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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON ACCOUNTING EDUCATION

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Abstract:

This study conducts a bibliometric and content analysis of relevant articles indexed in the Web of Science database, with the objective of examining the effects of Artificial Intelligence (AI) on accounting education (AE), alongside the challenges and opportunities associated with its integration into educational and research activities. The findings indicate, on the one hand, a growing scholarly interest in recent years in exploring the impact of AI on AE, and, on the other hand, a wide range of challenges and opportunities arising from the adoption of AI-based tools in this field. By offering a comprehensive and up-to-date synthesis of both the positive and negative effects observed during the years of AI application in AE, this study may serve as a foundation for developing strategies within higher education institutions (HEIs) – particularly in faculties responsible for training future accounting professionals – to promote the ethical and effective use of AI.

Key words: *Artificial Intelligence; accounting education; accounting profession; bibliometric analysis; content analysis*

1. Introduction

The global integration of Artificial Intelligence (AI) into education and other activities traditionally reserved for humans is fundamentally reshaping professional services. The accounting profession is thus undergoing one of the most significant transformations. AI technologies are automating routine tasks in core disciplines such as financial reporting, auditing, taxation, control and audit. These transformations call a profound reassessment of the skills required of future accounting professionals (Nusa *et al.*, 2024; Ghatrifi *et al.*, 2023; Qasim & Kharbat, 2020). In order to give students the chance to get ready for the use of cutting-edge technologies that they will come across more and more in the workplace in the future, curriculum disciplines will need to modify their content by incorporating particular AI concepts. Teachers will also need to incorporate new teaching strategies, such as those based on the use of AI. Holmes & Douglass (2021) found that these new skills are valued more by accounting professionals than by teachers.

In these conditions, the importance of accounting education research demands that its be established as a constant priority. Although this area currently occupies a less prominent status compared to other domains within accounting research (Sangster *et al.*,

2015), its potential impact on professional practice is substantial (Tharapos & Marriott, 2020). Consequently, it ought to serve as a important source of research and development essential for enabling universities to produce competent graduates. These graduates must be adequately prepared to navigate and practice the accounting profession within the increasingly complex, interconnected, and rapidly evolving contemporary landscape (Tharapos *et al.*, 2019).

The current body of literature concerning the impact of AI on AE reveals several critical research gaps that impede the effective design and implementation of curriculum reform. Most importantly, there is still a lack of empirical evidence supporting the effectiveness of curricula. Few studies have thoroughly evaluated which particular teaching strategies or structural changes best develop the skills necessary for future accounting professionals, despite the fact that many support the inclusion of AI-related content (Tandiono, 2023; Moran, 2025; Wale-Fadairo & Ige, 2025). This deficiency is exacerbated by an insufficient analytical focus on competency alignment, where limited research directly connects proposed AI-driven pedagogical approaches to the actual, evolving skills demanded by the profession, thereby restricting the ability to ascertain the true efficacy of educational inputs (Zhang *et al.*, 2020; Moran, 2025; Imjai *et al.*, 2025). A persistent need exists for deeper investigation into the ethical implications of AI within accounting practice and how these should be integrated into AE curricula. Furthermore, research must account for regional disparities in AI adoption and the institutional complexities of reform, including the critical issues of faculty preparedness, resistance to change, and the resource implications of technological adoption (Hasan, 2022; Shevchuk & Radelytskyy, 2024). Finally, the knowledge base is hindered by a severe limitation in real-world data, lacking comprehensive case studies that document the outcomes of AI implementation in specific academic fields, and an absence of longitudinal data necessary to track the long-term career success and skill utilization of graduates trained under these new models (Hasan, 2022; Wale-Fadairo & Ige, 2025). Addressing these gaps is essential for moving beyond theoretical proposals toward evidence-based strategic planning in AE.

The study of the impact of AI on AE is timly and highly significant given the exponential growth and widespread practical deployment of generative AI tools over the last two years. This acceleration turns curriculum adaptation from a future planning exercise into an urgent mandate. A prompt academic response is necessary, particularly in light of the recent development of generative AI. HEIs must swiftly go beyond theoretical debate to establish precise operational guidelines and ethical standards for teaching, learning, and assessment due to the quick uptake of these tools by professionals and students. It is important because it addresses the increasing gap between the skills required in AI-enabled accounting workplaces and the competencies that are currently prioritized in academic programs.

This study provides a more comprehensive, dual perspective by highlighting both the positive effects (e.g., enhanced personalized learning, efficiency) and the negative effects (e.g., plagiarism risk, curriculum inertia), which allows for a balanced analysis of opportunities versus challenges. The paper addresses the institutional dimension – the required changes in university policies, faculty roles, and assessment methods – which previous professional-focused studies often overlooked.

The paper is structured as follows: first, we present the the literature review on artificial intelligence and accounting education. The methodology is covered in the section that follows. The results are presented in the fourth section, which is followed by discussions. The study ends with the conclusions.

2. Literature review

2.1. Historical development of AI and foundational definitions

Over time, AI has been defined by leading scholars in the field, all referring to the ability of machines to perform tasks normally requiring human intelligence. Beyond the definitions proposed by AI pioneers Marvin Minsky and John McCarthy — who established the first research laboratory in this domain — and those provided by subsequent researchers, it is also relevant to consider the definitions offered by two American companies heavily engaged in AI research and development, as well as the one adopted by the most prominent English dictionary. Table 1 presents the most significant definitions of AI.

Table 1. Definitions of Artificial Intelligence

Author(s) and date	*Definition*
Minsky (1956) *(*Toosi *et al., 2021)*	The science of making machines do things that would require intelligence if done by men
McCarthy (1956, 2007) *(*Toosi *et al.,* 2021*)*	Machine's ability to mimic human cognitive functions, including perception, reasoning, learning, and problem-solving
Kaplan & Haenlein, 2019	A system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation.
Dwivedi *et al.,* 2019	The increasing ability of machines to perform specific roles and tasks currently performed by humans in the workplace and in society at large.
Demlehner & Laumer, 2020	A computer system having the ability to percept, learn, judge, or plan without being explicitly programmed to follow predetermined rules or action sequences throughout the whole process
Makarius *et al.,* 2020	A system's capability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaption
Mikalef & Gupta, 2021	The ability of a system to identify, interpret, make inferences, and learn from data to achieve predetermined organizational and societal goals.
IBM **Strayker & Kavakoglu, 2024**	A technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy.
McKinsey & Company, 2024	A machine's ability to perform some cognitive functions we usually associate with human minds.
Oxford English Dictionary, 2025	The capacity of computers or other machines to exhibit or simulate intelligent behaviour; the field of study concerned with this. In later use also: software used to perform tasks or produce output previously thought to require human intelligence, esp. by using machine learning to extrapolate from large collections of data.

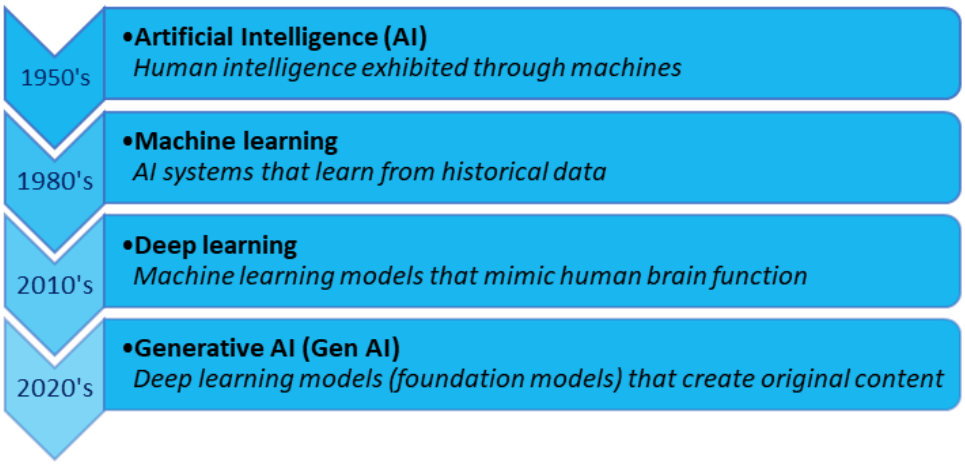
(Source: Own elaboration)

Enholm *et al.* (2022) note that there are two ways in which AI is defined. The first defines it as a tool that solves a specific task that would be impossible or time-consuming for a human (Minsky, 1956; Dwivedi *et al.*, 2019; Demlehner & Laumer, 2020; Makarius *et al.*, 2020). The second group of definitions considers AI as a system that imitates human intelligence and cognitive processes, such as interpretation, inference, and learning (Kaplan & Haenlein, 2019; Mikalef & Gupta, 2021; IBM; McKinsey & Company).

There are different opinions about the time of the emergence of AI. Haenlein & Kaplan (2019) believe that the idea of an intelligent machine appeared in science fiction literature, in Isaac Asimov's short story I, published in 1942 in the volume I, Robot. Piccinini (2004) considers that McCulloch and Pitts's work "A Logical Calculus of the Ideas Immanent in Nervous Activity", published in 1943, was the first step towards implementing AI. However, the one who asked himself concrete questions about the intelligence of some machines was the mathematician Alan Turing. In 1950, he published the article "Computing Machinery and Intelligence", in which he described how to create intelligent machines and, in particular, how to test their intelligence. In fact, the Turing test is still applied today. The concept "artificial intelligence" officially appeared six years later, when, in 1956, Marvin Minsky and John McCarthy (a computer scientist from Stanford) hosted the Dartmouth Summer Research Project on Artificial Intelligence, at Dartmouth College in New Hampshire (Toosi *et al.*, 2021).

Although AI was established as an academic discipline in the 1950s, it received relatively limited attention for over half a century. However, while AI has developed at different rates, over the past 70 years, nested and derivative concepts have emerged in the field, as can be seen in Figure 1.

Figure 1. Stages in the evolution of AI



(Source: Strayker, C., Kavakoglu, E. (2024) What is artificial intelligence (AI)? https://www.ibm.com/cloud/learn/what-is-artificial-intelligence)

The evolution of AI would not have been possible without the significant influence of other fields such as: cybernetics, mathematics, linguistics, computer science, philosophy, psychology, neuroscience, economics, statistics, etc. (Toosi *et al.*, 2021), to which AI owes

its current level of development. In recent years, AI has evolved at an accelerated pace, with many applications already being developed that influence our daily lives.

2.2. AI's impact on accounting education and professional competencies

Especially in the last two years, due to the development of increasingly powerful AI-based tools, it has begun to establish itself in the business environment, as well as in academic and public debates (Haenlein & Kaplan, 2019). In this context, the effect of AI on AE and on accounting profession is becoming increasingly significant, and universities and professional organizations of accountants cannot remain indifferent.

Accounting education is the process of acquiring knowledge and skills for the practical application of accounting principles and procedures. To gain the status of a professional accountant (e.g., financial auditor, certified public accountant), this preparatory process has distinct stages. Initially, it occurs within universities. Subsequently, training continues through professional organizations. This professional segment includes several steps: preparatory courses for initial access to an internship; training courses specifically for interns; and continuing professional development.

The integration of AI into accounting practice demands that HEIs adapt their programs to equip graduates with both technical and analytical skills relevant for the new era of the accounting profession (Shevchuk & Radelytskyy, 2024; Tandiono, 2023; Nusa *et al.*, 2024; Moran, 2025).

Recent research highlights that AI enhances efficiency, transparency, and accuracy in accounting processes, shifting the role of professionals from routine tasks to functions involving data analysis, critical thinking, and decision-making (Shevchuk & Radelytskyy, 2024; Han *et al.*, 2023; Hasan, 2022). As a result, accounting curricula must move beyond traditional content to incorporate AI concepts, data analytics and machine learning, ensuring alignment with contemporary industry requirements (Qasim & Kharbat, 2020; Tandiono, 2023; Wale-Fadairo & Ige, 2025; Moran, 2025).

All these transformations requires a deep understanding of AI and its implications for the accounting profession and education (Lee *et al.*, 2023). AI is also changing perspectives on the organizational behavior of accounting professionals, requiring adjustments to competency requirements and a better understanding of the application of professional ethics (Jackson *et al.*, 2022).

The skillset required of future accountants is more complex. Some authors appreciate that, for accounting students, technical proficiencies (data management and programming fundamentals) and analytical abilities (data analysis, statistical modeling and predictive analytics) are essential (Holmes & Douglass, 2021; Moran, 2025). Other authors think that proficiency with AI-specific accounting software and understanding of AI and machine learning concepts are also required (Qasim & Kharbat, 2020; Zhang *et al.*, 2020). In the same time, the students must develop strong interpretive and critical skills. This involves the ability to critically evaluate AI outputs, apply professional skepticism and interpret complex data for decision-making (Imjai *et al.*, 2025; Tandiono, 2023). Furthermore, soft skills (communication, adaptability, business acumen, ethical awareness, and critical thinking) are increasingly emphasized. These skills support the

accountant's evolving advisory and strategic roles alongside AI (Moran, 2025; Holmes & Douglass, 2021; Wale-Fadairo & Ige, 2025).

The transition to the AI era in AE is not without challenges. Academics preparedness, resistance to change, and the complexity of curriculum redesign are significant barriers, compounded by the need for ongoing professional development and collaboration between academia, industry, and regulatory bodies (Shevchuk & Radelytskyy, 2024; Wale-Fadairo & Ige, 2025). There is a growing gap in skills: while accountants care more about skills like data management, analytics, and using AI tools teachers might not focus on these things (Holmes & Douglass, 2021; Nusa *et al.,* 2024; Moran, 2025).

The need for higher education institutions to adapt to the evolution of the labor market determined by technological changes, economic uncertainty, demographic changes and the transition to "green" requires an effort to think and find solutions to offer study programs adapted to the skills needed by future professionals in various fields of activity. Empirical studies and case-based interventions show that AI-driven curricula and tools (e.g., ChatGPT, AI-based case studies) can significantly improve students' technical, analytical, and problem-solving skills (Imjai *et al.*, 2025; Tandiono, 2023; Wale-Fadairo & Ige, 2025).

The Future of Jobs Report (2025) brings together the perspectives of over 1,000 leading global employers – collectively representing over 14 million workers across 22 industry clusters and 55 economies around the world. One of the findings of the study on which this report is based is that "*half of employers plan to reorient their business in response to AI, two-thirds plan to hire talent with specific AI skills, while 40% anticipate reducing their workforce where AI can automate tasks*." (Future of Jobs Report, 2025, p.6). Furthermore, there are opinions that argue that generative AI could enable less specialized employees to perform a wider range of "specialized" tasks such as accountants, nurses, and even teachers (Author, 2024).

2.3. Regulatory and institutional responses to AI in higher education

The integration of AI into higher education environments has generated a critical need for structured governance and ethical frameworks. Policymakers from the national and international level, universities and other organizations are currently focused on developing frameworks to responsibly manage both the opportunities and the inherent risks associated with AI adoption in academia (Mahrishi *et al.*, 2024).

The discussion on the impact of global policies and regulatory frameworks on AI in HEIs is gaining significant scholarly momentum. A large consensus exists among global organizations and the academic community regarding the necessity of a global framework for AI. At the institutional level, policy development is actively addressing areas such as academic integrity, data governance, and the responsible use of generative AI tools (McDonald *et al.*, 2025). The variance in national and institutional policies highlights the need for continued study concerning the challenges faced and effective mitigation strategies during the adoption of AI in education (Drach *et al.*, 2023).

Dabis & Csáki (2024) identified a consensus regarding several ethical tenets, including, but not limited to, accountability, transparency, inclusiveness, and human oversight. These principles are intended to guide the responsible introduction and use of AI systems in educational settings.

Recent literature underscores that AI policy frameworks for HEIs are best structured around a tripartite model: pedagogical, governance, and operational (Chan, 2023; Alli *et al.*, 2025). The use of artificial intelligence to improve teaching and learning outcomes is central to the pedagogical dimension. This involves using AI for tasks such as providing individualized feedback, facilitating personalized learning, and promoting academic integrity in the digital age. Concerns about accountability, security, and privacy are addressed by the governance dimension. If HEIs adopt an AI framework for education, the established rules will guarantee the ethical use of AI technology, define roles, and protect data security and privacy for effective governance.The operational dimension addresses matters concerning infrastructure and training. AI support in HEIs requires significant and ongoing investments in infrastructure, staff training, and strategic resource allocation to power AI-based processes for the long term. Chan (2023, p. 22) stated that adopting a framework covering these three dimensions, “educational institutions can align actions with their policy, ensuring responsible and ethical AI usage while maximizing potential benefits.”

In the context of the unprecedented emergence and development of AI in the last three years, the European University Association, which represents approximately 900 universities from 48 countries, issued, in 2023, guidelines on the responsible use of artificial intelligence tools in higher education (European University Association, 2023). However, if some prestigious universities (Stanford, Erasmus University of Rotterdam and universities that are part of the Russell Group) have adopted normative provisions regarding the use of generative AI by members of the academic community (CARFIA, 2024), the use of generative AI is only regulated within a small number of universities. The adopted normes establish the general principles of the use of AI in the teaching and research process, with recommendations for teachers and students, these having different degrees of detail from one university to another. At the same time, there are large differences in the resources made available to teachers and students.

2.4. Emerging challenges, gaps, and future research needs

In recent years, the number of studies targeting the use of AI in education has increased significantly. However, research on the use of AI in AE remains fragmented. In general, there is a lack of empirical studies evaluating the effectiveness of AI-based teaching methods, especially in diverse educational and cultural settings (Tandiono, 2023; Qasim & Kharbat, 2020). There are still no studies identifying the determinants of successful adoption of AI. Also, due to the relatively timid and very recent introduction of AI-based teaching and learning tools, the long-term impact on student competencies or the relationship between the integration of AI and the performance of the entities where graduates will work cannot yet be determined. (Hasan, 2022) The literature highlights an insufficient exploration of ethical implications and the need for interdisciplinary approaches (Luthfiani, 2024; Holmes & Douglass, 2021).

Some authors (Tandiono, 2023; Hasan, 2022) consider it difficult to redesign the curriculum in order to update the content to suit the current developments in AI and different industries.

Fachrurrozie *et al.* (2025) address the issue of access and equity in the use of AI and find that there are significant digital gaps between countries, institutions, teachers and students both in terms of access to AI resources and the skills and knowledge possessed by those who should use these resources. The lack of training and experience in the use of AI tools is also noted by Wale-Fadairo & Ige (2025).

Ballantine et al. (2024) suggest that the adoption of AI in teaching and learning practices can bring the human dimension of accounting back into the discussion. The issue of moving beyond technical, managerial and financial aspects in accounting education and moving to broader social and critical perspectives can be addressed. Teachers play a fundamental role in recognizing the nature of the threats and challenges associated with AI. They are the ones who can capitalize on the opportunities available in ways that bring critical attitudes to the fore.

Taking all this into account, we believe that there are several research themes related to the impact of AI on education, in general, and on accounting education, in particular. Thus, curricula need to be evaluated in order to develop them and to enable the use of innovative teaching models enhanced with AI. A related theme could be the investigation of strategies for training teachers and students in the use of AI tools. Over time, as AI begins to be used extensively in education, case studies, longitudinal and cross-cultural studies on the successes and failures in AI implementation will become important. These studies' findings can guide the development of new AI-related regulations and procedures. To the same end, studies can be conducted to examine the ethical, legal and social implications of AI in accounting education.

3. Methodology

Our bibliometric assessment provides a descriptive bibliometric and content analysis approach to systematically map the current research landscape concerning the impact of AI on AE.

The purpose of the research is to analyze current concerns regarding the impact of AI on AE and to identify the main challenges and opportunities generated by the use of AI in the teaching and research process in accounting higher education. In this regard, we analyzed the publications from Web of Science Core Collection database by performing an advanced search for the keywords "accounting education" and "artificial intelligence" in the field *Topic*, which allows the identification of words/phrases to be searched for in the title, abstract, and authors' keywords in all types of articles and without time restrictions. The search string was (TS=(Artificial Intelligence)) AND TS=(accounting education). The results were refined by the following research areas: Education Educational Research and Business Economics and, after that, by the the following Web of Science Categories: Computer Science Artificial Intelligence, Computer Science Interdisciplinary Applications, Education Educational Research, Education Scientific Disciplines, Business Finance,

Management, Business, Economics. .The inclusion of these categories and research areas in the process of refining the search is based on the direct and significant application of AI in education and business, such as in developing educational tools and improving business productivity. We appreciate that Computer Science is an very important category for AI research because it includes the development of AI algorithms, models, and frameworks. Education is another essention category. The application of AI to improve teaching and learning outcomes is the main focus of research in this field. Inteligent tutoring programs, adaptive learnig environments, and technologies that customize students' educational experience are examples of how AI is being used in education. Business, Economics, Finance and Management are considered important search categories for our research because accounting is an applied discipline deeply embedded within the broader context of business and finance. Searching in these categories ensures that the research captures not only the technical aspects of AI but also its strategic, organizational and economic implications, thereby providing a holistic view of the skills needed for the future accounting professional. The Boolean operator AND in web of Science serves to narrow down the search, ensuring that both concepts or terms are present in every returned result. We chose this solution to best meet the goal of our research. Including too many research areas and categories in the search would have diverted from our objective.

This resulted in a number of 432 articles that we initially analyzed from the perspective of the keywords, the connection between them, as well as from the point of view of relevance to the research topic and the evolution over time of the research targeted by this study. For the first part of the analysis, we used the VOSviewer 1.6.20 program, which allows the analysis and visualization of the relationships between the different characterization elements of the articles (authors, keywords, journals, institutions, countries) through bibliometric maps. In this study, we first performed an analysis of the co-occurrence of keywords, followed by an analysis of the intensity of the link between them and the way of grouping into clusters.

The unit of analysis in VOSviewer was keywords, witch have been analyzed for co-occurrence. In a co-occurrence map, the weight of an item (node) is directly related to its frequency. The size of the node in the map is proportional to its numner of occurences (or total link strenght). A larger node indicates a more frequently discussed item in the literature. The intensity of the co-occurrence relationship has been meassured by the total link strength between two elements (i.e. the total number of documents in which these two elements appear simultaneously, weighted by the chosen counting method). We used the full counting method because is simple and suitable for small datasets. The threshold was minimum number of occurrences, representing the minimum frequency a keyword appear in the dataset to be included in the analysis. To effectively highlight distinct research themes or subdomains, we chose the clustering algorithm (the Louvain method). This allowed us to group nodes into clusters, which represent a set of elements more strongly correlated with each other than with elements outside the set.

Subsequently, the articles were the subject of a content analysis. For this, we proceeded to refine the selection criteria used in the first stage, by restricting the selection to the Document Types: Article, Review Article, Proceeding Paper, Early Access, Editorial

Material, Publication Years: 2015-2025, and Languages: English. The Quick Filter: Open Access was applied to be sure that articles can be downloaded to be read This resulted in a number of 120 works. We downloaded the articles and read the abstracts. Following the initial comprehensive search, a total of 120 articles were retrieved and subjected to a preliminary screening based on their abstract. This phase was very important for assessing the applicability of the material against the defined scope of our research questions (Q1 and Q2). The screening process focused on identifying material explicitly relevant to the influences, challenges, and opportunities of AI within the context of AE. To be considered relevant for our research questions, the abstract had to clearly indicate a focus on AI's impact, role, or application (e.g., in teaching, learnig, administration, or policy) specifically within the domain of AE. Articles were excluded if the abstract indicated: a fosus on AI on the secondary school; a purely technical discussion of AI algorithms without implication for educational practices; or a focus on AI outside the scope of education.

Ninety-three of the 120 abstracts that were retrieved were excluded because their abstracts either failed to meet the inclusion criteria or satisfied one of the exclusion criteria, indicationg that they would not provide significant information pertinent to answering Q1 and Q2. Consequently, only 27 articles were determined to contain highly relevant material and were selected for full-text review and detailed content analysis.

This filtering process ensured that the core dataset for analysis was pertinent and directly aligned with the established research objectives. In our opinion, all of this optimizes the efficiency and validity of the next phase of data extraction and synthesis.

The purpose of the research was to find answers to the following questions:

Q1: What are the most important influences of the AI on AE?

Q2: What are the challenges and opportunities of using AI in AE?

4. Results/findings

4.1. Bibliometric analysis

The descriptive analysis targeted a larger number of articles, without limiting to the recent period, because we wanted to find out if there were concerns for researching the potential impact of AI on accounting education from the emergence of AI to the present. The analysis of the 432 articles retained for the first part of the study led to the results presented below.

To make the results obtained more relevant, we selected for analysis a minimum occurrence of keywords at 2. Table 2 presents the keywords that appear with the highest frequency in the analyzed articles and the total link strength, which shows the total number of documents in which two elements appear simultaneously.

Table 2. Keyword occurrence and total link strength

Keywords	Occurrences	Total link strength
artificial intelligence	47	125
accounting education	13	35

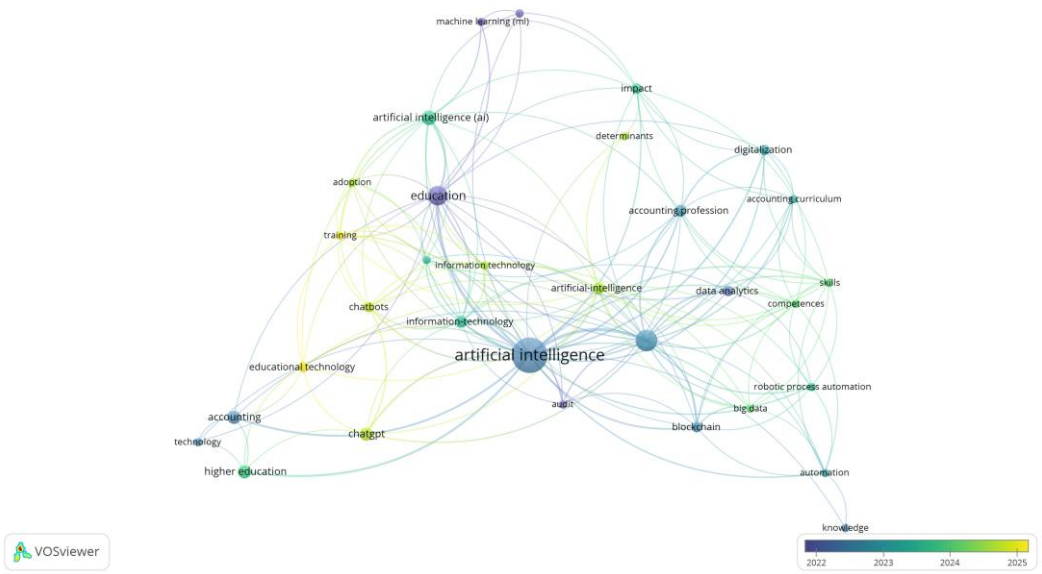
education	11	34
chatgpt	5	12
higher education	5	9
accounting	5	9
information-technology	4	22
accounting profession	4	16
blockchain	3	16
chatbots	3	15
impact	3	13
digitalization	3	12
educational technology	3	10
data analytics	3	9
skills	2	15

(Source: Own elaboration)

We found that the occurrence of the keyword *artificial intelligence* is three times higher than the keyword *accounting education*, and the ratio is also maintained in terms of total link strength. This can be explained by the significant growth in the last two years of public and academic debates on AI in general, but with a still insufficient concern for the relationship between the development of AI and the effect on AE. The rare appearance of the keyword *higher education* may be surprising. Usually, the concept of professional accountant in almost all jurisdictions asks for university studies, so that the expression higher education can overlap, in this context, with accounting education and even with education. All other keywords have similar occurrences and a relatively similar total link strength.

A better picture of the intensity of the link between the keywords identified in the selected articles is visible in Figure 2, which also allows for visualization of research trends in the field over the last four years – the richest in articles studying the connection between AE and AI.

Figure 2. Visualization of the research trends and the link strength between keywords



(Source: Own elaboration)

The VOSviewer network visualization shosws the co-occurrence of keywords over time. Artificial Intelligence (AI) is the absolute core of the network, having the largest node size. This confirms that AI is the fundamental subject of research. Two large co-occurring concepts surrounding AI are education and data analytics. This indicates that the research focus on integrating AI and data analytics principles into accounting education. Another high-frequency keyword linked to the AI and education concepts is machine learning.

Regarding the research trends, the color gradient reveals a clear shift in research focus over the 2022–2025 period – the most prolific from the analysed period. The technological terms, such as artificial intelligence, data analytics, blockchain cover the initial research phase focused on identifying and mapping the core emerging technologies relevant to the field. The most relevant terms from the recent research areas include: adoption and training (on the left side), impact and determinants (on the top center), and accounting curriculum and competences (on the right side). These are related to implementation, impact, and curriculum development. This transition shows that the research comunity has moved from discussing what the technologies are to discussing how they are integrated, what skills they demand and what their practical consequence are. These links weremore clearly highlighted by the five clusters in which the keywords from the analyzed articles were grouped, as shown in Table 3.

Table 3. Keywords' clusters

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
artificial intelligence	accounting curriculum	artificial intelligence	accounting	adoption
automation	accounting education	determinants	artificial intelligence	audit
big data	accounting profession	education	data analytics	chatbots
blockchain	data analytics	impact	chatgpt	information-technology
competences	digitalization	machine learning	education technology	training
knowledge		technology enhanced learning	higher education	acceptance
robotic process automation			technology	
skills				

(Source: Own elaboration)

We observed combinations that suggest a limited concern over time in studying the impact of AI on AE. This is not surprising given that other areas have been using AI for many years (medicine, solving mathematical theorems, translation, games, natural language processing). It should also be noted that research on the connection between AE and AI has experienced a relatively significant increase only in the last 6 years. Thus, in 2019, the number of articles indexed in the Web of Science exceeded 25, so that in the following years the growth will be even more significant (2019 – 26 articles, 2020 and 2021, 38 articles per year, 2022 – 52 articles, 2023 – 76 articles, 2024 – 101 articles). The way the words are grouped into the five clusters confirms the evolution of AI research, from the tools that have emerged in recent years and how they have influenced the

accounting profession, to the new generative AI tools whose influence on AE has been more evident in the last two years.

The clusters illustrate a clear progression from fundamental enabling technologies (cluster 1), to the necessity of educational change (clusters 2, 3, 4), and finally to the practical organizational response (cluster 5). The frequent co-occurrence of terms like artificial intelligence (in clusters 1, 3, and 4) and education (in clusters 2, 3, and 4) suggests that the influence of AI on pedagogical methods and curriculum design is a central, multifaceted area of study within this domain.

Cluster 1 is centered on core technologies like *artificial intelligence, automation, big data, blockchain,* and *robotic process automation (RPA)*. It links these technologies to necessary *competences, knowledge*, and *skills*, suggesting a focus on the capabilities required for the future of the profession. Cluster 2 focuses on the *educational aspects* of the discipline and the integration of modern tools. It links the *accounting curriculum* and *accounting education* with the *accounting profession* and *data analytics*, highlighting the immediate need for pedagogical reform to address technological shifts. Cluster 3 combines advanced technologies (*artificial intelligence, machine learning*) with concepts related to their impact and determinants within the context of *education* and technology-enhanced learning. It seems to represent a more theoretical investigation into how these *technologies* are changing *learning methods* and outcomes. Cluster 4 is a highly focused cluster that groups *Chatbots, ChatGPT, education technology*, and *higher education* with the foundational concepts of *accounting* and *artificial intelligence*. This suggests a specific sub-domain of research dealing with the application and implications of *generative AI* tools in the *educational setting*, particularly within *accounting*. Cluster 5 focuses on the organizational response to technological change. Terms like *adoption, audit, information-technology, training*, and *acceptance* are grouped, indicating a concentration on the practical, human, and organizational implementation of new systems and the corresponding need for *skill* development and buy-in.Although the concern about how AI can influence AE exists, as in the case of introducing AI into an organization's operations, at the level of educational institutions there will be barriers and challenges in the process of adopting any AI tool, especially generative AI. Thus, it will be necessary to connect interdisciplinary knowledge for the correct use of AI tools. Various data sources will need to be identified, integrated and cleaned (Mikalef & Gupta, 2021). and also AI applications will need to be integrated into existing processes (Davenport & Ronanki, 2018). In this context, Ballantine *et al.* (2024, p. 2) argue that "*simply adding a topic or topics to the existing syllabus does not recognise either the scale of potential AI-induced change within accounting and AE, or the threats that rapid advances in AI could pose to the nature of AE and to education more broadly."*

AI necessitates an immediate need for pedagogical reform in accounting. The influence is primarily seen in the linkage between the accounting curriculum, accounting education, and the integration of data analytics and other modern tools into the teaching process. AI, along with related advanced technologies like machine learning, is changing learning methods and outcomes. This influence is studied through a more theoretical investigation focusing on the impact and determinants of these technologies within the context of education and technology-enhanced learning. A specific and important influence

is the application and implications of generative AI tools – such as Chatbots and ChatGPT – in the educational setting, particularly within higher education and accounting. This suggests a direct influence on how students learn and how courses are delivered through education technology.

The answer to the research question Q1: What are the most important influences of AI on AE? is strongly supported by the VOSviewer cluster analysis. The clusters show that the influence of AI on AE is multidimensional and affects different aspects of the discipline and the learning process: curricular reform, learning methods and learning tools. Thus, the influence is not limited to a single domain, but extends from what is taught (curriculum) to how it is taught and learned (methods, technology).

4.2. Content analysis

In the second part of the study, we conducted a content analysis of the articles retained after the selection. In this part, we highlighted the most important challenges and opportunities brought by the introduction of AI in the AE process (teaching, assessment, development of teaching materials, learning, and doing reseach for dissertations and doctoral theses, etc.).

After reading the selected articles, we found that, all over the world, the adoption and/or intention to adopt AI in AE generates similar questions and fears, brings into question the same risks, advantages and opportunities, and faces the same challenges. There are different approaches to these influences: some target the institutions involved, others refer to teachers and students, some deal with technical aspects, others pursue behavioral or psychological elements.

In the Table 4 we presented the main challenges identified following the content analysis of the 27 articles (Appendix 1 contains the list of publications analysed, presented by relevance, in the order in which they appear in the Web of Science).

Table 4. Challenges related to the introduction of AI in AE

Domain	Challenges
Curriculum and pedagogical style	• the need to update and redesign the curriculum to reflect the advances in AI (Brabete *et al.*, 2024; Cheng *et al.*, 2024; Stancu & Duțescu, 2021; Nusa *et al.*, 2024; Grabińska *et al.*, 2021; Bui *et al.*, 2024 etc.); this involves introducing new teaching methods (Brabete *et al.*, 2024; Moșteanu, 2022), changing didactic approaches (Nusa *et al.*, 2024) and adapting educational programs to technological evolution (Grabińska *et al.*, 2021); • universities must redefine the basic competencies and skills expected from graduates (Gatea, 2024; Grabińska *et al.*, 2021); • curriculum review must be a cyclical and continuous process (Moșteanu, 2022); • teachers need to adapt to students' diverse learning styles when integrating AI in the teaching activities (Mulyani *et al.*, 2025).
Teacher training, redefining the role of professors, and concerns	• the need to improve IT skills and develop AI competencies among teachers (Cheng *et al.*, 2024; Stancu & Duțescu, 2021; Fachrurrozie *et al.*, 2025; Bui *et al.*, 2024); • the need for universities to provide teachers with the skills to create, adapt and use generative AI (Bolívar-Cruz & Verano-Tacoronte, 2025); • anxiety among teachers regarding student activities and the use of technology (Bolívar-Cruz and Verano-Tacoronte, 2025); • the integration of AI is redefining the role of teachers (Lee, 2023), leading to fears of job loss (Grabińska *et al.*, 2021) and concerns that AI could provide more comprehensive answers than experienced teachers (Cohen *et al.*, 2023);

Domain	Challenges
	• teachers face an increased workload (Tavares *et al.*, 2023) and the challenge of understanding the usefulness of AI in AE beyond research (Vinichenko *et al.*, 2020); • the existence of a digital disparity among teachers that needs to be addressed (Mulyani *et al.*, 2025, Kudrina *et al.*, 2024).
Ethics, integrity and trust	• AI introduces new ethical requirements (Brabete *et al.*, 2024), which require an understanding of the specific ethics of AI use (Fachrurrozie *et al.*, 2025); • ensuring confidentiality, security, fairness, trust and transparency in human-AI interaction (Fachrurrozie *et al.*, 2025); • AI tools may provide erroneous answers or may invent answers (Wood *et al.*, 2023; Das & Madhusudan, 2024), may lack the ability to analyze complex situations and may provide repetitive answers without improving quality (Wood *et al.*, 2023); • increased student plagiarism (Wood *et al.*, 2023; Das & Madhusudan, 2024; Atmini *et al.*, 2024; Bhullar *et al.*, 2024), especially under conditions of high workload and competitive pressures, which may lead to a "democratization of plagiarism" (Das & Madhusudan, 2024); • students may rationalize plagiarism or experience ethical decline even if they understand the use of AI; this situation may generate evaluation errors in which results obtained dishonestly may appear better (Atmini *et al.* (2024); • AI can increase dependency and encourage laziness (Fachrurrozie *et al.*, 2025), potentially affecting students' intelligence and social interaction (Fachrurrozie *et al.*, 2025; Bhullar *et al.*, 2024), decreasing self-control and confidence in acquired skills (Rodríguez-Ruiz *et al.*, 2025); • breach of confidentiality and lack of data security (Bhullar *et al.*, 2024); • universities need to set standards for the use of AI in education and research and review academic integrity policies (O'Leary, 2023); • the Dunning-Kruger effect may occur with the use of AI, and there are also challenges in preventing and detecting the use of AI in dissertations and research (O'Leary, 2023); • caution is needed in evaluating responses provided by AI due to the potential for inaccurate information (Cohen *et al.*, 2023; Das & Madhusudan, 2024; Bhullar *et al.*, 2024); • AI currently lacks emotional intelligence and empathy (Bhullar *et al.*, 2024), and the results provided lack depth and nuance (Mulyani *et al.*, 2025).
Infrastructure and resources	• the universities need significant investments to ensure access to quality AI and to develop the infrastructure for an efficient use of AI (Cheng *et al.*, 2024; Nusa *et al.*, 2024; Fachrurrozie *et al.*, 2025); • high costs associated with automated writing evaluation (AWE) systems (Venter *et al.*, 2025); • development of digital educational environments and new learning technologies (e.g. immersive technologies, VR/AR (Kudrina *et al.*, 2024); • the need to overcome technical limitations and ensure the availability of resources (Mulyani *et al.*, 2025).
Student performance	• there is a risk of a decline in higher-order cognitive skills and creativity among students (Das & Madhusudan, 2024); • may reduce student performance and contribute to disparities in access to education (Bhullar *et al.*, 2024); • may reduce human interaction in learning (Mulyani *et al.*, 2025).
The regulatory process and collaboration with employers and professional organizations	• strengthening collaboration between academia, employers and professional organizations (Brabete *et al.*, 2024; Grabińska *et al.*, 2021; Tavares *et al.*, 2023) to ensure that AE meets industry requirements for technology-related skills (Tavares *et al.*, 2023); • universities need to adapt and ensure compliance with legal regulations (Bhullar *et al.*, 2024; Gatea, 2024); • difficulties in predicting AI behavior and a need to establish clear rules for its use (O'Leary, 2023).

(Source: Own elaboration)

In addition to these effects on accounting education, artificial intelligence can also bring benefits, if its adoption is carried out in a critical manner, after in-depth analysis and after establishing clear rules of use.

The main opportunities that the implementation of AI in AE can offer are presented in Table 5.

Table 5. Opportunities brought by the introduction of AI in AE

Domain	Oportunities
Improved learning and teaching experience	• higher quality training, connected to market requirements (Brabete *et al.*, 2024); • shorter response time to problems and more complex answers than humans for certain tasks (Cheng *et al.*, 2024); • high efficiency in tasks involving explanations, rule application and ethical evaluation (Cheng *et al.*, 2024); • better results than humans, especially in repetitive work (Stancu & Duțescu, 2021; Fachrurrozie *et al.*, 2025); • improving the quality of learning and student-teacher interaction, by increasing teaching efficiency and t project-based learning (Nusa *et al.*, 2024); • supporting individual study, support in editing teaching materials (Wood *et al.*, 2023) and assistance in creating tests for student assessment (Wood *et al.*, 2023; Das & Madhusudan, 2024); • reducing academic stress and improving research and learning outcomes by providing fast and easy access to data (Gatea, 2024); • automating some administrative processes and tasks for teachers, allowing them to carry out more creative and quality activities (Grabińska *et al.*, 2021; Das & Madhusudan, 2024; Rodríguez-Ruiz *et al.*, 2025); • driving a significant reform in AE, making it more relevant to current and future needs and increasing the attractiveness of the profession (Ballantine *et al.*, 2024; Tavares *et al.*, 2023).
Personalization and adaptation of education	• provides a tailored and personalized dialogue with students, offering personalized courses through personalized guidance and assessment (Lee, 2023); • introduces knowledge, presents topics appropriate to the level of each student, and provides immediate or delayed feedback, similar to human feedback (Lee, 2023; Venter *et al.*, 2025); • improves personalized learning, allows automatic profiling of students, and can recommend content tailored to individual needs (Babashahi *et al.*, 2024; Castro *et al.*, 2024; Bhullar *et al.*, 2024; Mulyani *et al.*, (2025); • allows for dynamic adjustment of the pace, content, and teaching method according to the progress and individual preferences of students (Mulyani *et al.*, 2025).
Operational efficiency and innovation	• increases the effectiveness of education (Grabińska *et al.*, 2021) and has a positive impact on the image, efficiency, academic reputation and citation index of universities (Vinichenko *et al.*, 2020); • allows faster access to courses and supports the development of intelligent course content (Moșteanu, 2022; Das & Madhusudan, 2024); • predicts student performance and helps teachers in successfully managing classes (Das & Madhusudan, 2024); • provides time savings and support in finding more creative solutions to problems (Das & Madhusudan, 2024); • ease of use and increasing acceptability due to social influence and perceived usefulness (Mulyani *et al.*, 2025; Bui *et al.* (2024).
Improving student skills and research quality	• develops students' creativity (Brabete *et al.*, 2024); • improves students' advanced cognitive skills, especially those related to quantitative reasoning (Bhullar *et al.*, 2024); • helps with brainstorming and provides better processing and writing capabilities for research (O'Leary, 2023); • improves the readability and language of research papers and helps both students and teachers with assignments and answers (O'Leary, 2023);

Domain	Oportunities
	● increases the interest of researchers and practitioners in fields such as accounting (Elo *et al.*, 2024).
Accessibility and inclusion	● contributes to increasing accessibility and inclusion in higher education, reducing costs (Bhullar *et al.*, 2024; Mulyani *et al.*, 2025); ● helps promote a stimulating learning environment and develop courses that require critical thinking from students (Bhullar *et al.*, 2024).
Strategic benefits	● represents an important opportunity to reassess the purpose, form and content of AE (Ballantine *et al.*, 2024); ● strengthens the competitiveness of innovative teaching staff and stimulates learning (Vinichenko *et al.*, 2020); ● allows the integration of AE into broader socio-economic processes (Kudrina *et al.*, 2024).

(Source: Own elaboration)

Based on the content analysis conducted on the selected articles, the results provide positive answers to both research questions, confirming the significant impact of AI on AE.

In response to research question Q1, the influences of AI on AE are widespread, affecting several key activities such as teaching, learning, assessment, the development of teaching materials, and conducting research**.** Globally, the adoption of AI in AE generates similar questions, risks, advantages, and opportunities.

In addressing research question Q2, the analysis highlights multiple challenges and opportunities associated with implementing AI in AE. Major challenges identified include the need to update and redesign the curriculum and didactic approaches, the imperative for universities to provide teachers with the skills to use and create generative AI, and the necessity to address teacher anxiety regarding the technology and potential job loss. Ethical considerations are also paramount, specifically addressing new ethical requirements, ensuring data security and confidentiality, and mitigating the risk of increased student plagiarism and dependency on AI tools. On the other hand, core opportunities include an improved learning and teaching experience by delivering higher quality training and automating repetitive tasks, allowing teachers to engage in more creative activities. AI further enables the personalization and adaptation of education by offering tailored guidance, customized courses, and dynamic adjustment of content based on student progress. Finally, AI is seen as driving a significant reform in AE, improving operational efficiency, increasing accessibility, and enhancing student skills, particularly in advanced cognitive areas like quantitative reasoning.

5. Discussions

The rapid and widespread deployment of (generative) AI tools in the last three years requires an urgent institutional response within higher education, especially in AE. Our study highlights the duality of AI as a source of profound opportunities and significant challenges for the AE.

Our bibliometric analysis confims the rising research interest in the field. The keyword AI appear three times more frequently than AE in the dataset analyzed, reflecting the broader academic debate on AI. We observed an accelerating growth curve, with the number of indexed articles exceeding 100 in 2024, double compared to 2022. The

VOSviewer cluster analysis identified AI as the core of the research network. This findings emphasize that its influence is multidimensional, impacting curricular reform, learning methods, and the specific tools used in education.

5.1. Positive impacts of AI on AE

The results obtained through content analysis allow us to state that artificial intelligence improves operational efficiency, research capabilities and educational accessibility in several ways, mainly through automation, personalization and cognitive support.

AI automates administrative tasks, freeing educators to concentrate on creative and high-quality teaching activities (Wood *et al.*, 2023). This yields significant time savings (Das & Madhusudan, 2024) and enables faster, often more complex, problem-solving than human intervention allows in certain tasks (Cheng *et al.*, 2024). While Grabińska *et al.* (2021) found that AI increases the overall effectiveness of education, Cheng *et al.* (2024) find that AI excels in tasks such as explanations, rule enforcement, and ethical evaluation, outperforming humans, especially in repetitive work. For institutions, AI positively influences the overall efficiency, academic reputation, and citation index of universities (Vinichenko et al., 2020). By increasing teaching efficiency, it concurrently improves the quality of learning and student-teacher interaction (Nusa et al., 2024). Furthermore, AI can predict student performance, aiding teachers in effective class management (Das & Madhusudan, 2024). In research, AI facilitates brainstorming and offers superior writing capabilities, specifically improving the readability of research papers (O'Leary, 2023). It accelerates research outcomes by providing fast and easy access to data (Gatea, 2024) and assists in generating more creative problem solutions (Das & Madhusudan, 2024). AI plays a very important role in developing students' creativity and improving advanced cognitive skills, particularly those related to quantitative reasoning (Brabete et al., 2024; Bhullar *et al.*, 2024). It also heightens researcher and practitioner interest in specific fields, such as accounting (Elo *et al.*, 2024).

On the other hand, AI fundamentally transforms higher education by increasing accessibility and inclusion while simultaneously reducing costs (Bhullar *et al.*, 2024; Mulyani *et al.*, 2025). It enables personalization and adaptation of the communication between professors and students, offering tailored dialogue, guidance, and assessment (Lee, 2023). Specifically, AI can automatically profile students and recommend customized content (Babashahi *et al.*, 2024; Castro *et al.*, 2024). This personalization extends to the adjustment of pace, content, and teaching methods based on individual progress and preferences (Mulyani *et al.*, 2025). Thus, knowledge and topics are presented at the appropriate level for each student (Lee, 2023; Venter *et al.*, 2025). Furthermore, AI accelerates course access and supports the development of intelligent course content (Moșteanu, 2022; Das & Madhusudan, 2024).

Our findings regarding the positive impact of AI on accounting education confirm those of Holmes *et al.* (2022) and Zawacki-Richter *et al.* (2019).

5.2. Challenges and risks in implementing AI in education

The introduction of AI in education presents several significant challenges related to ethics, academic integrity, and trust, necessitating the establishment of new standards and policy reviews (Fachrurrozie *et al.*, 2025; O'Leary, 2023).

AI tools have led to increased student plagiarism, especially under conditions of high workload and competitive pressures. (Wood *et al.*, 2023; Das & Madhusudan, 2024). Students may rationalize plagiarism or experience an ethical decline, even if they understand the appropriate use of AI. This situation can generate evaluation errors because results obtained dishonestly may appear better than genuine work (Atmini *et al.*, 2024). AI can potentially increase dependency and encourage laziness among students (Fachrurrozie *et al.*, 2025). This dependency may negatively affect students' intelligence, social interaction, and decrease their self-control and confidence in acquired skills (Rodríguez-Ruiz *et al.*, 2025). There is a risk of a decline in higher-order cognitive skills and creativity among students (Das & Madhusudan, 2024). There are also challenges in preventing and detecting the use of AI in dissertations and research (O'Leary, 2023). Generative AI tools may provide erroneous answers or invent answers (hallucinate). Caution is needed when evaluating responses provided by AI due to the potential for inaccurate information (Wood *et al.*, 2023; Das & Madhusudan, 2024). Many times, AI results may lack depth and nuance and the tools may provide repetitive answers without improving quality. Furthermore, AI currently lacks emotional intelligence and empathy (Mulyani *et al.*, 2025). The Dunning-Kruger effect – where people with low competence overestimate their abilities – may occur with the use of AI (O'Leary, 2023). Another challenge is related to the breach of confidentiality and lack of data security. Universities must work towards ensuring fairness, transparency, confidentiality and security in human-AI interaction (Bhullar *et al.*, 2024; Fachrurrozie *et al.*, 2025).

Our results concerning ethical concerns, academic integrity issues, and the need for updated policies and standards are consistent with the broader literature. Specifically, our findings support the conclusions drawn by Zawacki-Richter et al. (2019) and Holmes *et al.* (2022). Furthermore, the observations we made regarding plagiarism and other forms of unethical behavior show a strong similarity to the patterns reported by Cotton *et al.* (2023) and Dawson (2023).

5.3. Practical recommendations for institutions, teachers, and students

There are difficulties in predicting AI behavior, which underscores the need to establish clear rules for its use.

Universities need to focus on structural changes, resource allocation, ethical governance, and strategic collaboration to meet the challenges of using artificial intelligence. They need to review their academic integrity policies and set clear standards for the use of AI in education and research.

Universities must undertake a cyclical and continuous process to update and redesign the curriculum to reflect advances in AI (Kudrina *et al.*, 2024). They need to redefine the basic competencies and skills expected from graduates in the AI era (Gatea,

2024; Grabińska *et al.*, 2021). Universities must provide teachers with the skills necessary to create, adapt, and use generative AI (Bolívar-Cruz & Verano-Tacoronte, 2025). There is a fundamental need to improve IT skills and develop AI competencies among teaching staff, by adressing the digital disparity existing among teachers (Mulyani *et al.*, 2025; Stancu & Duțescu, 2021; Bui *et al.*, 2024). Significant investments are needed to ensure access to quality AI and to develop the infrastructure required for its efficient use (Cheng *et al.*, 2024; Nusa *et al.*, 2024; Fachrurrozie *et al.*, 2025). Institutions must focus on the development of digital educational environments and new learning technologies (such as immersive technologies and virtual reality/augmented reality). They must also work to overcome technical limitations and ensure resource availability (Kudrina *et al.*, 2024).

Universities need to set standards for the use of AI in education and research (O'Leary, 2023). They must also review academic integrity policies to address issues like increased student plagiarism and the difficulty of detecting AI use (Das & Madhusudan, 2024; Atmini *et al.*, 2024; Bhullar *et al.*, 2024). Policies must ensure confidentiality, security, fairness, trust, and transparency in human-AI interaction (Fachrurrozie *et al.*, 2025). Universities should strengthen collaboration between academia, employers, and professional organizations to ensure AE meets industry requirements for technology-related skills (Brabete *et al.*, 2024; Grabińska *et al.*, 2021; Tavares *et al.*, 2023). They must establish clear rules for the use of AI and adapt and ensure compliance with legal regulations (Bhullar *et al.*, 2024; Gatea, 2024; O'Leary, 2023).

Our practical recommendations for universities regarding the responsible implementation of AI are strongly aligned with previous research. The necessity for institutions to establish robust ethical governance frameworks to effectively manage AI is consistent with the findings of Holmes *et al.* (2022). Moreover, our emphasis on the urgent need for the development of clear standards and policies for AI use, with a critical focus on academic integrity, data security, and transparency, aligns with the key recommendations put forth by Dawson (2023) and Cotton *et al.* (2023).

Teachers must evolve their skills and adapt their pedagogical styles to harness AI's efficiency while mitigating its ethical risks. A very important commitment for educators is to improve their IT skills and develop AI competencies (Cheng *et al.*, 2024; Stancu & Duțescu, 2021; Fachrurrozie *et al.*, 2025). When integrating AI into teaching activities, they need to adapt to students' diverse learning styles (Mulyani *et al.*, 2025) and must understand the specific ethics of AI use (Fachrurrozie *et al.*, 2025).

Accepting that AI integration is redefining their role (Lee, 2023), teachers should leverage AI to automate administrative tasks, enabling them to focus on more creative and quality educational activities (Grabińska *et al.*, 2021; Das & Madhusudan, 2024; Rodríguez-Ruiz *et al.*, 2025). They should develop courses that require critical thinking from students, moving beyond tasks where AI provides simple, repetitive answers (Bhullar *et al.*, 2024; Wood *et al.*, 2023). When evaluating responses provided by AI, teachers must use caution due to the potential for inaccurate, erroneous, or invented information (Cohen *et al.*, 2023; Das & Madhusudan, 2024; Bhullar *et al.*, 2024). They should also be aware that AI results may lack depth and nuance (Mulyani *et al.*, 2025). Finally, teachers must overcome the challenge of understanding the usefulness of AI in AE beyond research (Vinichenko *et al.*, 2020).

Recent research strongly supports the practical recommendations outlined for teachers adapting to AI in higher education (Mouta *et al.*, 2024; Walter, 2024). The literature emphasizes the need for educators to evolve their skills, adapt pedagogical approaches, and address ethical challenges as AI becomes integral to teaching and learning (Ng *et al.*, 2023; Walter, 2024).

Students are encouraged to embrace AI for skill development and efficiency while maintaining academic integrity and critical judgment. Students must recognize that using AI presents a significant risk of increased plagiarism and may contribute to an ethical decline (Wood *et al.*, 2023; Das & Madhusudan, 2024). It is essential for students to avoid allowing AI to increase dependency and encourage laziness, which can negatively affect their intelligence, social interaction, self-control, and confidence in acquired skills (Fachrurrozie *et al.*, 2025; Bhullar *et al.*, 2024). Furthermore, students should strive to understand the specific ethics of AI use (Fachrurrozie *et al.*, 2025). AI can be utilized by students to develop creativity (Brabete *et al.*, 2024) and improve advanced cognitive skills, particularly quantitative reasoning (Bhullar *et al.*, 2024). Students can leverage AI for brainstorming, enhancing processing and writing capabilities for research, and improving the readability and language of papers (O'Leary, 2023). But they should be mindful of the risk of the Dunning-Kruger effect when using AI (O'Leary, 2023). Additionally, students can benefit from AI's capability to provide a tailored and personalized dialogue, offering courses and guidance appropriate to their level (Lee, 2023). The stress can be reduced by providing fast and easy access to data (Gatea, 2024). Students must be aware that AI tools may provide erroneous or invented answers (Wood *et al.*, 2023; Das & Madhusudan, 2024). Therefore, caution is necessary when evaluating AI-generated currently lacks emotional intelligence and empathy (Bhullar *et al.*, 2024; Mulyani *et al.*, 2025).

Our findings are consistent with recent studies that suggest students should utilize AI to enhance learning efficiency, creativity, and cognitive skills, but must do so with a strong commitment to academic integrity and ethical awareness (Holmes *et al.*, 2022; Dawson, 2023).

6. Conclusions

This study, utilizing a bibliometric and content analysis approach, confirms the significant and multidimensional impact of AI on AE. The findings synthesize a wide range of both challenges and opportunities associated with the integration of AI-based tools in this field.

The challenges indentified center on the neeed for curricular reform, necessity for significant investements in infrastructure, resources and digital educational environments to ensure efficient AI use, while addressing teacher anxiety, digital disparity, and ethical integrity in academia.

AI offers many opportunities for AE by driving efficiency and personalization. The automation of the repetitive tasks for teachers allows them to focus on creative teaching, personalized learning paths and tailored assessments for students. AI enhances educational operational efficiency and helps develop students' creative skills, growing the overall quality of accounting graduates.

The study has practical implications for universities, teachers and students. Thus, universities must quickly provide an institutional response to the need for curriculum change, as well as invest in infrastructure and teacher training. Collaboration between universities, employers and professional organizations must be developed so that accounting education aligns with the requirements of the industry in terms of required skills. At the institutional level, policies and procedures must be developed to ensure confidentiality, security, fairness, trust and transparency in the interaction between humans and artificial intelligence. Policies that target academic integrity must also be redefined to address the increasing risk of plagiarism.

Policymakers must focus on structural changes, ethical governance, and strategic collaboration to meet the challenges of using AI. The widespread use of artificial intelligence in universities is very recent, so there is not enough information to anticipate all the problems that may arise as a result of the implementation of these tools. The difficulty of predicting the effects of the expansion of the use of AI requires the authorities to issue clear rules for the use of AI. In turn, universities must ensure compliance with current legislation and establish robust ethical governance frameworks that allow them to responsibly adopt AI in their various activities.

The widespread use of artificial intelligence in universities is very recent, so there is not enough information to anticipate all the problems that may arise as a result of the implementation of these tools. The difficulty of predicting the effects of the expansion of the use of AI requires the establishment of clear rules by the authorities for the use of AI. In turn, universities must ensure compliance with current legislation and establish robust ethical governance frameworks that allow them to responsibly adopt AI in their various activities.

The study's contribution to the development of knowledge in accounting lies in providing a comprehensive and updated perspective on the implications of using AI in AE.

The limitation of the study is that it only targeted articles from the Web of Science Core Collection database, which means that some articles from other databases were omitted. On the other hand, the use of the Boolean "AND" operator, as well as other search refinement criteria, restricted the search to the articles considered most relevant, but may have excluded articles indirectly related to the topic of interest. The largest number of articles (93 of the 120 initially selected for content analysis) were excluded as a result of reading the abstract. This rigorous selection process, although ensuring a high level of relevance of the selected articles, may lead to the omission of important studies, the relevance of which can only be determined after reading the entire article.

Future research must prioritize moving beyond theoretical proposals towards evidence-based strategic planning. This requires conducting rigorous empirical research, including longitudinal and cross-cultural studies, to document the actual outcomes (both successes and failures) of AI implementation in academic settings, thereby guiding the development of new regulations. Simultaneously, a focus must be the evaluation and enhancement of curricula and pedagogical models to enable the use of AI-enhanced teaching methods, alongside developing robust strategies for training and competency development for both faculty and students in the ethical and effective use of AI tools. Finally, research must address the wider ethical, legal, and social implications of AI in

accounting practice for seamless integration into AE curricula, while also considering practical challenges such as regional disparities, institutional complexities of reform, faculty preparedness, and the resource implications of technology adoption.

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Appendix 1

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