

## TRANSFORMATIONS IN HIGHER EDUCATION: REDEFINING THE TEACHING ROLE IN THE FACE OF THE EMERGENCE OF GENERATIVE ARTIFICIAL INTELLIGENCE

### *TRANSFORMACIONES EN LA EDUCACIÓN SUPERIOR: REDEFINICIÓN DEL PAPEL DEL PROFESORADO ANTE LA APARICIÓN DE LA INTELIGENCIA ARTIFICIAL GENERATIVA*

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**ABSTRACT:** Generative artificial intelligence (GenAI) is an emerging technology that has significantly transformed the interaction between humans and machines. GenAI has the capacity to create content such as text, images, and videos, and it even uses human language. In the educational field, tools such as ChatGPT stand out for their ability to maintain coherent conversations, simulating human interactions. This study aims to offer a comprehensive and critical view of the convergence of GenAI and higher education. To this end, a systematic literature review has been carried out following the PRISMA protocol through the WoS and Dialnet databases. The analysis focuses on understanding the role of GenAI in this context, identifying both the opportunities and challenges associated with its implementation. The results of the study highlight key challenge areas, promising trends, and future prospects. Likewise, the effects of GenAI on students and teachers are analyzed, paying special attention to the ethical and social implications that accompany its integration into higher education.

**Keywords:** artificial intelligence; higher education; pedagogical use; ChatGPT; educational tool; pedagogical innovation.

**RESUMEN:** La inteligencia artificial generativa (GenAI) es una tecnología emergente que ha transformado significativamente la interacción entre humanos y máquinas. La GenAI tiene la capacidad de crear contenidos como textos, imágenes y vídeos, e incluso utiliza el lenguaje humano. En el ámbito educativo, herramientas como ChatGPT destacan por su capacidad para mantener conversaciones coherentes, simulando interacciones humanas. Este estudio tiene como objetivo ofrecer una visión global y crítica de la convergencia de la GenAI y la educación.

superior. Para ello, se ha llevado a cabo una revisión sistemática de la literatura siguiendo el protocolo PRISMA a través de las bases de datos WoS y Dialnet. El análisis se centra en comprender el papel de la GenAI en este contexto, identificando tanto las oportunidades como los retos asociados a su implementación. Los resultados del estudio destacan las áreas clave de desafío, las tendencias prometedoras y las perspectivas de futuro. Asimismo, se analizan los efectos de la GenAI en los estudiantes y profesores, prestando especial atención a las implicaciones éticas y sociales que acompañan a su integración en la educación superior.

*Palabras clave:* inteligencia artificial; educación superior; uso pedagógico; ChatGPT; herramienta educativa; innovación pedagógica.

## 1. INTRODUCTION ABOUT AI INTEGRATION

### 1.1. DEFINITION OF ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is a complex concept without a single universally accepted definition. The European Commission defines it as software (and possibly hardware) systems designed by humans that, given a complex objective, act in the physical or digital dimension by perceiving their environment, interpreting data, processing information, and deciding on the best actions to achieve predetermined goals [1]. For Bryson [2], AI refers to «artifacts used to detect contexts or carry out actions in response to those contexts that have already been detected» (pp. 127-159).

Other definitions describe AI as «the ability of a system to correctly interpret external data, learn from that data, and use that learning to achieve specific goals and tasks through flexible adaptation» [3] or as «any technique that enables computers to mimic human behavior» [4]. Ultimately, AI encompasses systems capable of performing tasks that typically require human intelligence, such as learning, reasoning, and perception.

### 1.2. THE ROLE OF THE TEACHER SINCE THE EMERGENCE OF AI

The arrival of generative AI tools like ChatGPT has significantly transformed the educator's role in higher education. Authors such as [5] posit that teachers now act more as facilitators of learning rather than as the primary source of knowledge.

- *From Transmitter to Facilitator and Mentor:* With AI, teachers can guide students to explore and understand information independently, fostering a more student-centered approach [6]. This allows educators to focus on developing critical skills like critical thinking and problem-solving.
- *Designer of Personalized Learning Experiences:* AI enables the creation of personalized and adaptive learning experiences. Teachers become designers of these experiences, using tools like ChatGPT to develop interactive activities tailored to individual student needs [7].

- *Continuous Training and Professional Development*: Effective integration requires ongoing teacher training. Educators need to learn to use these tools pedagogically, interpret the data they generate, and address associated ethical challenges [8].
- *Assessment and Feedback*: ChatGPT and similar tools transform assessment by enabling more timely and precise automated feedback, allowing teachers to dedicate more time to continuous and formative evaluation rather than traditional summative exams [9].

In summary, the teacher's role evolves towards educational guidance, pedagogical design, and ethical mediation in the use of AI, leveraging technology to enhance the teaching-learning process without replacing the essential human element.

### 1.3. GENERATIVE AI IN HIGHER EDUCATION

Generative Artificial Intelligence (GAI), a subfield of AI focused on autonomously creating content (text, images, etc.), has emerged as a disruptive force in higher education.

- *Potential for Transformation*: GAI has the potential to revolutionize teaching, learning, and research by automating content generation, personalizing instruction, and providing real-time data analysis [10].
- *Key Applications in the Academic Context*:
  1. *Personalized Learning*: Adaptive systems can tailor educational resources and pathways to individual student needs and learning styles.
  2. *Automated Tutoring and 24/7 Support*: Tools like ChatGPT can offer instant assistance, answer questions, and provide explanations outside of classroom hours.
  3. *Content and Resource Creation*: AI can help generate educational materials, draft summaries, or create practice exercises, saving educators time.
  4. *Data Analysis and Research Support*: GAI can assist in literature reviews, data processing, hypothesis generation, and identifying at-risk students through learning analytics [11, 12].
- *Inherent Challenges*: Despite its potential, GAI integration poses significant challenges:
  1. *Academic Integrity*: Risks of plagiarism, unauthorized use in assessments, and questions about authorship [13].
  2. *Information Reliability*: Potential for generating inaccurate or biased information («hallucinations»).
  3. *Ethical and Privacy Issues*: Concerns regarding data privacy, algorithmic bias, and equitable access to technology.
  4. *Need for New Competencies*: Highlights the urgent need to develop AI literacy among both students and teachers.

#### 1.4. AI APPLICATIONS AND TRENDS IN EDUCATION

The application of AI in education (AIEd) is based on a wide range of techniques that go beyond GAI:

Table 1. Core technique underlying AI applications

| Technique                                               | Description                                                          | Application                                                          |
|---------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------|
| <i>Learning Analytics &amp; Educational Data Mining</i> | Analysis of large student datasets to identify patterns and trends.  | Design of personalized curricula and provision of detailed feedback. |
| <i>Multi-Agent Systems</i>                              | Creation of intelligent tutoring systems that interact in real-time. | Personalized and adaptive learning experiences.                      |
| <i>Neural Networks</i>                                  | Used for classification, data analysis, and pattern recognition.     | Learning pattern identification, voice/text recognition systems.     |
| <i>Fuzzy Logic</i>                                      | Modeling of uncertainty and creation of adaptive systems.            | Development of adaptive and personalized assessment systems.         |
| <i>Bayesian Systems</i>                                 | Decision-making and uncertainty modeling.                            | Adaptive assessment systems.                                         |

*Source:* Adapted from Jimeno (2024).

## 2. CURRENT AND EMERGING TRENDS

- *Conversational AI and Advanced Chatbots:* Evolution towards more specialized and contextual conversational agents, moving beyond general-purpose language models like ChatGPT to provide support and functionalities tailored to specific domains.
- *Human Capability Augmentation with AI:* Development of tools designed to enhance and complement human capabilities across various fields, automating routine tasks (such as data analysis or content generation) so professionals can focus on higher-value activities like strategic decision-making, creativity, and complex interaction.
- *Predictive Analytics:* Increasing application of AI algorithms to analyze patterns in large datasets, enabling the prediction of outcomes, behaviors, or needs, which facilitates proactive intervention and the personalization of services or products.
- *Ethics and Regulation:* Growing focus on the development of ethical frameworks, responsible use guidelines, and regulatory frameworks to ensure fairness, transparency, privacy, and safety in the design and deployment of AI systems, mitigating risks such as algorithmic bias.
- *AI Literacy as a Core Competency:* Recognition of the need to integrate skills for understanding, interacting with, and critically evaluating AI into training programs and professional development, preparing society for an environment increasingly mediated by this technology.

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