



La inteligencia artificial en la educación superior

Artificial intelligence in higher education

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Inteligencia artificial, educación, habilidades, investigación, estudiantes

Keywords:

Artificial intelligence, education, skills, research, students.

Resumen

Introducción: La educación es solo una de las muchas cosas que la inteligencia artificial (IA) puede cambiar. La inteligencia artificial (IA) ha emergido como una herramienta poderosa que está revolucionando la enseñanza y la educación en la era digital actual. Este artículo analizará los diferentes softwares en inteligencia artificial en la educación y cómo está cambiando la educación en todos los niveles. **Objetivo:** Examinaremos cómo la IA está cambiando la forma en que adquirimos conocimientos y habilidades, en el proceso enseñanza aprendizaje en el desarrollo de recursos interactivos. **Metodología:** La investigación ha examinado publicaciones sobre la Inteligencia Artificial aplicada en la educación entre 2013 y 2023 y ha utilizado una metodología de investigación descriptiva no experimental. Esta estrategia se basa en la realización de un análisis de la producción científica y su evolución a partir de una variedad de criterios establecidos. **Conclusión:** Podemos decir que la IA puede mejorar la educación al ofrecer nuevas formas de enseñanza personalizada y retroalimentación instantánea para todos los estudiantes. Sin embargo, para lograr una adopción efectiva de la IA en la educación, se deben superar algunos desafíos, como la falta de datos adecuados, la resistencia al cambio y la falta de interpretabilidad. Además, la IA tiene la capacidad de hacer que la educación sea más accesible para todos los estudiantes, incluidos aquellos con discapacidades y aquellos que no tienen acceso a recursos educativos de alta calidad.

Abstract

Introduction: Education is just one of the many things that artificial intelligence (AI) can change. Artificial intelligence (AI) has emerged as a powerful tool that is revolutionizing teaching and education in today's digital age. This article will analyze the different artificial intelligence software in education and how it is changing education at all levels. **Objective:** We will examine how AI is changing the way we acquire knowledge and skills, in the teaching-learning process in the development of interactive resources. **Methodology:** The research has examined publications on Artificial Intelligence applied in education between 2013 and 2023 and has used a non-experimental descriptive research methodology. This strategy is based on carrying out an analysis of scientific production and its evolution based on a variety of established criteria. **Conclusion:** We can say that AI can

improve education by offering new ways of personalized teaching and instant feedback for all students. However, to achieve effective adoption of AI in education, some challenges must be overcome, such as lack of adequate data, resistance to change, and lack of interpretability. Additionally, AI has the ability to make education more accessible for all students, including those with disabilities and those who do not have access to high-quality educational resources.

Introduction

The knowledge society requires changes in educational systems to prepare young people for the academic and work scenarios of the future. This is due to the digital transformation related to the fourth industrial revolution or technological revolution. The intelligent interconnection of various digital technologies, such as 3D printing, artificial intelligence and the Internet of Things, is a distinctive feature of this revolution. In this way, the paradigm of education 4.0 emerges, which seeks to avoid inequalities in social development and encourages self-learning through reflection in a training context supported by technology and its use to work on educational content.

In this line, in recent years, international organizations have been focusing on the importance of all educational agents becoming digitally literate so that they can implement technologies in their classrooms. Therefore, the UN includes a fourth objective related to equity and inclusion in the 2030 Agenda for Sustainable Development (2015). To improve the quality of teaching, this objective includes the use of technology and support for distance education and freely accessible educational resources (UNESCO, 2016). In the Beijing Consensus (2019) on Artificial Intelligence (AI) and Education (2015), participants highlighted the importance of integrating AI into the educational field to achieve an open and fair educational system. This is possible thanks to the flexibility offered by the AI tool, which facilitates the personalization of learning based on the consideration of the characteristics of the students.

However, Williams et al. (2019), in their study that proposed a specific plan for AI training with early childhood education students, highlighted that it is possible to start using AI from this early stage, as students can understand AI concepts and interact with the tool despite their young age. However, according to León and Viña (2017), although AI could alter the way a teacher teaches and how students learn, it is important to remember that the main goal should be meaningful learning. Teaching ethical aspects so that students take them into account in their designs is another challenge in teaching AI. Therefore, it is important for educational institutions to consider their educational practices and create adaptable teaching spaces that include the use of AI.

According to Gisbert and Esteve (2011), it is necessary to redesign educational methods so that university students learn to use digital literacy throughout the course. This will allow students to develop the skills, knowledge and attitudes necessary to use ICTs. However, Martín and Grudziecki (2015) point out that skills, attitudes and concepts would be relegated to the initial level of digital literacy.

Lack of equity and access to higher education are two major obstacles to the implementation of AI in higher education. Although AI can democratize access to education by offering large numbers of students online learning opportunities, there is a risk that only those with access to the right technology and resources can fully benefit from it. This could increase disparities in education between students from different areas, socioeconomic backgrounds, and technological skills.

It is therefore essential to ensure that all students have the opportunity to access and reap the benefits of AI when incorporating it into higher education. Ethics and privacy are other important issues when implementing AI in higher education.

The use of AI algorithms for analysis and decision-making, as well as mass data collection, raises concerns about the privacy and security of students' information. According to Professor Michael Sandel of Harvard Law School, AI raises three main ethical questions for society: privacy vs. surveillance, bias vs. discrimination, and arguably the deepest and most difficult philosophical question of the era: the role of human judgment.

The use of AI algorithms to assess and grade students may also raise ethical questions about the fairness and impartiality in assessing their academic performance. It is therefore critical to establish clear policies and regulations to protect the privacy and ethics of using AI in higher education and to promote critical and moral reflection on how technology affects the educational process. Furthermore, the incorporation of artificial intelligence in higher education presents multiple possibilities.

Personalization of learning is one of the most prominent opportunities. In fact, AI has the ability to adapt the teaching-learning process to the needs and preferences of each student, offering learning resources and activities tailored to their level of knowledge, learning style and pace of progress. This allows our students to have a more individualized and meaningful learning experience, which can improve their motivation and commitment to study.

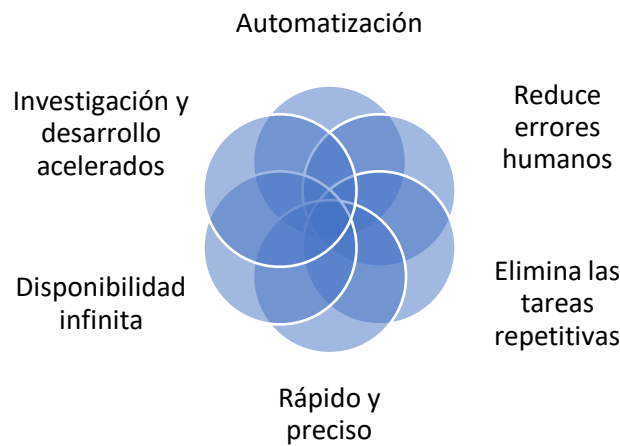
Artificial intelligence in higher education

Artificial intelligence is a field of science concerned with creating computers and machines that can reason, learn, and act in ways that would normally require human intelligence or that involve data whose scale exceeds what humans can analyze.

AI is a broad field that spans many different disciplines, including computer science, data analysis and statistics, hardware and software engineering, linguistics, neuroscience, and even philosophy and psychology.(Google, 2023)

Figure 1.



Benefits of AI



Fountain: (Google, 2023)

Table 1

Most popular programs or applications with artificial intelligence

Application/program	Description	Characteristics	Disadvantages
	It is one of the best AI tools for creating content, allowing writers to generate ideas, write texts and optimize workflow.	Facilitates interaction and understanding of the natural language Writing assistance Creation of intelligent chatbots	Lack of human interaction Possible biases and errors Time-limited information
	It is a conversational system, designed to merge traditional search and generation of contextual responses based on dialogue.	It is constantly connected to the network The information is constantly updated and responds to the reality of the moment.	It's still in development, so it may not be as reliable.(Pineda, 2023)






	<p>It is a tool of artificial intelligence to create images. With the ability to generate images from textual descriptions</p>	<p>Creating illustrations unique Generation of graphic material for marketing campaigns</p>	<p>The graphics quality is low for some tips Dall-e can create harmful images. (Shin Kan, 2023)</p>
	<p>Ability to transform textual descriptions into images, which is achieved thanks to advanced algorithms and machine learning techniques.</p>	<p>Potential to generate precise, detailed and high-resolution images It suits both professionals and amateurs, providing a fairly straightforward and accessible user experience.</p>	<p>The generated images are in the public domain Under quality control. (Keytrends, 2023)</p>
<p>Fireflies</p>	<p>Specially created for record and transcribe conversations, is a very useful tool for real-time conversations.</p>	<p>Easily integrates with popular applications like google meet, zoom and teams webex</p>	<p>Technology dependency Possible lack of accuracy in transcription Limitations in the free version. (Hassan, 2023)</p>
	<p>It is an online writing assistant with the mission of improving texts through artificial intelligence.</p>	<p>Ability to check grammar, spelling and punctuation In addition to checking for plagiarism Citation generator and essay review.</p>	<p>It can be invasive It consumes a lot of resources. (Sources, 2023)</p>

Table 1

Most popular programs or applications with artificial intelligence (continued)

Application/program	Description	Characteristics	Disadvantages
	It is an AI tool for musical separation and vocal removal	Very useful for extracting instrumental music from files Makes it easy to extract audio elements from any file	Cost: While lalal.ai offers a free package, paid packages can be expensive.(Saints , 2023)
	He specializes in large-scale numerical computing and machine learning.	Intuitive creation and visualization of models from scratch with tensorboard Pattern detection and emulation of human learning.	The resulting code was very long, unintuitive and difficult to understand.(Sota quira, 2020)

Fountain: (Dominguez, 2023)

Table 2

AI tools for students



Application/program	Description	Characteristics	Disadvantages
	Brainly is an AI tool that allows students to ask questions and get answers from other students and subject matter experts.	It has a free version and a pro version. It has its own keyboard to add formulas. You can ask questions in the area you want.	Advertising
	It is a voice recognition tool that allows you to transcribe up to 160 words per minute	Allows you to dictate in Spanish or English, interchangeably	Sometimes words appear out of context which can create very funny expressions.(Serrahima, 2023)

Table 2

AI Tools for Students (continued)

Application/program	Description	Characteristics	Disadvantages
	It is an AI tool that provides answers to questions in various areas, such as mathematics, science and technology.	They understand natural language Troubleshooting Data visualization Interactive calculations	Some answers may be too technical or complex It does not always provide a direct answer to the user's question. (Patel, 2023)
	It is an AI tool that helps you improve your reading comprehension and written expression.	Available to students anytime, anywhere they need it Understanding student written responses in many different ways. (Suarez, 2022)	Price
	It is an AI tool that helps you memorize information (especially vocabulary) in a fun and efficient way.	They combine entertaining content with scientifically proven methodologies to create an engaging and effective learning platform.	Availability due to high demand for use
	This language learning app uses AI to personalize the learning experience for each user.	It works through the self-taught learning process Level-based lessons to help them acquire vocabulary and improve their communication skills.	Learning exercises They can become repetitive. Does not offer advice for users by teachers or professionals in the area. (Perez, 2023)
	It is an AI tool that helps you learn any subject in a	Follows the interaction of students on the	

personalized and dynamic way. Computer from the movement of the cursor to the number of clicks, locating patterns programmed by neuropsychologists from the field of neuroscience.

Fountain: (Alvarado, 2023)

Figure 2

AI in higher education



Fountain:(Alvarado, 2023)

Methodology of the study

The research examined publications on Artificial Intelligence applied in education between 2013 and 2023 and used a non-experimental descriptive research methodology.

This strategy is based on an analysis of scientific production and its evolution based on a variety of established criteria (González et al., 2020). Quantitative and descriptive criteria include topics such as the field of knowledge where the publications are indexed, the year in which they are published, or the authorship. In turn, previous research has validated the usefulness and effectiveness of bibliometric studies.

Statistical data on artificial intelligence

Do you know when content is written by artificial intelligence?

Forbes Advisor asked consumers if they can distinguish between human-generated content and AI-created content.(Haan, 2023)

Figure 3

Content is written by artificial intelligence

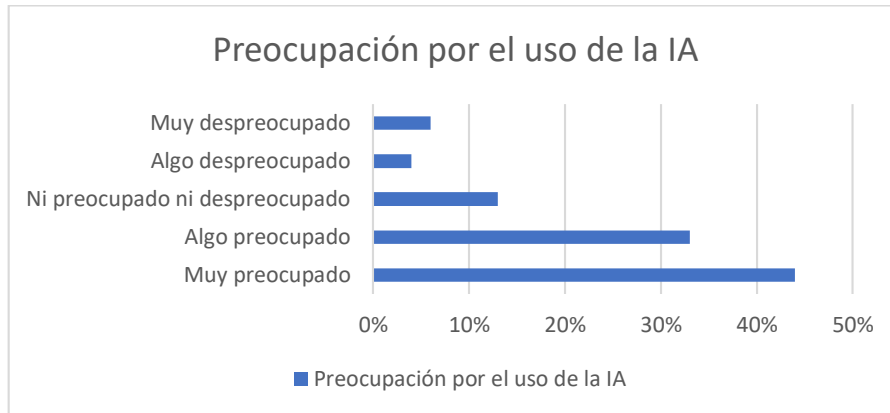


Fountain: (Haan, 2023)

- More than 40% say they want to use artificial intelligence to respond to text messages
- More than 40% would use artificial intelligence to obtain financial advice
- Most consumers would still trust a company that uses artificial intelligence.(Haan, 2023)

Figure 4

Level of concern about loss of human employment due to artificial intelligence



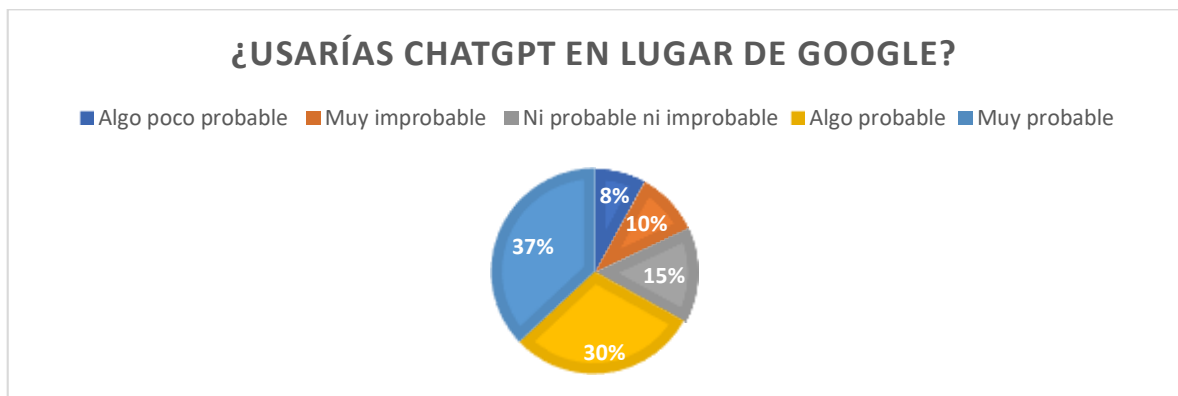
Fountain: (Haan, 2023)

The survey highlights significant concern among consumers regarding the potential impact of AI on employment. The majority of respondents (77%) are concerned that AI will lead to job loss in the next 12 months. Forty-four percent said they were very concerned, while 33% were somewhat concerned. Thirteen percent were neither concerned nor unconcerned, and a combined 10% were somewhat or very unconcerned.

These results suggest that as AI becomes more embedded across various industries, fear of job displacement is a major concern. Based on our survey findings, strategies such as reskilling programs, job transition support, and educational initiatives could play a role in addressing these concerns and helping workers adapt to the changing work landscape.(Haan, 2023)

Figure 5

Would you use ChatGPT instead of Google?

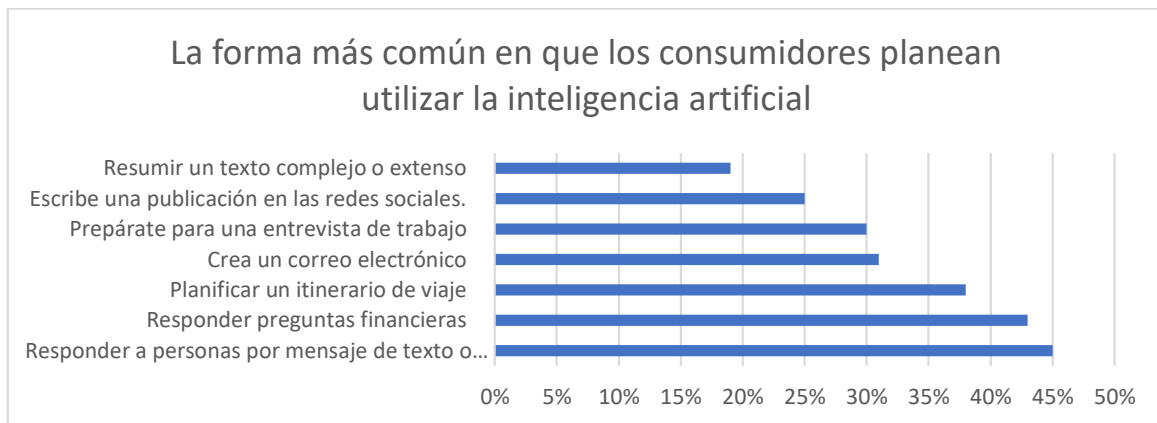


Fountain: (Haan, 2023)

This trend highlights the potential for AI language models to revolutionize the way people search for and interact with information online. It also suggests that businesses may want to consider investing in AI-powered solutions to provide a more personalized and efficient user experience.(Haan, 2023)

Figure 6

The most common way consumers plan to use artificial intelligence



Fountain: (Haan, 2023)

These discoveries demonstrate the wide range of applications of AI and its ability to make a positive difference in multiple areas of our lives. As AI evolves, we are set to see new ways of tackling complex issues, as well as more efficient ways of doing everyday things.(Haan, 2023)

Conclusions

- Techniques such as machine learning, natural language processing, data mining, multi-agent systems, neural networks, fuzzy logic, and Bayesian systems have helped advance AI research in education. These strategies are used for personalized learning, automated assessment, intelligent tutoring, and early detection of learning disabilities.
- One of the most important areas of AI research in education is learning personalization, which adapts learning content to the individual needs and characteristics of each student. Automated assessment is also a useful technique that can save time and make assessments more objective.
- Generative AI has many applications in education, including creating educational content, building educational chatbots, helping with essay writing, and tailoring learning to the needs of each student.
- We can say that AI can improve education by offering new forms of personalized teaching and instant feedback for all students. However, to achieve effective

adoption of AI in education, some challenges need to be overcome, such as lack of adequate data, resistance to change, and lack of interpretability. Furthermore, AI has the ability to make education more accessible to all students, including those with disabilities and those who do not have access to high-quality educational resources.

- AI cannot replace human teachers; instead, it can serve as a useful tool to enhance the teaching process and improve student learning.

Conflict of interest

The authors declare that they have no conflict of interest.

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