Data and Metadata. 2024; 3:285
doi: 10.56294/dm2024285

ORIGINAL

Assessment of the level of knowledge on artificial intelligence in a sample of university professors: A descriptive study

Evaluación del nivel de conocimiento sobre inteligencia artificial en una muestra de docentes universitarios: Un estudio descriptivo

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Cite as: Estrada-Araoz EG, Manrique-Jaramillo YV, Díaz-Pereira VH, Rucoba-Frisancho JM, Paredes-Valverde Y, Quispe-Herrera R, Quispe-Paredes DR. Assessment of the level of knowledge on artificial intelligence in a sample of university professors: A descriptive study. Data and Metadata. 2024; 3:285. https://doi.org/10.56294/dm2024285

Submitted: 11-10-2023 **Revised:** 10-02-2024 **Accepted:** 23-04-2024 **Published:** 24-04-2024

Editor: Prof. Dr. Javier González Argote

ABSTRACT

Introduction: the knowledge of artificial intelligence (AI) by university professors provides them with the ability to effectively integrate these innovative technological tools, resulting in a significant improvement in the quality of the teaching and learning process.
Objective: to assess the level of knowledge about AI in a sample of Peruvian university professors.
Methods: quantitative study, non-experimental design and descriptive cross-sectional type. The sample consisted of 55 university professors of both sexes who were administered a questionnaire to assess their level of knowledge about AI, which had adequate metric properties.
Results: the level of knowledge about AI was low for 41,8 % of professors, regular for 40 %, and high for 18,2 %. This indicates that there is a significant gap in the knowledge of university professors about AI and its application in education, which could limit their ability to fully leverage AI tools and applications in the educational environment and could affect the quality and effectiveness of teaching. Likewise, it was determined that age and self-perception of digital competencies of professors were significantly associated with their level of knowledge about AI ($p<0,05$).
Conclusions: peruvian university professors are characterized by presenting a low level of knowledge about AI. Therefore, it is recommended to implement training and professional development programs focused on artificial intelligence, in order to update and improve their skills in this field.

Keywords: Artificial Intelligence; University Professors; Education; Higher Education; Educational Technology.

RESUMEN

Introducción: el conocimiento de la inteligencia artificial (IA) por parte de los docentes universitarios les proporciona la capacidad de integrar eficazmente estas innovadoras herramientas tecnológicas, lo que resulta en una mejora significativa en la calidad del proceso de enseñanza y aprendizaje.
Objetivo: evaluar el nivel de conocimientos sobre IA en una muestra de docentes universitarios peruanos.
Métodos: estudio cuantitativo, diseño no experimental y de tipo descriptivo transversal. La muestra fue conformada por 55 docentes universitarios de ambos sexos a quienes se les aplicó un cuestionario para evaluar el nivel de conocimientos sobre IA, el cual contaba con adecuadas propiedades métricas.
Resultados: el nivel de conocimiento sobre IA del 41,8 % de docentes fue bajo, del 40 % fue regular y del 18,2 % fue alto. Esto indica que existe una brecha significativa en el conocimiento de los docentes universitarios

sobre IA y su aplicación en la educación, lo cual podría limitar su capacidad para aprovechar plenamente las herramientas y aplicaciones de IA en el entorno educativo y podría afectar la calidad y la efectividad de la enseñanza. Del mismo modo, se determinó que la edad y la autopercepción de las competencias digitales de los docentes se asoció de manera significativa a su nivel de conocimiento sobre IA ($p<0,05$).
Conclusiones: los docentes universitarios peruanos se caracterizan por presentar un bajo nivel de conocimientos sobre IA. Por lo tanto, se recomienda implementar programas de capacitación y desarrollo profesional centrados en la inteligencia artificial, con el fin de actualizar y mejorar sus habilidades en este campo.

Palabras clave: Inteligencia Artificial; Docentes Universitarios; Educación; Educación Superior; Tecnología Educativa.

INTRODUCTION

Artificial intelligence (AI) currently represents one of the most fascinating and promising fields of science and technology.[1] From its conception in past decades to its exponential growth today, AI is no longer a futuristic concept but a pervasive reality in everyday life.[2] With its ability to mimic human intelligence and perform tasks once thought to be exclusive to human thought, AI has transformed industries, revolutionized processes, and raised fundamental questions about the future of humankind.[3] In general terms, AI refers to the process by which computers and machines simulate human behavior, encompassing aspects such as perception, learning, inference, analysis, and decision-making, all through the use of computers and machines.

In general terms, AI refers to the process by which computers and machines simulate human behavior, encompassing aspects such as perception, learning, inference, analysis, and decision-making, all through data processing and pattern recognition.[4] AI comprises multiple subsets or subfields, among which machine learning, deep learning, neural networks, computer vision, and robotics stand out as the top five.[5] In addition, AI is structured into three main paradigms: symbolic, based on logic and knowledge; statistical, which employs probabilistic methods and machine learning; and subsymbolic, which focuses on embodied intelligence and search. These paradigms address various problem domains, such as perception, reasoning, knowledge, planning, and communication.

Since its development in the 1950s, experts have been continuously exploring AI programs and applications that can optimize and transform various areas of everyday life.[6] Initially conceived as a tool primarily intended for the technological and industrial domain, over time, its potential to revolutionize the educational field has become evident.[7]

At the same time, university educators are in a unique position to take advantage of AI's capabilities and significantly improve the teaching and learning process in the classroom.[8] From personalization of education to automated assessment and virtual support, AI applications offer vast potential to transform the educational experience and prepare students for the challenges of the 21st century.[9]

There are multiple benefits that teachers can gain from using AI. First, they can use AI systems to personalize education by tailoring content and learning activities according to individual student needs.[10] In addition, AI can assist in the automated assessment of assignments and exams, providing instant feedback to students.[11] They can also employ AI-powered virtual assistants to answer common student questions and provide personalized support outside of class time.[12] Finally, teachers can use AI-based data analysis tools to identify patterns of student performance and adjust their teaching methods accordingly.[13]

Although AI offers numerous benefits in education, from personalization of learning to automation of administrative tasks, it also presents a number of challenges for the university community.[14] Several ethical violations have been identified that could erode students' motivation and critical thinking skills.[15] For example, the continued use of AI tools that do not encourage the development of critical thinking skills can lead to 'intellectual laziness' among students.[16]

On the other hand, a decrease in student creativity and an increased propensity for academic dishonesty have been observed because some AI tools facilitate plagiarism and the generation of unverified content.[17,18] This phenomenon raises concerns about the credibility and quality of AI-generated content, as algorithms can produce writing based on unverified data and massive corpora of information.[19] Ultimately, the overuse of AI tools could undermine students' autonomy and independent study skills, as students may become overly reliant on technology to complete academic tasks and assignments.[20]

This research is justified in the context of an ever-evolving digital age, where artificial intelligence is rapidly transforming the way we interact with information and work. University educators have a responsibility to prepare students for a world where artificial intelligence will be central. Assessing their understanding of artificial intelligence will not only identify gaps in their knowledge. However, it will also enable the design of targeted training programs to improve their proficiency in this field. This will ensure that teachers are better prepared to integrate artificial intelligence into their educational practices, thus benefiting the quality and

relevance of university teaching in an increasingly digitized world.

The objective of this research was to evaluate the level of knowledge about artificial intelligence in a sample of Peruvian university teachers.

METHODS

The research was based on a quantitative approach to analyze the behavioral patterns of the participants, using numerical measurements and statistical analysis. A non-experimental design was used since the behavior of the study variable was observed in its natural environment without any deliberate manipulation. In addition, it was descriptive and cross-sectional, which allowed an understanding of the characteristics of the variable at a single time point.[21]

The sample consisted of 55 teachers of both sexes and was of a census nature since it covered all the teachers working in a Peruvian public university. This choice was justified by virtue of its convenience and accessibility, thus providing a manageable sample within the scope of the study.

For data collection, a structured virtual survey was used using the Google Forms platform, composed of two sections. In the first part, sociodemographic and employment information was collected from the participants, such as gender, age, employment status and self-perception of digital competencies. In the second part, a questionnaire was applied to assess the level of knowledge about artificial intelligence in university teachers.[22] This instrument consists of three dimensions: theoretical aspects of artificial intelligence (5 items), artificial intelligence tools for education (5 items), and applications of artificial intelligence tools in the classroom and teaching activities (5 items). To ensure the validity and internal consistency of the questionnaire in the context of this research, a validation and reliability process was carried out. In that sense, it was determined that the scale possessed an adequate level of content validity (Aiken's V = 0,928) and reliability (α = 0,955).

Data collection was carried out after obtaining the necessary authorizations from the relevant university authorities. To facilitate the participation of teachers, the WhatsApp messaging application was used. Teachers were invited to participate and were provided with a link to the survey, along with instructions on how to complete it. This process, which lasted approximately 20 minutes, concluded with the confirmed participation of the 55 teachers surveyed. Once data collection was completed, access to the survey was deactivated.

For data analysis, SPSS version 25 software was used. In the first phase, the percentage distribution of the variable, dimensions, and study items was calculated. Subsequently, inferential analysis was performed using the nonparametric Chi-Square test (X2). The purpose of this analysis was to determine whether there was a significant association between the level of knowledge about artificial intelligence and the proposed sociodemographic and occupational variables.

Following the ethical principles established in the Declaration of Helsinki, this study was conducted rigorously in terms of ethical standards. All participating teachers gave informed consent after receiving a full explanation of the purpose and procedures of the research. In addition, the confidentiality of the data collected was guaranteed, and the welfare of the teachers was ensured at all times.

RESULTS

According to the data collected in table 1, 56,4 % of the teachers were male, while 43,6 % were female. In terms of age distribution, 58,2 % were between 41 to 50 years old, 21,8 % were over 50 years old, and 20 % were between 30 to 40 years old. In terms of employment status, 65,5 % were appointed teachers, and 34,5 % were contracted. Regarding the perception of their digital skills, 63,6 % rated them at a fair level, 20 % at a low level, and 16,4 % at a high level.

Table 1. Distribution of the sample

Variables		n= 55	%
Gender	Male	31	56,4
	Female	24	43,6
Age	Between 30 and 40 years old	11	20,0
	Between 41 and 50 years old	32	58,2
	More than 50 years old	12	21,8
Employment status	Hired	19	34,5
	Appointed	36	65,5
Self-perception of digital competence	High	9	16,4
	Regular	35	63,6
	Low	11	20,0

Figure 1 shows that the level of knowledge about IA of 41,8 % of teachers was low, 40 % was fair, and 18,2 % was high. Likewise, the level of knowledge about theoretical aspects of AI of 50,9 % was low, 34,5 % was fair, and 14,5 % was high. Regarding AI tools for education, the level of knowledge of 43,6 % was fair, 40 % was low, and 16,4 % was high. Regarding the applications of AI tools in the classroom and teaching activities, the level of knowledge of 41,8 % was fair, 36,4 % was low, and 21,8 % was high. Based on the findings presented it can be stated that there is a significant gap in the knowledge of university teachers about AI and its application in education.

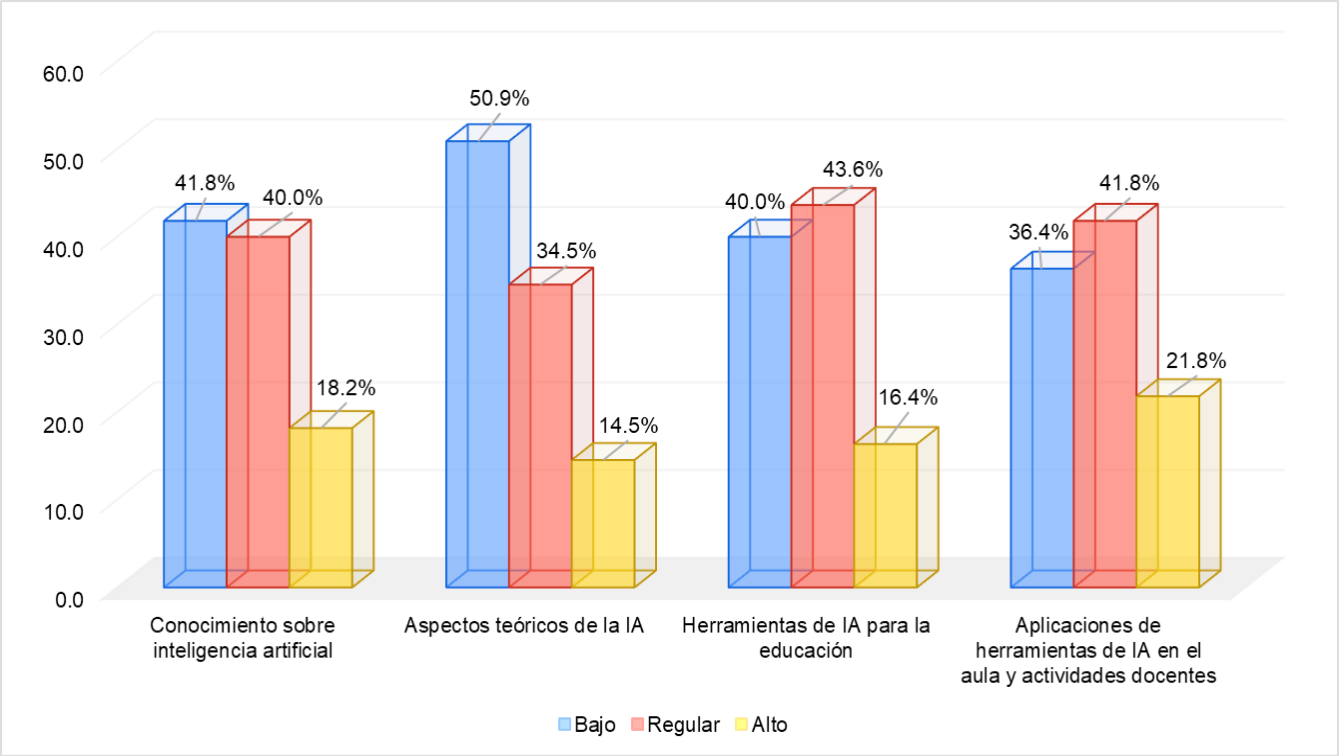

Figure 1. Percentage distribution of artificial intelligence knowledge and its dimensions
Source: Surveys.

The results of the items related to the AI knowledge dimension, presented in table 2, indicate that teachers demonstrated greater knowledge about the definition of AI and its ethical implications. However, they revealed a notable lack of knowledge about neural networks, their practical application, and the distinction between supervised and unsupervised learning in the field of AI.

Table 2. Responses to the items of the dimension of the theoretical aspects of artificial intelligence

Items	Correct answer	Incorrect answer
1. How would you define artificial intelligence?	45,5 %	54,5 %
2. What is the difference between supervised learning and unsupervised learning in artificial intelligence?	18,2 %	81,8 %
3. What are neural networks and how are they used in artificial intelligence?	14,5 %	85,5 %
4. What is reinforcement learning and how is it used in artificial intelligence?	21,8 %	78,2 %
5. What are some of the ethical and social challenges associated with artificial intelligence?	38,2 %	61,8 %

Source: Surveys.

The results of the items related to the AI tools for education dimension, presented in table 3, reveal that teachers possessed more excellent knowledge about the advantages of using AI tools in education, as well as about the use of educational chatbots. However, there needs to be more knowledge in areas such as natural language processing and learning analytics, as well as their application in education.

Table 3. Responses to the items of the dimension artificial intelligence tools for education

Items	Correct answer	Incorrect answer
6. What is natural language processing and how can it be used in education?	12,7 %	87,3 %
7. What are some of the artificial intelligence tools that can be used in education?	34,5 %	47,3 %
8. What is learning analytics and how can it be used in education?	21,8 %	78,2 %
9. What are educational chatbots and how can they be used in education?	40,0 %	60,0 %
10. What are some of the advantages of using artificial intelligence tools in education?	45,5 %	54,5 %

Source: Surveys.

The results of the items related to the dimension applications of AI tools in the classroom and teaching activities, detailed in Table 4, indicate that teachers were more knowledgeable about the ethical and social challenges associated with the use of AI in education, as well as strategies for using AI to develop technological skills among students. However, limitations were evident in terms of understanding how AI can enhance the teaching-learning process and optimize collaboration and teamwork in the classroom.

Table 4. Responses to the items of the dimension of AI tools applications in the classroom and teaching activities

Items	Correct answer	Incorrect answer
11. How can artificial intelligence be used to improve classroom teaching?	38,2 %	61,8 %
12. How can artificial intelligence be used to improve student assessment?	49,1 %	50,9 %
13. How can artificial intelligence be used to foster collaboration and teamwork in the classroom?	43,6 %	56,4 %
14. How can artificial intelligence be used to develop technological skills in students?	56,4 %	43,6 %
15. What ethical and social challenges should be taken into account when using artificial intelligence in education?	63,6 %	36,4 %

Source: Surveys.

Table 5 shows that the sociodemographic and occupational variables that were significantly associated with the level of AI knowledge among teachers were age and self-perception of digital competence ($p<0,05$). In that sense, it can be affirmed that younger teachers and those who considered that they had a high level of development of their digital competencies showed a higher knowledge about AI compared to older teachers and those with less favorable perceptions about their digital competencies.

Table 5. Association between the level of knowledge about artificial intelligence and sociodemographic and occupational variables

Sociodemographic and labor variables		Knowledge about AI			p-value (X^2)
		Under	Regular	High	
Gender	Male	13 (41,9 %)	13 (41,9 %)	5 (16,1 %)	p>0,05
	Female	10 (41,7 %)	9 (37,5 %)	5 (20,8 %)	
Age	Between 30 and 40 years old	2 (18,2 %)	6 (54,5 %)	3 (27,3 %)	p<0,05
	Between 41 and 50 years old	14 (43,7 %)	12 (37,5 %)	6 (18,8 %)	
	More than 50 years old	7 (58,3 %)	4 (33,3 %)	1 (8,3 %)	
Employment status	Hired	7 (36,8 %)	8 (42,1 %)	4 (21,1 %)	p>0,05
	Appointed	16 (44,4 %)	14 (38,9 %)	6 (16,7 %)	
Self-perception of digital competence	High	3 (33,3 %)	4 (44,4 %)	2 (22,2 %)	p<0,05
	Regular	14 (40,0 %)	14 (40,0 %)	7 (20,0 %)	
	Under	6 (54,5 %)	4 (36,4 %)	1 (9,1 %)	

Source: Surveys.

DISCUSSION

An interesting result in the present research shows that the level of knowledge about AI that characterized

the teachers was fair. This highlights the limitations that university teachers have on the management and implementation of AI in the educational context. When analyzed in detail, it was observed that teachers showed greater mastery in areas such as the definition of AI, the advantages of employing AI tools in education, and the ethical and social challenges linked to its application. On the other hand, teachers were found to have limitations with respect to understanding neural networks, natural language processing, and understanding how AI can enhance the teaching-learning process.

There is research to support our findings. For example, research in Sweden found that there was limited knowledge, fear, and skepticism on the part of teachers about AI in higher education.[23] Similarly, in France, they found that teachers were partially aware of the potential benefits of AI. However, there were ethical concerns associated with its use.[24] On the other hand, a study in Ecuador found that there were difficulties and a need for more knowledge during the process of integrating AI into university teaching due to the limited training of teachers in this field of knowledge.[25]

When associating the level of knowledge about AI and sociodemographic variables, it was found that there was a statistically significant association with the age of the teachers. This means that younger teachers showed higher AI knowledge compared to older teachers. This would be because younger teachers have grown up in an era where technology, including AI, has been more prominent in society and education.[26] They are likely to have been exposed to AI from a younger age, which provides them with a knowledge base early in their careers. In addition, younger teachers may have completed their academic training more recently, which means that they are more likely to have received formal AI education.[27]

Another finding indicates that the level of AI knowledge among teachers also showed a statistically significant association with their self-perceived digital competence ($p<0,05$). The above means that teachers who considered themselves to have a high level of development of their digital competencies showed higher knowledge about AI compared to teachers with less favorable perceptions about their digital competencies. This association may reflect the fact that those who feel more digitally competent not only have more vital technical skills but also a greater confidence and willingness to adapt to new tools and emerging technologies.[28] Being more familiar with the digital environment, they are likely to be more comfortable experimenting with AI and exploring its potential in the educational setting.[29]

The assessment of the level of knowledge about artificial intelligence (AI) in university teachers represents a crucial step towards understanding how this technology is being incorporated into the educational setting in the Peruvian context. The results of this research raise the urgent need for AI-focused training and professional development programs. As AI continues to transform education, teachers must be equipped with the knowledge and skills necessary to take full advantage of its potential.

Among the strengths of the present research is its contribution as one of the first to assess the level of AI knowledge in a sample of Peruvian university teachers. In addition, it highlights the use of a validated instrument that integrates subscales designed to measure knowledge, mastery of tools, and integration of AI in the teaching and learning process. This allows a more complete and nuanced understanding of teachers' perception of artificial intelligence in the educational context, providing valuable information for the formulation of training and professional development strategies in this area.

Finally, it is necessary to specify certain limitations that could influence the interpretation of the results. The sample, being small and specific to a single university, could restrict the generalization of the findings to other populations. In addition, the use of a self-administered instrument could have introduced social desirability biases, which may affect the accuracy of the responses. For future research, it is suggested to employ more extensive and more diverse samples, covering different contexts and profiles of university teachers, and to complement quantitative approaches with qualitative methods to obtain a more complete and detailed understanding of the variable studied.

CONCLUSIONS

The integration of AI in university education represents a remarkable turning point in the evolution of the educational process in higher education institutions. This technological advancement has revolutionized how educators design and deliver educational content, as well as how students access information and engage in learning. AI has pushed the boundaries of teaching and learning by providing innovative tools that allow for deeper personalization of the curriculum, adapting to the individual needs of each student. However, since the implementation of AI in university education is a relatively new phenomenon, not all teachers are familiar with its applications and potential, which poses additional challenges to its widespread adoption.

The findings allow us to conclude that a low level of knowledge about AI characterized Peruvian university teachers. This indicates that there is a significant gap in university teachers' knowledge of AI and its application in education, which could limit their ability to take full advantage of AI tools and applications in the educational environment and could affect the quality and effectiveness of teaching. On the other hand, it was found that teachers who were younger and who considered themselves to have a high level of development of their digital

competencies showed more excellent knowledge about AI compared to older teachers and those with less favorable perceptions about their digital competencies.

Therefore, it is recommended to implement specific training programs and professional development strategies focused on AI. These initiatives could include refresher courses, hands-on workshops, and continuous learning activities aimed at improving teachers' understanding and proficiency in the effective use of AI in the educational context. In addition, it is suggested to foster spaces for collaboration and socialization of good practices among teachers, as well as to promote the integration of AI in the curricula of educational institutions to ensure more complete and updated training in this field.

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FINANCING

The authors did not receive funding for the development of this research.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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