stand out, where participants express a need to stay updated in AI to be relevant in their field, a dependence on validation and feedback from these systems to feel confident in their decisions, and a fear of AI replacing their current skills.

Table 4. Descriptive results of the Artificial Intelligence Dependence Scale

Items		M	SD
1.	I feel unprotected when I don't have access to artificial intelligence.	2.45	0.918
2.	I worry about the idea of delaying my tasks or projects if I don't use artificial intelligence.	2.52	0.971
3.	I do my best to stay current in artificial intelligence to remain relevant in my field.	2.77	0.984
4.	I constantly need validation or feedback from artificial intelligence systems to feel confident in my decisions.	2.70	0.961
5.	I feel fearful that artificial intelligence will replace my current skills or capabilities.	2.64	1.047

Note. Authors' development with the research data

Table 5 presents the comparative results between men and women in relation to the variables of academic self-efficacy and AI dependence. Regarding academic self-efficacy, it is observed that males have a mean (M) of 26.74 with a standard deviation (SD) of 5.199, compared to females, who have a mean of 24.05 and a standard deviation (SD) of 5.322. This difference is statistically significant ($p<0.05$) and the effect size ($d= 0.511$) suggests a median difference, indicating that men feel more confident in their academic ability than women. On the other hand, regarding the AI dependence variable, the means are similar between males (M= 13.03, SD= 4.218) and females (M= 13.11, SD= 3.456), and the difference is not statistically significant ($p>0.05$), suggesting that there is no gender difference in AI dependence.

Table 5. Comparative results for the variables with respect to sex

Variable and dimensions	Man		Woman		t	p	d
	M	SD	M	SD			
Academic self-efficacy	26.74	5.199	24.05	5.322	3.341	0.001	0.511
Dependence on artificial intelligence	13.03	4.218	13.11	3.456	-0.134	0.894	0.021

Note. Authors' development with the research data

Table 6 shows the comparative results for the variables of academic self-efficacy and AI dependence as a function of age. Regarding academic self-efficacy, young people between 16 and 24 years of age present a mean of 24.36, significantly lower than participants between 25 and 34 years of age, who have a mean of 30.65. This difference is statistically significant, with a Cohen's d coefficient of 0.551, indicating a medium effect size and suggesting that older students tend to perceive themselves as having higher academic self-efficacy. On the other hand, in relation to AI dependence, 16-24 year olds have a mean of 13.38, higher than the mean of 10.60 of those aged 25-34. This difference is also significant, with a Cohen's d coefficient of 0.483, indicating a medium effect size. These findings suggest that age influences perceived academic self-efficacy and reliance on AI.

Table 6. Comparative results for the variables with respect to age

Variable and dimensions	Between 16 and 24 years old		Between 25 and 34 years old		t	p	d
	M	SD	M	SD			
Academic self-efficacy	24.36	4.968	30.65	5.878	-5.246	0.000	0.551
Dependence on artificial intelligence	13.38	3.534	10.60	4.535	2.646	0.015	0.483

Note. Authors' development with the research data

Table 7 presents the correlation between academic self-efficacy and AI dependence. A Pearson correlation of -0.299 is observed, indicating a moderate inverse relationship between the two variables. This suggests that as academic self-efficacy increases, AI dependence tends to decrease, and vice versa.

Table 7. Correlation between academic self-efficacy and reliance on artificial intelligence

		Academic self-efficacy	Dependence on artificial intelligence
Academic self-efficacy	Pearson correlation	1	-0.299**
	Sig. (bilateral)		0.000
	N	186	186
Dependence on artificial intelligence	Pearson correlation	-0.299**	1
	Sig. (bilateral)	0.000	
	N	186	186

Note. Authors' development with the research data
**. Correlation is significant at the 0.01 level (bilateral).

Discussion

Academic self-efficacy plays an important role in the development and performance of university students, as it directly influences their motivation and the way they face academic challenges. In the university context, where intellectual and emotional demands are high, having a solid perception of self-efficacy can make a difference in students' performance and adaptation to the demands of their studies. Today, however, the increased use of AI has introduced a variable that may change this perception of self-efficacy. As students turn to AI to facilitate academic tasks, from searching for information to solving complex problems, a dependency could be generated that affects their confidence in their own abilities and learning processes. Therefore, the present research focused on determining whether there is a relationship between academic self-efficacy and AI dependence in a sample of Peruvian university students.

Preliminarily, it was found that students were characterized by perceiving a medium level of academic self-efficacy. This means that, although students perceive a certain capacity to organize themselves and fulfill their tasks, they face doubts or insecurities in situations of greater difficulty or stress, which affects their confidence in their own performance. This level of self-efficacy implies that, although students manage to respond to everyday academic demands, their confidence is affected when faced with challenges that they consider complex or highly demanding. In such scenarios, they are likely to seek support from external tools, such as AI, to manage academic demands. Similar results were reported in some studies in which university students participated and found that the predominant level of academic self-efficacy was moderate (Núñez & García, 2024; Estrada et al., 2023; Pichen & Turpo, 2022).

When comparing academic self-efficacy according to gender, it was found that males had a higher level compared to females. This suggests that men tend to have greater confidence in their ability to face and meet academic demands, which could be reflected in a more positive perception of their abilities to organize themselves, solve problems and handle challenging academic situations. This result is related to some studies (Estrada et al., 2024b; Jaramillo et al., 2023; Zamora et al., 2022).

On the other hand, it was found that students who were between 25 and 34 years old presented higher levels of academic self-efficacy than younger students between 16 and 24 years old. This indicates that older students, possibly with more academic and life experience, tend to have greater confidence in their ability to meet academic challenges. Greater maturity and previous experiences might have strengthened their self-efficacy, enabling them to better handle academic demands compared to younger students, who are still in the process of developing coping and study management skills. Some previous research supports this finding (Roncal et al., 2024; Abusalehi et al., 2019).

Regarding the AI dependence variable, the predominant level was found to be moderate, indicating that, although they resort to AI to facilitate certain tasks or to access information quickly, they still maintain a certain degree of autonomy and ability to solve academic problems by their own means. In this sense, students seem to use AI in a complementary way,

without its use interfering excessively with their self-confidence or academic self-efficacy, which may be a positive indication of a balanced relationship with this technology. This finding coincides with what has been reported in some research (Granda et al., 2024; Zhang et al., 2024).

It was also found that reliance on AI was higher in 16–24-year-olds than in those aged 25-34. This would be explained by the fact that younger students, having grown up in a digitized environment, are more accustomed to integrating technologies, including AI, into their daily routines. Their familiarity with technological tools may lead them to use them more frequently as a support in their academic activities. On the other hand, students aged 25-34, while also familiar with technology, may have developed more autonomous problem-solving skills and study methods over time, leading them to rely less on AI to fulfill their academic responsibilities. This finding diverges from that found in recently published research that reported that students in their 30s and 40s were more likely to use AI frequently than those in younger age groups (Baek et al., 2024).

An interesting finding shows that there is a significant inverse relationship between academic self-efficacy and AI dependence. This means that as students perceive a greater ability to face academic challenges and manage their learning autonomously, they tend to rely less on AI to solve their problems or complete tasks. In other words, students with high academic self-efficacy are confident in their abilities to organize their time, understand concepts, and develop effective study strategies, which reduces their need for external assistance, such as that provided by AI. On the other hand, those with lower academic self-efficacy, i.e., those who feel they lack the skills to handle academic demands, tend to turn more frequently to AI tools. These tools can offer a sense of immediate support, providing quick responses or assisting in the completion of tasks, providing compensation for a lack of confidence in their own abilities. The reliance on AI in these cases may reflect a search for quick fixes that substitute for active problem solving, which in the long run could lead to an unhealthy dependence on technology rather than fostering the development of personal skills.

There is research that reported similar results. For example, in South Korea, Zhang et al. (2024) assessed the relationship between academic self-efficacy and AI dependence in university students, finding that those with lower levels of self-efficacy tended to rely more on AI tools to complete their academic tasks. In addition, the study revealed that over-reliance on AI negatively affected the development of skills such as creativity, critical thinking and autonomy, as students preferred immediate solutions provided by technology rather than solving problems on their own. On the other hand, it is related to a study conducted in Spain by Rodriguez et al. (2024), who found that the need to interact with AI to solve problems was related to low levels of self-efficacy and self-regulation skills, while students with higher self-efficacy tended to use AI in a more complementary way and not as an essential tool for their academic activities.

Our findings and the previously mentioned studies found that the level of self-efficacy and self-regulation skills play an important role in how students use technology in their learning process. The evidence that students with lower self-efficacy and self-control tend to rely more on AI to solve their academic responsibilities raises important reflections on the impact of this technology in education. While AI offers benefits by facilitating quick access to information and solutions, overuse may limit the development of basic and necessary skills, such as autonomy, creativity, and critical thinking. This scenario invites a reconsideration of the role of AI in the university context, promoting a balanced stance that not only complements learning, but also fosters autonomy and the development of strong personal and academic competencies in students.

Among the strengths of this research is its current relevance. As one of the first studies to examine how academic self-efficacy may relate to the degree of technological dependence, especially in the use of AI, this research offers a novel perspective in the educational context. It provides initial empirical evidence that allows us to explore how students' confidence in their academic abilities may affect or moderate their use of advanced technological tools. Thus, this research contributes significantly to an emerging area, providing a foundation for future research that wishes to delve deeper into the effects of technology on the development of autonomous skills and academic confidence.

Limitations and future research

Finally, it is also important to note that this study has some limitations that should be considered when interpreting the results. First, the study was conducted at a single university, which restricts the generalizability of the findings to other institutions or contexts. In addition, two self-administered instruments were used, which could have introduced social desirability biases in the participants' responses. Finally, the cross-sectional design of the study provides insight into students' perceptions and behaviors at a specific point in time, without offering insight into changes over time. To address these limitations, we recommend expanding the sample to include more universities and employing a combination of data collection methods, such as interviews or longitudinal studies, that would allow for a more complete and accurate understanding of the relationship between variables.

FINAL REMARKS

The findings allow us to conclude that there is an inverse and significant relationship between academic self-efficacy and dependence on AI in a sample of Peruvian university students. This means that, as students' academic self-efficacy increases, their level of dependence on AI tools decreases. In other words, students who are more confident in their own academic skills and abilities tend to rely less on AI to complete tasks, which could suggest a greater development of autonomous learning strategies and self-regulation skills. This relationship also indicates that academic self-efficacy could play a protective role, promoting an active and critical learning approach that reduces the need for external support and fosters personal growth and autonomy in the academic learning process.

Therefore, it is suggested that universities implement programs that strengthen students' academic self-efficacy through autonomous learning strategies, self-regulation skills, and developing confidence in their own abilities. This could include workshops on study techniques, time management and problem solving without excessive reliance on AI. In addition, it is recommended to promote the responsible and critical use of AI in academic contexts, training students to understand its limits and foster a balance between technological assistance and their personal skills. This will contribute to deeper, autonomous and sustainable learning, reducing dependence on external tools.

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