

ARTIFICIAL INTELLIGENCE AND THE FUTURE OF ACCOUNTING EDUCATION

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Abstract

Scientific papers have become the primary means of disseminating research findings. Consequently, the literature on accounting teaching and learning has increasingly explored the implications of artificial intelligence (AI), particularly following the enactment of Resolution CNE/CES number 1 of March 27, 2024, which established national guidelines for undergraduate accounting education in Brazil. According to the Federal Accounting Council (CFC, 2025), the Pedagogical Project of the Course (PPC) is a mandatory document for undergraduate programs and can be developed through a stepwise process. This article examines the effects of artificial intelligence on undergraduate accounting education. We argue that educational processes must be transformed to meet the demands of a new era characterized by rapid economic and technological change. Our analysis applies to the TEMAC methodology and focuses on highly cited studies to identify trends, challenges, and opportunities for innovation in accounting education. Data were collected from two databases: CAPES (a Brazilian database) and Scopus (an international database). Nevertheless, various methods and instruments may be used in different contexts to develop a PPC, our focus is on exploring the persistent gaps within interdisciplinary systems.

Keywords: accounting education; artificial intelligence; method.

1. Introduction

The literature on accounting teaching and learning increasingly explores the implications of artificial intelligence (AI), particularly after the Brazilian government enacted Resolution CNE/CES number 1 (March 27, 2024), which established national guidelines for undergraduate accounting education in Brazil. According to the Federal Accounting Council (CFC, 2025), the Pedagogical Project of the Course (PPC) is a mandatory document for all undergraduate programs. A PPC is generally developed through a stepwise process that includes contextual diagnosis, definition of learning objectives, curricular design, selection of teaching methodologies, organization of knowledge systems, resource planning, document preparation and implementation, curriculum evaluation, and continuous monitoring and feedback.

Loiola and Cirne (2025) argue that this era is marked by the rapid advancement of technology, in which AI has become an integral component of accounting processes. Abdo-

Salloum and Al-Mousawi (2023) highlight the changes resulting from the introduction of AI across various sectors, including education, auditing, finance, and accounting. According to their study on Lebanese universities, the adoption of AI requires specific technical and cognitive skills. This finding aligns with the perspective presented in the document issued by the CFC.

A key point for consideration is the curricular structure, as undergraduate accounting programs must become more open to interdisciplinary perspectives and disruptive pedagogical approaches. For example, studies have examined the meaning of equity and stocks in technology startups and similar enterprises, as well as the potential implications of quantum technology for accounting information systems (Lazirko, 2023). Teachers can play an active role by incorporating multiple teaching methods into their practice (Ioannidou & Erduran, 2020). In certain areas of accounting education, this approach can be particularly valuable.

This paper discusses the challenges that universities may encounter in this context. This leads to the following research question: What challenges has been AI creating for educational practices in accounting courses, as identified in scientific literature? The aim of this article is to bridge the gap in the existing literature by linking the new Brazilian undergraduate accounting guidelines with academic research on the application of AI in educational processes. By analyzing these interactions, we seek to generate insights that can assist universities in developing their PPC.

2. Literature review

2.1. Accounting Science

According to Black et al. (1973), accounting supports decision-making in various enterprises and activities because it is a valuable tool for communicating financial situations. Many groups (especially stakeholders, governments, and shareholders) constantly use accounting information in their operations and to plan future scenarios.

Furthermore, the authors emphasized that organizations understand their businesses through reports generated from accounting systems. In summary, Black et al. (1973) described how information can be utilized: defining the problem, identifying alternatives, selecting the best alternative, analyzing the reasons behind each option through a quantitative focus, and determining directions and factors that involve other aspects (such as qualitative considerations). In conclusion, we always need accounting information, especially in this information age, when machine learning is present in many aspects of our lives. This explains why the integration between accounting and technology has long coexisted.

2.2. Artificial Intelligence

Turing (1950) proposed a reflection that remains highly relevant today, particularly concerning the ethical principles involved in the use of machine learning and the replacement of human labor by machines. Although technology is essential, humans must remain in control, continually thinking and creating. Machines can take on certain human roles; however, it is crucial that humans use them as tools for support rather than as the foundation of our social and ethical structures.

Artificial intelligence (AI) is the result of many years of research in different fields. We can use this tool to expand our knowledge, but we need to pay attention to how we use it. Basically, AI is based on neural logic. Jefriyanto et al. (2025) explained that AI was developed by humans to think, learn, and make decisions quickly. In addition, they highlighted that

students with technological competencies tend to play a more significant role in the job market. According to Frey and Osborne (2023), their estimate from ten years ago that about 47% of US-based jobs could be automated still holds true, as it depends on three main conditions: creativity, complex relationships, and environmental adaptability. In addition, the energy requirements of AI remain a potential limitation

3. Methods

The bibliographic review consisted of an analysis aimed at reducing biases and combining the most relevant studies, with the objective of defining conceptual boundaries to build the theoretical framework and guide the research (Webster & Watson, 2002). This paper applied this method to two databases, with the support of TemacAI when possible, and included reading all the articles mentioned in Tables 3 and 4.

3.1. Scopus

Our research design integrates both quantitative and qualitative approaches to investigate the issue discussed above. We selected two databases: Scopus and CAPES. First, we present the results obtained from Scopus, and subsequently, we discuss the findings from CAPES. We conducted a quantitative analysis of scientific literature using the first database. In this initial stage, we used the following search string: TITLE-ABS-KEY (“accounting education” OR “accountancy education”) AND TITLE-ABS-KEY (“artificial intelligence”). This search retrieved 328 documents (Articles: 148; Conference Papers: 103; Conference Reviews: 24; Book Chapters: 23; Reviews: 20; Books: 4; Notes: 3; Retracted Papers: 1; Errata: 1; Editorials: 1).

We then applied an initial filter by selecting only papers written in English, resulting in 318 documents. Subsequently, we restricted the publication period to 2015–2025, which yielded 265 papers. In summary, the final search query included the following parameters: TITLE-ABS-KEY (“accounting education” OR “accountancy education”) AND TITLE-ABS-KEY (“artificial intelligence”) AND PUBYEAR > 2019 AND PUBYEAR < 2026 AND (LIMIT-TO (LANGUAGE, “English”)).

We applied the Consolidated Analytical Meta-Approach Theory (TEMAC), a bibliometric and meta-analytical methodology developed by Mariano, Rocha, and colleagues at the University of Brasília. According to Mariano and Rocha (2017), this methodology offers several advantages, including the identification of research trends and their evolution over time; the mapping of areas with higher research concentration and methodological frequency; the identification of key journals and citation weights; and the detection of research clusters as well as underrepresented areas. The data were then processed using TemacAI, a software tool developed by the creators of the TEMAC methodology, from which we obtained the following outputs. Selected outputs from the TemacAI system are summarized in the tables below.

Table 1 – Methods

Method / Approach	Frequency	% of Total	Status
Modeling / Simulation	160	60.4%	□ Well represented
Quantitative Study	75	28.3%	□ Well represented
Experimental Study	36	13.6%	□ Moderately used
Systematic Review	35	13.2%	□ Moderately used
Qualitative Study	31	11.7%	□ Moderately used
Longitudinal Study	4	1.5%	● Underexplored
Mixed Methods	2	0.8%	● Underexplored

Source: Adapted from TemacAI, retrieved October 22, 2025

Table 2 - Main Journals Indexed in Scopus

Journal Title	Number of Articles
Lecture Notes in Networks and Systems	8
ACM International Conference Proceedings Series	6
Journal of Emerging Technologies in Accounting	5
Journal of Physics: Conference Series	5
Journal of Accounting Education	4

Source: Adapted from TemacAI, retrieved October 22, 2025

Table 3 - Recent Articles (2025, 2024, 2023) with Impact Analysis

Article	Authors	Year	Citations	Source	Impact
The ChatGPT Artificial Intelligence Chatbot: How Well Does It Answer Accounting Assessment Questions?	Wood et al.	2023	80	<i>Issues in Accounting Education</i>	High impact
The impact of artificial intelligence and Industry 4.0 on transforming accounting and auditing practices	Abdullah, A.A.H., Almaqtari, F.A.	2024	79	<i>Journal of Open Innovation: Technology, Market, and Complexity</i>	High impact
AI-Augmented HRM: Literature Review and a Proposed Multilevel Framework for Future research	Prikshat et al.	2023	77	<i>Technological Forecasting and Social Change</i>	High impact
Harnessing AI for Education 4.0: Drivers of Personalized Learning	Castro et al.	2024	61	<i>Electronic Journal of e-Learning</i>	High impact
Artificial Intelligence and Its Impact on Accounting Systems	Khaled AlKoheji, A.; Al-Sartawi, A.	2023	54	<i>Lecture Notes in Networks and Systems</i>	High impact
Challenges of education in the accounting profession in the Era 5.0: A systematic review	Tavares et al.	2023	50	<i>Cogent Business and Management</i>	Medium impact
A critical review of AI in accounting education: Threat and opportunity	Ballantine et al.	2024	41	<i>Critical Perspectives on Accounting</i>	Medium impact
Artificial Intelligence and the Transformation of Higher Education Institutions: A Systems Approach	Katsamakas et al.	2024	35	<i>Sustainability (Switzerland)</i>	Medium impact

Source: Adapted from TemacAI, retrieved October 22, 2025

In Table 3, we excluded two articles because they were not related to the topic of this paper. In addition, the analysis performed by TemacAI on 264 abstracts showed some specific areas: Innovation & Technology (264; 100.0%), Education & Learning (264; 100.0%),

Business & Management (145; 54.9%), Social Sciences (99; 37.5%), Sustainability & Environment (65; 24.6%), and Health & Medicine (56; 21.2%). The analysis identified two underexplored areas in the Scopus database: Interdisciplinary research, represented by 9 studies (3.4%), and Funding Impact, represented by 8 studies (3.0%). Both areas demonstrate limited coverage within the analyzed literature. Basically, we read the main articles described in Table 2 and discussed some important points from them.

3.2. CAPES

We used the CAPES database (a Brazilian governmental support network for higher education) with the keywords accounting education, accounting and education, or accounting science and artificial intelligence. These terms you used in Portuguese language. The time frame considered was from 2020 to 2025, following the standard established by CAPES, which cannot be modified.

The results obtained through TemacAI were not representative or indicative of clear research paths, as there were only a few records available. Regardless of this limitation, we present the relevant information. The data were also verified on PlumX, a tool developed by Elsevier that measures the impact of publications. The papers originally written in Portuguese were translated into English for analysis.

Table 4 – Paper from CAPES

Title in Portuguese	Title in English	Year	Authors	Readers (PlumX Metrics)
Perícia Contábil: Novas perspectivas da profissão na Era Tecnológica	Accounting Expertise: New Perspectives for the Profession in the Technological Era	2021	Bronzato, A., & Dias, S. M. P.	155
Educação Híbrida e Cultura Digital: Reflexões sobre Docência, Aprendizagem e Tecnologias na Contemporaneidade	Hybrid Education and Digital Culture: Reflections on Teaching, Learning, and Contemporary Technologies	2023	Veloso et al.	36
Contabilidade 4.0: Os Desafios para Profissionais Contábeis	Accounting 4.0: The Challenges for Accounting Professionals	2022	Camargo et al.	7
Inteligência Artificial e Contabilidade: uma Aliança Estratégica para o Futuro Profissional no Brasil	Artificial Intelligence and Accounting: A Strategic Alliance for the Professional Future in Brazil	2023	Souza et al.	22
Pesquisa Contábil: forjando o Futuro da Profissão Contábil	Accounting Research: Shaping the Future of the Accounting Profession	2024	Corrêa et al.	No metrics

Title in Portuguese	Title in English	Year	Authors	Readers (PlumX Metrics)
Reflexões sobre o uso de Inteligência Artificial na Contabilidade e Gerencial: Oportunidades, Desafios e Riscos	Reflections on the use of Artificial Intelligence in Management Accounting: Opportunities, Challenges, and Risks	2024	Araújo, M. H., & Cornacchione, E. B.	16
Revolução Contábil nas pequenas empresas: Desafios e Oportunidades na Era Digital	Accounting Revolution in small businesses: Challenges and Opportunities in the Digital Era	2024	Silva et al.	No metrics
Impactos da Inteligência Artificial na Auditoria Contábil: Explorando Transformações e Desafios	Impacts of Artificial Intelligence on Accounting Auditing: Exploring Transformations and Challenges	2024	Ferreira, J. S., & Oliveira, M. C.	7
O impacto da tecnologia na profissão contábil sob perspectivas de pessoas com formação e/ou experiência profissional na área	Impacto of technology on the accounting profession from perspectives of individuals with undergraduate education and/or professional experience in the field	2023	Silva et al.	No metrics
Contabilidade 4.0: O Profissional Contábil frente à Contabilidade do Futuro	Accounting 4.0: The Accounting Professional facing the Accounting of the Future	2024	Guimarães et al.	4
Sucesso ou Fracasso? Desempenho do Chatgpt nas habilidades conceituais, procedimentais e atitudinais do Exame de Suficiência do CFC	Success or failure? Performance of Chatgpt in the conceptual, procedural, and attitudinal skills of the CFC Sufficiency Exam	2024	Godke et al.	No metrics

4. Findings

4.1. Scopus

One of the most significant findings includes studies classified as having high and medium impact, which are briefly discussed below. First, Wood et al. (2023) present a large-

scale study conducted across 14 countries and 186 institutions, comparing ChatGPT's responses to accounting-related questions with those of students. The findings indicate similar overall performance levels, with the highest accuracy achieved in English-language questions. The research was conducted in accounting faculties as part of classroom-based assessments.

Second, Abdullah and Almaqtari (2024) discuss the integration of artificial intelligence with various technological tools, such as databases and advanced auditing systems, within the broader framework of Industry 4.0. Their study highlights the interconnection among these technologies and emphasizes the essential digital competencies that accounting and auditing professionals must develop.

In the third study, Prikshat et al. (2023) make only incidental references to accounting, as their paper primarily examines the application of AI in recruitment, selection, and other human resource management functions. Therefore, their review does not focus on accounting education. Castro et al. (2024) focus on the integration and personalization of educational systems supported by artificial intelligence. Their results show positive outcomes, with notable improvements in students' knowledge and practical learning experiences. The authors employed the PRISMA protocol to conduct a systematic literature review. Their analysis identifies key drivers and evaluation criteria associated with various AI-based learning tools and applications.

The paper by Khaled and Al-Sartawi (2023) was not available in full. Nevertheless, according to its abstract, accounting professionals need to develop new skills and assess which activities can be enhanced or automated through AI. Accountants must also understand the broader implications of AI for their professional trajectories. Additionally, medium-impact studies provide incremental insights into the field. Tavares et al. (2023) discuss the challenges emerging in the new Era of Industry 5.0, also referred to as Society 5.0, where professional skills are continuously evolving. This is a period of instability in which educational frameworks require rapid adaptation by institutions. The key concepts involve complexity and new paradigms. According to the authors, achieving a balance between soft and hard skills is essential.

Ballantine et al. (2024) foster a dialogue on the threats and challenges involved in integrating artificial intelligence (AI) into accounting education (AE). They encourage a culture of critical reflection when analyzing tools, resources, and outcomes arising from the interaction between machine learning and professional competencies. Finally, the last high-impact study applies a systems-thinking approach to analyze how AI is transforming higher education institutions (HEIs). Using a causal loop diagram (CLD), the authors map reinforcing and balancing feedback loops that explain AI's impact on learning, research, administration, and institutional reputation. AI can enhance teaching quality and efficiency but simultaneously increases risks related to academic dishonesty and ethical concerns.

4.2. CAPES

In the first article, the authors demonstrated the use of AI in the daily routine of accounting experts. Although the study does not focus on education, it included a survey on the educational background of these professionals and mentioned the relevance of continuing education programs. Veloso et al. (2023) mentioned a study that involved research on the use of technological tools in accounting courses, titled Information Technology and Communication in Educational Practices. This study was conducted by Giovanna Gomes Cure, Danielle Bueno Bueno, Flávia Verônica Silva Jacques, and Cristiane Gularte Quintana.

Camargo et al. (2022) did not address the specific research problem that we focus on in the present paper but rather discussed the relationship between technology and the

transformation of the accounting profession. Nevertheless, they touched on a pivotal issue: the integration between Industry 4.0 and accounting, referring to this connection as Accounting 4.0. Souza et al. (2023) emphasized in their study that artificial intelligence plays a pivotal role in enhancing accounting tasks. Although their research did not specifically address the problem investigated in the present study, as did other studies discussed in this paper, it elucidated the intricate interconnection between accounting and technological innovation, especially AI.

Corrêa et al. (2024) demonstrated the urgency of integrating accounting academia with professional practice. They also emphasized the importance of promoting research that links emerging technologies, such as big data and artificial intelligence, to accounting theories and practices. This approach is closely aligned with our research focus. It also highlights the need for educational institutions to pay greater attention to the demands of stakeholders and other users of accounting information. Araújo and Cornacchione (2024) discussed the use of technological tools including artificial intelligence, big data, machine learning, robotic process automation and natural language processing in accounting processes. They emphasized that these tools have long been part of accounting practice and consequently represent a natural evolution within the field. Ferreira and Oliveira (2024) demonstrated the integration between AI and auditing through a literature review. The results showed that AI and auditing are associated with accounting skills, ethics, and technological knowledge, which are essential to achieving good results. Basically, we need excellent professionals to ensure high-quality work.

Silva et al. (2024) conducted a study on the business environment of small enterprises and presented their findings through 17 open and closed-ended questions, supported by methodological and ethical frameworks. Even though the authors did not specify the number of respondents, they reported representative results regarding the perceptions of accounting professionals working in small organizations. Importantly, the findings revealed similar views about the relationship between technology, innovation, and the need to maintain a critical perspective when using and developing accounting systems. These results align with previous studies emphasizing that technological adoption in accounting must be accompanied by reflective considerations to ensure responsible innovation.

Silva et al. (2023) conducted a survey on the implications and impacts of technology in accounting services. The responses showed that technological skills are essential for professionals to stay competitive in the business market. Guimarães et al. (2024) demonstrated the relevance of digital accounting, also known as accounting 4.0, and showed that competencies will need to be developed by both students and accounting professionals. They explained that it is pivotal to build knowledge focused on leadership in different situations, integration, social awareness, creativity, resilience, interpersonal relationships, ethics, efficiency, and technological skills. Godke et al. (2024) presented an interesting study that used ChatGPT in a practical setting. The Sufficiency Exam administered by the CFC (Federal Accounting Council) to assess the competence of accounting professionals in Brazil revealed that ChatGPT, when used to solve the questions from different exam essays, faced several challenges in interpreting practical and visual cases. In addition, the tool demonstrated difficulties when dealing with non-standard situations.

5. Discussion

The main question guiding this study is: What challenges has been AI creating for educational practices in accounting courses, as identified in scientific literature? The reviewed articles provide valuable insights into methods and frameworks that support the development of innovative educational strategies. Accounting professionals must analyze global trends, as the profession is becoming increasingly interconnected across geographic boundaries. Industry

5.0 has already become a reality, and there is a growing need to develop new skills and creative solutions to engage diverse learners and respond effectively to market transformations. It is essential to maintain an open mindset and integrate knowledge from multiple disciplines.

Furthermore, 60.4 percent (Table 1) of the reviewed studies employ simulation or modeling approaches that illustrate the interconnection between the academic sphere and the practical realities faced by stakeholders in accounting information. These applications offer valuable insights for improving the design and implementation of the PPC in Brazilian higher education institutions. Accounting science carries significant social value, as both individuals and markets rely on the integrity and accuracy ensured by robust accounting systems. Hence, particular attention should be given to understanding how this integration develops within the context of AI.

Accounting educators and institutions must genuinely embrace innovative thinking, fostering creativity while upholding the principles of integrity, reliability, fidelity, and regulatory compliance. These attributes form the foundation of reliable accounting information systems and are essential for maintaining stakeholders' confidence in the profession's ethical and technical rigor. In this regard, the TEMAC methodology and its key principles are useful for identifying major publications and fostering discussions that enhance diverse perspectives. Additionally, it is important for educators to maintain a critical perspective on the use of AI in academic contexts, as its effectiveness depends on several factors such as students' maturity, prior knowledge, and the type of platform used (for example, ChatGPT, DeepSeek, and others).

The data from CAPES indicate the relevance of using technology in various business contexts in Brazil and highlight the urgent need for curricular actions in undergraduate programs. The market increasingly demands accounting professionals who can apply artificial intelligence to automate routine tasks, allowing better use of their experience, expertise, and professional knowledge. Universities need to reformulate their curricula and adapt to this new reality. According to Resolution CNE/CES number 1, undergraduate programs must develop competencies in the use of information technology among students and foster holistic perspectives in academic discussions, encouraging multifaceted thinking and innovative actions. The document also mentions big data, data analytics, data visualization, and artificial intelligence as essential elements for developing these competencies.

6. Limitation and future research

The findings discussed above highlight both opportunities and challenges that institutions must address when integrating AI into their curricula. This study underscores the critical need to discuss the pivotal role of artificial intelligence in education, particularly within accounting programs. Future surveys involving students, educators, and other stakeholders directly engaged in the teaching and learning process could provide deeper and more comprehensive insights.

Future research could also explore how AI-driven tools influence ethical decision-making within accounting education. In addition, using other academic databases could serve as an important means of expanding and deepening the analysis, thereby providing broader insights into this emerging field. While certain risks remain, numerous opportunities also emerge from this process.

7. Conclusion

There are several promising directions for future research that could further enhance and expand upon the findings of this study. Various methods and instruments can be applied

in different contexts to develop the Pedagogical Project of the Course (PPC). Nonetheless, the focus of this research lies in addressing the gaps that persist within interdisciplinary systems. These findings contribute to the broader effort to expand the conceptual and practical boundaries of accounting science. It is urgent to address dynamic issues without neglecting the technical rigor and advanced competencies that ensure the accountability and security of this pivotal field. In essence, accounting remains the science of assets and liabilities and the discipline that guarantees the development of social data with methodological precision and transparency, which is especially relevant in a society undergoing constant change. It is crucial to discuss the integration of new technologies, especially AI, in accounting courses and to promote a culture of knowledge development in different accounting environments. Continuous learning and adaptation are key strategies for accounting in the new era, characterized by quantum technologies and intangible assets.

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