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An Umbrella Mapping Review on the Use of Artificial Intelligence in Accounting Education

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Abstract—This umbrella mapping review examines the integration of Artificial Intelligence (AI) into accounting education by synthesizing recent review-type studies. A PRISMA-guided search of Web of Science identified the corpus, while bibliometric science mapping with CiteSpace was used to uncover underlying structures and trends. To improve topical clarity and analytical accuracy, this paper proposes a Methodological Framework for Key Terms Mapping (MFKTM), which aims to systematically extract and categorize key terms across multiple sections of each article, supporting more precise and context-aware thematic analysis. Through co-citation and co-occurrence analyses of references, authors, and keywords, the study identifies five interconnected thematic clusters: curriculum reform, technological adoption, competency development, ethical implications, and systemic transformation. The co-citation network of authors highlights key intellectual influencers, while the temporal evolution of keywords reveals shifting research priorities toward acceleration and convergence around AI-supported assessment and AI-literacy outcomes. Overall, the findings illustrate a multi-level reconfiguration of accounting education, positioning AI not just as a technological enhancement but as a catalyst for broader pedagogical and institutional change. This study provides a transdisciplinary roadmap for aligning academic curricula with the evolving demands of the digital economy.

Keywords—Accounting Education, Umbrella Review, Emerging Educational Technologies, CiteSpace, Artificial Intelligence, MFKTM.

I. Introduction

WHILE umbrella review investigations (i.e., overviews of systematic reviews, [1]) have been conducted in some education-related fields, [2], none were identified that concentrate on the application of artificial intelligence (AI) in accounting education. Recent research publications in the broader field of education highlight this disparity. Thus, a 2024 research study on generative AI in education noted that "no umbrella review explores the use of generative AI in education (teaching and learning)", [3].

Nevertheless, a growing body of literature is examining AI in accounting education, as several systematic and scoping reviews have been published in recent years, reflecting a global interest in the topic, as briefly presented hereafter. The study [4], conducted a systematic review of "Era 5.0" (encompassing AI and related technologies) and its impact on the accounting profession. They emphasize an "urgent and pressing need for educational institutions… to ensure the success of retraining [accountants]… and the sustainability of the profession" in the face of rapid technological change. In other words, many accounting programs worldwide have not kept pace with innovations like AI. In the same study, the authors stressed that accounting education has lagged behind the technological advances in industry, and they call for updating curricula to "equip students with the necessary technological skills" (e.g., data analytics, AI tools) needed for modern accounting careers. This global review (with authors from Europe and a reviewer from Asia) highlights that the challenge of integrating AI into accounting education is recognized across regions. This aligns with the findings of [5], who conducted a systematic literature review with bibliometric analysis to explore the impact of AI on accounting education and competencies. They conclude that universities are "the main pillar" in driving curriculum updates, and that revising accounting curricula for the AI era is the primary measure needed. The originality of their work lies in proposing specific solutions for curriculum "reconfiguration" and in highlighting challenges to overcome in adapting to accounting education under AI's impact. Their findings reinforce that few prior studies had addressed these issues in depth – a research gap also noted by other authors.

Beyond formal reviews, thought pieces, and emerging

research, these efforts also map the landscape of AI in accounting education. The study [6], provides a critical perspective, arguing that the explosion of AI (e.g., ChatGPT) poses significant challenges that accounting educators must "urgently address". They characterize AI's rise as a "change-inducing crisis" but also a unique opportunity to reform accounting education, which has long been criticized for its overly technical focus. In their view, embracing AI should go hand-in-hand with a renewed emphasis on the human and ethical dimensions of accounting (critical thinking, social context, etc.), moving beyond the decades-long dominance of technical content. This reflects a broader trend in the literature: many experts view AI not only as a technology to adopt but also as a catalyst for modernizing teaching approaches and skill sets in accounting programs.

Recent studies also attempt to map global research trends. For example, a 2023 bibliometric analysis of Scopus-indexed publications found a growing number of papers on AI in accounting education across countries, [7]. The international scope of interest is further evidenced by research from various regions: Asia (e.g., a semi-systematic review on AI's impact on accounting education, [8]), Africa (studies on accounting curricula and automation, [9]), and North America (calls to integrate analytics and AI into accounting courses, [10]). Overall, these works indicate that AI in undergraduate accounting education is a global concern, though the extent of research and implementation varies by context. They also collectively show that the literature remains somewhat fragmented, covering topics such as required competencies, curriculum design, educational technology tools, and ethical considerations, without a single synthesis.

Building upon the points discussed above, the need for an umbrella review is well supported by the current state of the art. Therefore, a bibliometric patchwork of literature reviews and studies from around the world, when synthesized in an umbrella review, would offer a new, higher-order perspective and a much-needed global synthesis, as accounting education is currently at a juncture with AI, with numerous voices advocating for action but fragmented evidence.

II. Methods and Tools

To ensure a thorough and reproducible identification of relevant literature, a structured search strategy was developed and implemented within the Web of Science (WoS) Core Collection database, given its comprehensive content of high-quality articles. The objective of the search was to capture published review articles that examine the intersection of Artificial Intelligence (AI) and accounting education. The selection of search terms was guided by the need to balance sensitivity (recall) and specificity (precision), ensuring both breadth and thematic relevance.

As shown in Table I, the search strategy was organized into three main conceptual areas, each aimed at capturing a different but related part of the literature landscape that makes the object of present investigation: (1st) Artificial Intelligence and Emerging Educational Technologies, which covers foundational and modern AI tools and systems used in education; (2nd) Accounting Education and Instructional Contexts, focusing on studies related to pedagogy and curriculum in accounting; and (3rd) Review-Type Literature, which includes publications that use systematic, scoping, bibliometric, or other recognized review approaches.

TABLE I. SEARCH STRATEGY FOR THE WOS CORE COLLECTION DATABASE

Field tag	Conceptual block	Logic keywords query	
TS	Artificial Intelligence and Emerging Educational Technologies	"artificial intelligence" OR "machine learning" OR "deep learning" OR "neural network*" OR "natural language processing" OR "language model*" OR "large language model* OR chatbot* OR "intelligent tutoring system*" OR "adaptive learning system*" OR "generative AI" OR ChatGPT OR "educational technology" OR "intelligent system*" OR "automated feedback" OR "learning analytics"	
	Accounting Education and Instructional Contexts	AND	"accounting education" OR "accounting students" OR "accounting curriculum" OR "accounting curricula" OR "accounting instruction" OR "teaching accounting" OR "learning accounting" OR "accounting pedagogy" OR "accounting course*" OR "accounting classroom*" OR "accounting training"
AB	Review-Type Literature	AND	review OR "literature review" OR "systematic review" OR "scoping review" OR "state of the art" OR "meta-analysis" OR "bibliometric analysis" OR "umbrella review"

Source: created by the authors.

The above-mentioned query was applied without restriction on publication year, geographic region, or journal scope to provide a comprehensive global and temporal overview. The search was limited to English-language publications and conducted in May 2025.

A rigorous and transparent methodology for data collection was maintained by following the Preferred Reporting Items for rigorous Reviews and Meta-Analyses (PRISMA) criteria, as recently revised in [11]. Figure 1 illustrates the PRISMA flowchart used in this work, which facilitates the systematic identification, screening, and inclusion of studies in a consistent and structured manner, essential for a high-quality bibliometric analysis.

According to the specified search criteria, the identification phase produced an initial collection of 16 review-type articles. Thereafter, the relevant bibliographic data were exported from the WoS Core Collection database in plain text format, encompassing complete records and cited references, to facilitate later processing in CiteSpace.

The screening process was carried out in two stages. First, titles and abstracts were reviewed separately to assess their relevance to the topic and the quality of the methodology. Then, full texts were collected and examined to ensure each

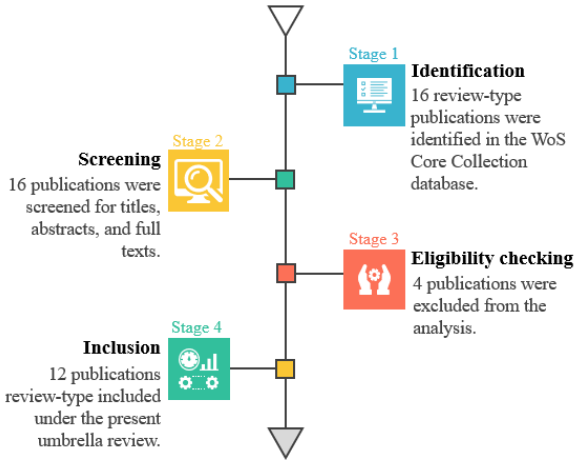

Fig. 1. The PRISMA flowchart utilized in this study.
Source: Created by the authors

study met the inclusion criteria.

Within the eligibility assessment phase, clearly defined inclusion and exclusion criteria were employed. As previously mentioned, the inclusion criteria were limited to peer-reviewed journal articles that explicitly adopted a review-type methodology (e.g., literature review, systematic review, scoping review, bibliometric analysis, or umbrella review), with a primary focus on the application, integration, or implications of Artificial Intelligence in accounting education. Studies were excluded if they: (a) addressed AI in accounting practice without an educational component; (b) described empirical case studies without a review-based approach; (c) focused on generic educational technologies unrelated to AI; or (d) were commentaries, editorials, book chapters, or non-English publications.

After completing the inclusion phase, 12 scientific articles were selected, and the resulting dataset was carefully pre-processed to ensure consistency and compatibility with CiteSpace software for subsequent bibliometric mapping. Special attention was given to formatting the cited references (CR fields), addressing issues such as the use of periods or dots between initials, surnames written in all caps, full forenames, or anonymous entries. Because these issues caused fragmented citation records and misrepresented co-citation connections, all records were thoroughly reviewed and standardized to ensure uniform formatting, thereby improving the accuracy of co-citation and author network visualizations.

Furthermore, to ensure the accuracy of citation records and author identification in the bibliometric study, special attention was given to the consistency of published author names, particularly for individuals with the same last name. If not addressed, such inconsistencies could result in disconnected citation networks and an incomplete view of an author's work. Therefore, all variations were carefully checked and merged, ensuring that each author's publication record was treated as a single, unified identity during the co-citation and cooperation analyses conducted in CiteSpace.

A methodological challenge encountered during data preparation was the limited semantic accuracy and inconsistent relevance of Keywords Plus for theme mapping. According to Clarivate Analytics, [12], Keywords Plus are generated from phrases often found in the titles of an article's cited sources, rather than from the article itself. A proprietary algorithm automatically creates these and tends to prioritize multidisciplinary breadth over topical precision. While such phrases can help identify citation patterns, their ability to accurately represent the core content of review papers is relatively limited, [13]. Inspection showed that Keywords Plus, and often Author Keywords, did not consistently reflect the primary contributions or topics of the papers. Therefore, a Methodological Framework for Key Terms Mapping (MFKTM) is proposed to improve topical clarity and analytical accuracy, as shown in Figure 2. As can be seen, it involves systematically extracting and classifying significant key terms from different sections of each article, enabling more accurate and contextually relevant theme analysis.

To consolidate all the above-mentioned methods, this

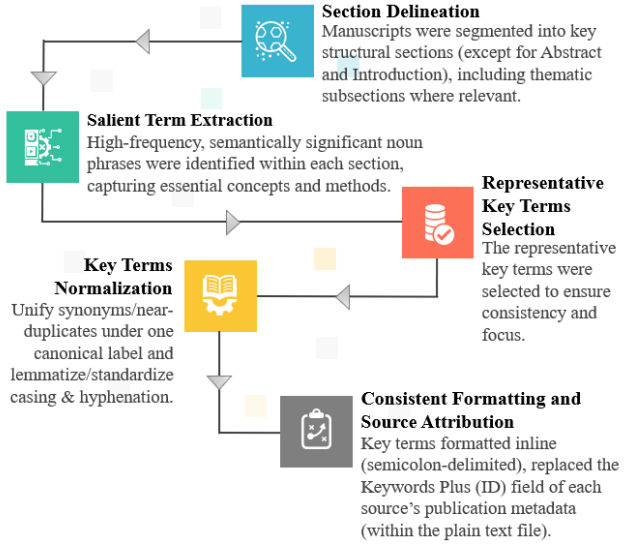

Fig. 2. The MFKTM flowchart.
Source: created by the authors

study's analytical phase utilized CiteSpace software, [14], as the primary tool for conducting an in-depth bibliometric umbrella review. It allows the exploration and visualization of intellectual structures within the literature by creating various network maps that reveal key thematic connections, patterns of scholarly influence, and the temporal development of research fronts, [15]. The dataset, comprising 12 review articles on artificial intelligence in accounting education, was analyzed over the period from 2021 to 2025, with a one-year slice length.

III. Results and Discussion

Five interrelated subsections, each addressing the results of distinct analytical dimensions, are presented and discussed hereafter. These include co-citation analysis of references, clustering of co-cited literature, co-citation patterns of influential authors, co-occurrence of keywords, and a temporal

timeline view of key terms. Together, these analyses offer a comprehensive overview of the thematic development, influential contributions, and emerging trends within the field.

A. *Co-citation analysis of references*

Co-citation analysis of references reveals a conceptually cohesive and emerging intellectual space, grounded in key contributions from recent literature. The five most co-cited articles listed in Table II (each cited together at least two to three times within the review articles dataset) emphasize complementary themes on digital transformation, pedagogical adaptation, and technological readiness.

TABLE II. TOP-5 CO-CITED REFERENCES

No. of co-citations	Core ID in CiteSpace-style	Cluster ID in Figure 3
3	Sutton SG, 2016, INT J ACCOUNT INF SY, V22, P60	#4
3	Banasik E, 2021, AUST ACCOUNT REV, V31, P256	#2
3	Damerji H, 2021, ACCOUNT EDUC, V30, P107	#3
3	Holmes AF, 2022, J EMERG TECHNOL ACCO, V19, P53	#6
2	Guse GR, 2022, AMFITEATRU ECON, V24, P252	#6

Source: created by the authors

The most co-cited work, [16], revisits the historical trajectory of AI research in accounting, rebutting the narrative of its decline and emphasizing a renewed momentum. This reference serves as a conceptual anchor, affirming the vitality and continuity of AI-focused research within accounting information systems. Its centrality reflects the field's concern with validating AI's relevance and charting methodological directions for future studies in both research and practice.

The study, [17], contributes a curriculum-focused perspective, analyzing how employability skills—mainly digital and leadership abilities—are integrated into accounting programs in Australia. Her work is often co-cited in discussions about the gaps between academic training and industry expectations, serving as a key reference in debates about future-ready accounting curricula. Its significance is heightened by its alignment with international education standards and several specific recommendations for reform.

The study, [18], provided a psychological and behavioral lens, examining how students' perceptions of technology influence their readiness to adopt AI. This paper is co-cited in works exploring individual-level adoption factors, particularly the mediating roles of perceived usefulness and ease of use. Its frequent appearance in co-citation patterns underscores the growing emphasis on learner agency and digital adaptation in AI-integrated accounting education.

Finally, the research, [19], presented a case study on the readiness of Romanian universities for digital transformation in accounting education. Although more regionally focused, the study's emphasis on institutional capacity, generational learning gaps, and curriculum mapping makes it a crucial contribution to the comparative and implementation-focused dialogue on digital education reform.

B. *Clustering of co-cited literature*

Whereas co-citation analysis of references identifies the frequency with which pairs of documents are cited together (thereby highlighting influential works within a domain), clustering of co-cited literature goes a step further by organizing these co-cited references into coherent thematic groups, as shown in Figure 3. The purpose of clustering is not merely to map individual influence, but to reveal the structural and conceptual organization of the field. It enables researchers to identify emerging research fronts, interrelated subtopics, and latent knowledge communities by grouping references that are consistently co-cited across different source articles. In essence, clustering transforms a co-citation network into a semantic landscape, where each cluster represents a distinct area of scholarly inquiry or a developing discourse. This is especially valuable in umbrella reviews, where the goal is to synthesize a broad body of knowledge into clearly defined

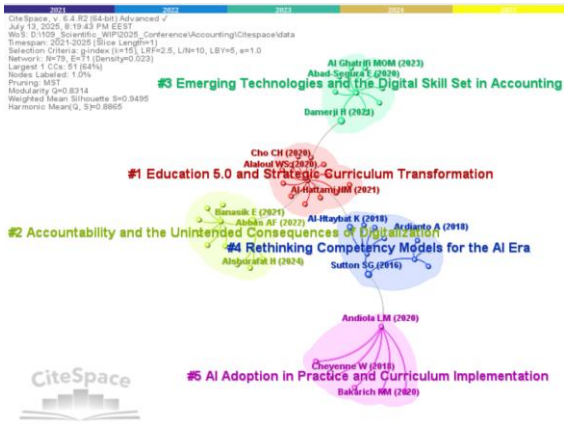

Fig. 3. Visualisation of literature co-citation clusters
Source: Created by the authors

thematic domains.

The 1st co-citation literature cluster is centered on the challenges and transformations in accounting education brought by Society 5.0 and Education 4.0. Anchored by [4], this cluster consolidates research on aligning educational systems with emerging technological and societal demands. Core contributions from [20] and [21] highlight the disconnect between traditional curricula and IT job market expectations, while, [22], advocates for a strategic overhaul of accounting as a learned profession. Collectively, this cluster captures the macro-educational discourse, emphasizing institutional readiness, interdisciplinary innovation, and the sustainability of accounting education in an era of digital transformation.

Driven in [23], the 2nd co-citation literature cluster explores the broader implications of digital transformation for accounting, auditing, and accountability. In fact, it combines bibliometric and qualitative methods to evaluate unforeseen impacts at the individual, organizational, and societal levels. Highly cited works in [17] and [24] highlight concerns about AI ethics, employability skills, and academic dishonesty (e.g.,

misuse of ChatGPT). This cluster adds an essential dimension to the discussion, examining how digital tools influence values, responsibilities, and risks within the accounting education ecosystem.

Led in [25], the third co-citation literature cluster provides a technology-focused overview of AI, blockchain, big data, and automation in the accounting field. Thematically, it expands on Damerji's model of technology readiness and adoption, [18], demonstrating how perceptions of ease of use and usefulness affect AI integration. Complementary studies in [26] and [27] contribute to this perspective by highlighting research gaps and challenges in the application of technology in education. This cluster acts as a diagnostic and planning tool, emphasizing both progress and ongoing gaps in AI literacy and digital skills development.

The 4th co-citation literature cluster, anchored in [28], introduces the "Seven Cs" competency model, which redefines accounting education in terms of critical thinking, communication, collaboration, and creativity. It connects to foundational works, such as [16] and [29], reaffirming the importance of AI research in accounting and highlighting the need for curriculum changes. The inclusion of [30], on data mining applications places this cluster at the intersection of AI analytics and educational redesign, encouraging a shift from knowledge-based to skill-based education in response to automation.

The smallest yet high-quality co-citation literature is the 5th cluster, driven in [31], which examines the practical implementation and institutional response to AI in accounting. Key contributions in [32] and [33] assess the extent of AI usage in professional settings and the challenges faced by academic departments in integrating AI and data analytics into curricula. The cluster also includes studies [34] and [35], which reinforce themes of practice-readiness and computational proficiency. As can be seen, it is characterized by its applied orientation, which captures organizational realities and educator strategies for managing digital change.

Together, these clusters, whose visualization network, as shown in Figure 3, reflect a multi-level transformation of accounting education: i.e., spanning visionary reforms in Cluster #1, ethical and institutional critique in Cluster #2, technological adoption described by Cluster #3, competency development in Cluster #4, and curricular implementation in Cluster #5. This kind of rich structural mapping affirms the transdisciplinary and practice-aligned nature of the discourse, positioning AI not just as a technical tool but as a catalyst for pedagogical and professional reconfiguration.

C. Co-citation analysis of authors

The co-citation analysis of authors is a valuable addition to the co-citation analysis of references, as it uncovers patterns of intellectual influence and scholarly alignment among authors whose works are often cited together. This approach goes beyond analyzing individual documents to identify key thought leaders, intellectual communities, and collaborative groups that shape a research field. By tracking how authors are co-cited across multiple studies, the analysis offers more profound insights into the structural cohesion and thematic connections within and across subfields. When combined with co-citation analysis of references, the author-based approach enhances bibliometric mapping by shifting focus from what is cited to who drives and sustains the discourse. This distinction is especially important in rapidly evolving, interdisciplinary areas such as AI in accounting education, where influence extends across educational theory, technological innovation, and professional practice.

Figure 4 presents a visual representation of the author co-citation network, showing four clusters of researchers whose work together contributes to the growth of this emerging field.

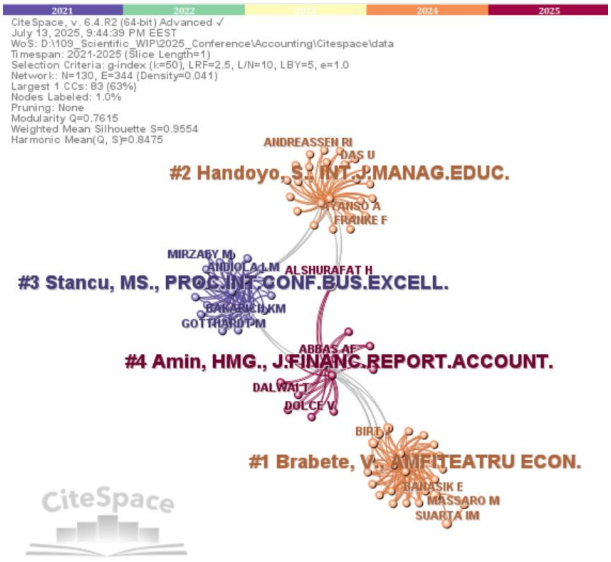

Fig. 4. Visualisation of authors co-citation clusters
Source: Created by the authors

Anchored by [5], the 1st co-citation cluster of authors reflects a growing concern with restructuring accounting education to meet the demands of AI-driven professional environments. The analysis identifies 25 authors in this cluster, among whom the most cited are [17], [36], [37], [38], [39]; their contributions converge on the university's role in curriculum innovation and skills development. In fact, Brabete's citing articles frame AI as a driver of redefinition in accounting roles, urging institutions to modernize educational content and pedagogy. This cluster represents the strategic and policy-level discourse focused on aligning academic programs with the evolving technological landscape and labor market expectations.

The 2nd largest co-citation cluster of researchers, driven by [40], comprises 24 authors and illustrates a bibliometric view of paradigm shifts in accounting education driven by technological development. The most cited authors in this cluster are [41], [42], [43], [44], [45], who explore topics such as AI, accounting information systems, big data, e-learning, and blockchain. The driving paper emphasizes the combined importance of technical skills and psychological readiness, highlighting the link between digital literacy, mental health,

and instructional adaptability. This cluster highlights the theoretical and integrative approaches in education, focusing on the transition from traditional to technology-enhanced models in the accounting curriculum.

The 3rd co-citation cluster of authors, rooted in [31], includes 22 authors and focuses on how AI is reshaping accounting jobs and the skills required. With key contributors such as [32], [33], [46], [47], [48], the emphasis here is on understanding the practical implications of AI adoption; how automation reduces repetitive tasks and what this means for professional training. In fact, the foremost article highlights the organizational reluctance to adopt AI and emphasizes the need for educational strategies that prepare students to work alongside intelligent systems. This cluster reflects the practitioner and readiness discourse, bridging academic insight with labor market transition.

Underpinned by [9], the smallest 4th cluster, comprising 12 authors, contributes to the strategic bibliometric mapping of the accounting education field in the digital era. Influential figures such as [24], [49], [50], [51], emphasize the identification of several key themes: technology integration, skill transformation, and institutional productivity. This cluster provides a meta-perspective, essential for guiding future research agendas, identifying gaps, and supporting policymakers and academic leaders in developing responsive strategies.

D. Co-occurrence of keywords

Based on the CiteSpace clustering results from the co-citation analysis of keywords, the intellectual structure of the field related to AI in accounting education is organized into three main thematic clusters, as shown in Figure 5, each representing a different area of scholarly discussion. These clusters provide insights into the conceptual focus, shifting priorities, and emerging research directions within the domain. The analysis in the following sections offers a narrative overview of each cluster, using silhouette values, keyword centrality, and thematic orientation.

The first cluster of co-occurring keywords is the largest and most conceptually integrated group, with a high silhouette value of 0.921, showing strong internal consistency. It mainly centers on keywords such as digital transformation, future research agenda, higher education, enterprise resource planning, and information technology. These terms emphasize the technological foundation of the discussion, highlighting how both basic and emerging digital systems are changing accounting education. The inclusion of "future research agenda" also signals an anticipatory focus, stressing this cluster's role in shaping long-term priorities for integrating AI and related technologies into academic practice. Its recent average publication year (2024) further underlines its forward-looking and strategic stance within the field.

The 2nd cluster of keywords co-occurrence shows a highly cohesive and mature conceptual structure, with a perfect silhouette value of 1. This indicates a clearly defined thematic boundary. The main keywords in this cluster (holistic perspective, curriculum integration, and education reform) point to an ongoing shift in how educational institutions are redesigning accounting programs to address AI-related demands. Therefore, this cluster highlights pedagogical transformation, emphasizing the rethinking of learning outcomes, instructional design, and educational philosophy to prepare graduates who are AI-ready.

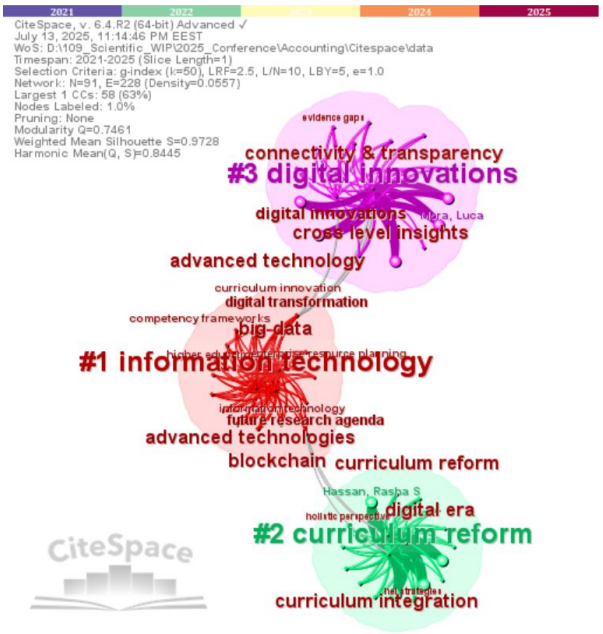

Fig. 5. Keywords co-occurrence network visualization
Source: Created by the authors

The 3rd cluster of keyword co-occurrence focuses on cutting-edge trends and frontier technologies that are shaping the landscape of accounting education. With keywords such as anonymity & transparency, evidence gaps, and digital tools, this cluster captures innovation at the intersection of ethics, usability, and accountability. The cluster's average year of 2025 positions it as the most contemporary and rapidly evolving thematic frontier, likely reflecting post-pandemic advancements and the acceleration of ed-tech adoption. The conceptual thrust here is toward designing agile, inclusive, and ethically grounded digital learning environments.

Together, these keyword clusters delineate a multi-dimensional framework for understanding AI's role in transforming accounting education. Cluster #1 (Information Technology) sets the technological foundation, Cluster #2 (Curriculum Reform) addresses institutional and pedagogical reconfiguration, and Cluster #3 (Digital Innovations) charts the emerging ethical and functional challenges of implementation. The coherence and recency of these clusters suggest that AI integration in accounting education is not merely an emerging topic but a strategically positioned research frontier that demands sustained scholarly engagement and interdisciplinary collaboration.

E. Timeline view of co-cited keywords

The timeline visualization of co-cited keywords, depicted in

Figure 6, illustrates the temporal evolution of conceptual themes by analyzing the co-citation patterns of keywords across different time periods. Instead of focusing on superficial subject connections, this perspective examines the long-term growth and endurance of more profound intellectual frameworks. It illustrates how keyword clusters have evolved, remained stable, or fluctuated over time, thereby clarifying the historical dynamics of academic attention. This temporal approach enables researchers to identify research fronts, track theme transitions, and highlight periods of conceptual convergence or innovation, providing a strategic overview of the evolution of concepts related to AI in accounting education over time.

The graphic above shows that the field's ideas have been growing steadily. During the initial phase (2021–2022), the study was limited and mainly focused on broad technical issues, as indicated by the early use of the phrase "advanced technology." This term likely reflects an initial interest in integrating AI-related technologies and systems into accounting education; however, there is no clear plan for their implementation.

As the timeline approaches 2023 and 2024, the network becomes increasingly complex, with heightened research activity and a broader range of topics. Words like "competency frameworks," "blockchain," "big data," and "curriculum integration" are converging, indicating that more scholars are interested in enhancing teaching methods, integrating digital information, and updating courses to keep pace with new technologies. These words also indicate that we are shifting our focus from merely examining whether technology exists to considering its impact on education and the skills required to train future accountants.

Fig. 1. Timeline visualization of co-cited keywords
Source: Created by the authors

By 2025, the map will become more interconnected, with key phrases like "curriculum reform," "digital era," "cross-level insights," and "connectivity & transparency" forming a strong framework. This signals a shift toward institutional transformation and systemic change, where research focuses not only on AI and digital technologies but also on their interdisciplinary, ethical, and administrative aspects, including the integration of these innovations into accounting education. The rise of "cross-level insights" reflects a growing interest in comparative or multi-tiered analysis, potentially across different educational levels or national contexts.

IV. Conclusion

The co-citation network of references suggests that the field is progressing, with an increasing focus on reform through practical applications, the adoption of new technologies, and preparing students for workplaces that utilize AI.

The clustering of co-cited literature suggests that the field of accounting education is undergoing changes at multiple levels due to the adoption of AI. The identified clusters encompass a range of academic activities, including new reforms, critiques of institutions, the adoption of new technologies, skill development, and the implementation of new curricula. This structural mapping demonstrates how the discussion intersects with several fields and remains closely connected to real-world experiences. Overall, the results support the idea that AI is not only a technological advance but also a reason to reconsider how we teach and prepare people for jobs in accounting and related professions.

The network clustering derived from co-citation analysis of authors provides a comprehensive framework for examining the transformative impact of AI on accounting education. The clarity and current relevance of these clusters confirm that AI has shifted from a marginal topic to a vital research area, requiring ongoing multidisciplinary research and educational reforms.

Ultimately, the keyword co-occurrence analysis reveals a complex theme structure that demonstrates the evolution of AI integration in accounting education. The identified clusters—covering technical infrastructure (Information Technology), curricular and institutional reform (Curriculum Reform), and ethical and functional innovation (Digital Innovations)—show a sector undergoing significant redefinition. Their coherence and recent appearance indicate that AI has shifted from a minor concern to a crucial strategic frontier in educational research. This shift, then, calls for ongoing research, cross-disciplinary collaboration, and proactive curriculum development to ensure that accounting education stays relevant in a world where professionals are becoming more intelligent and automated.

The timeline visualization of co-cited terms showed how study goals changed over time, shifting from a broad focus on technology to a focus on competency and ethical issues in educational design. The trend reflects a shift from learning about ideas to applying them, aligning with the global demand for business and accounting curricula that equip students for the future. Additionally, the increasing connections between nodes in later years indicate that concepts are coming together more, as researchers are not only reacting to technological changes but also actively shaping an AI-literate, digitally fluent accounting education environment.

Declaration of Generative AI and AI-assisted Technologies in the Writing Process

The author wrote, reviewed and edited the content as needed and verifies that none utilised artificial intelligence (AI) tools were used. The authors take full responsibility for the content of the publication.

References

[1] N. Strydom, A. Mohammadali-Haji, "The accountancy profession and the challenges of artificial intelligence," in Artificial Intelligence in Accounting, Auditing and Finance. Cham: Springer, pp. 45–61, 2025.

[2] D. Gulseren, N. Turner, and J. M. Weinhardt, "What makes ethics education effective? An umbrella review and evidence-led best practices," Journal of Business Ethics Education, vol. 18, no. 1, pp. 5–24, 2021.

[3] A. Namoun et al., "Generative artificial intelligence in education: an umbrella review of applications and challenges," in press, 2024.

[4] M. C. Tavares, G. Azevedo, R. P. Marques, and M. A. Bastos, "Challenges of education in the accounting profession in the Era 5.0: A systematic review," Cogent Business & Management, vol. 10, no. 2, 2023.

[5] V. Brabete et al., "Redesign of accounting education to meet the challenges of artificial intelligence—a literature review," Amfiteatru Economic, vol. 26, no. 65, pp. 275–293, 2024.

[6] J. Ballantine, G. Boyce, and G. Stoner, "A critical review of AI in accounting education: threat and opportunity," Critical Perspectives on Accounting, vol. 99, 102711, 2024.

[7] G. Wale-Fadairo and O. A. Ige, "A scoping review of artificial intelligence integration into accounting," International Journal of Educational Methodology, vol. 11, no. 1, pp. 113–125, 2025.

[8] R. Tandiono, "The impact of artificial intelligence on accounting education: a review of literature," in E3S Web of Conferences, vol. 426. EDP Sciences, 2023.

[9] H. M. G. Amin et al., "A bibliometric analysis of accounting education literature in the digital era: current status, implications and agenda for future research," Journal of Financial Reporting and Accounting, vol. 23, no. 2, pp. 742–768, 2025.

[10] Q. Liu et al., "Bringing scholarly data analytics knowledge using emerging technology tools in accounting into classrooms: a bibliometric approach," Issues in Accounting Education, vol. 36, no. 4, pp. 153–181, 2021.

[11] M. J. Page et al., "PRISMA 2020 statement: an updated guideline for reporting systematic reviews," BMJ (Clinical Research Ed.), vol. 372, pp. 71, 2021.

[12] Clarivate Analytics, "KeyWords Plus: Generation, Creation, and Changes," Clarivate Support, [Online]. https://support.clarivate.com/ScientificandAcademicResearch/s/article/KeyWords-Plus-generation-creation-and-changes?language=en_US (Accessed: Jun. 28, 2025).

[13] J. Zhang, Q. Yu, F. Zheng, C. Long, Z. Lu, and Z. Duan, "Comparing Keywords Plus of WOS and Author Keywords: A Case Study of Patient Adherence Research," Journal of the Association for Information Science and Technology, vol. 67, no. 4, pp. 967–972, 2016.

[14] C. Chen, "CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature," Journal of the American Society for Information Science and Technology, vol. 57, no. 3, pp. 359–377, 2006.

[15] C. Chen, "Science mapping: a systematic review of the literature," Journal of Data and Information Science, vol. 2, pp. 1–40, 2017.

[16] S. G. Sutton, M. Holt, and V. Arnold, "'The reports of my death are greatly exaggerated'—Artificial intelligence research in accounting," International Journal of Accounting Information Systems, vol. 22, pp. 60–73, 2016.

[17] E. Banasik and C. Jubb, "Are accounting programs future-ready? Employability skills," Australian Accounting Review, vol. 31, no. 3, pp. 256–267, 2021.

[18] H. Damerji and A. Salimi, "Mediating effect of use perceptions on technology readiness and adoption of artificial intelligence in accounting," Accounting Education, vol. 30, no. 2, pp. 107–130, 2021.

[19] G. R. Guşe and M. D. Mangiuc, "Digital transformation in Romanian accounting practice and education: impact and perspectives," Amfiteatru Economic, vol. 24, no. 59, pp. 252–267, 2022.

[20] H. M. Al-Hattami, "University accounting curriculum, IT, and job market demands: evidence from Yemen," SAGE Open, vol. 11, no. 2, 2021.

[21] J. Alvarez-Cedillo et al., "Actions to be taken in Mexico towards Education 4.0 and Society 5.0," International Journal of Evaluation and Research in Education, vol. 8, no. 4, pp. 693–698, 2019.

[22] M. Aldredge, C. Rogers, and J. Smith, "The strategic transformation of accounting into a learned profession," *Industry and Higher Education*, vol. 35, no. 2, pp. 83–88, 2021.

[23] D. Argento et al., "The unaccounted effects of digital transformation: implications for accounting, auditing and accountability research," Accounting, Auditing & Accountability Journal, vol. 38, no. 3, pp. 765–796, 2025.

[24] H. Alshurafat et al., "Factors affecting accounting students' misuse of ChatGPT: an application of the fraud triangle theory," Journal of Financial Reporting and Accounting, vol. 22, no. 2, pp. 274–288, 2024.

[25] Indrayani, E. G. Sukoharsono, A. Djamhuri, and Roekhudin, "Mapping research landscape of emerging technology in the accounting field: a bibliometric analysis," Cogent Business & Management, vol. 11, no. 1, 2407044, 2024.

[26] E. Abad-Segura and M.-D. González-Zamar, "Research analysis on emerging technologies in corporate accounting," Mathematics, vol. 8, no. 9, pp. 1589, 2020.

[27] M. O. M. Al Ghatrifi, J. S. S. Al Amairi, and M. M. Thottoli, "Surfing the technology wave: an international

perspective on enhancing teaching and learning in accounting," Computers and Education: Artificial Intelligence, vol. 4, 100144, 2023.

[28] R. De Villiers, "Seven principles to ensure future-ready accounting graduates—a model for future research and practice," Meditari Accountancy Research, vol. 29, no. 6, pp. 1354–1380, Nov. 2021.

[29] K. Al-Htaybat, L. von Alberti-Alhtaybat, and Z. Alhatabat, "Educating digital natives for the future: accounting educators' evaluation of the accounting curriculum," Accounting Education, vol. 27, no. 4, pp. 333–357, 2018.

[30] F. A. Amani and A. M. Fadlalla, "Data mining applications in accounting: a review of the literature and organizing framework," International Journal of Accounting Information Systems, vol. 24, pp. 32–58, 2017.

[31] M. S. Stancu and A. Duțescu, "The impact of artificial intelligence on the accounting profession, a literature's assessment," Proceedings of the International Conference on Business Excellence, vol. 15, no. 1, 2021.

[32] K. M. Bakarich and P. E. O'Brien, "The robots are coming… but aren't here yet: the use of artificial intelligence technologies in the public accounting profession," Journal of Emerging Technologies in Accounting, vol. 18, no. 1, pp. 27–43, 2021.

[33] L. M. Andiola, E. Masters, and C. Norman, "Integrating technology and data analytic skills into the accounting curriculum: accounting department leaders' experiences and insights," Journal of Accounting Education, vol. 50, 100655, 2020.

[34] V. N. Chukwuani and M. A. Egiyi, "Automation of accounting processes: impact of artificial intelligence," International Journal of Research and Innovation in Social Science (IJRISS), vol. 4, no. 8, pp. 444–449, 2020.

[35] D. Andriosopoulos et al., "Computational approaches and data analytics in financial services: a literature review," Journal of the Operational Research Society, vol. 70, no. 10, pp. 1581–1599, 2019.

[36] M. Massaro, J. Dumay, and J. Guthrie, "On the shoulders of giants: undertaking a structured literature review in accounting," Accounting, Auditing & Accountability Journal, vol. 29, no. 5, pp. 767–801, Jun. 2016.

[37] I. M. Suarta, I. K. Suwintana, I. G. A. O. Sudiadnyani, and N. P. R. Sintadevi, "Employability and digital technology: what skills employers want from accounting workers?," Accounting Education, vol. 33, no. 3, pp. 274–295, 2024.

[38] J. Birt, M. Safari, and V. B. de Castro, "Critical analysis of integration of ICT and data analytics into the accounting curriculum: A multidimensional perspective," Accounting & Finance, vol. 63, no. 4, pp. 4037–4063, 2023.

[39] T. Elo, S. Pätäri, H. Sjögrén, and M. Mättö, "Transformation of skills in the accounting field: the expectation–performance gap perceived by accounting students," Accounting Education, vol. 33, no. 3, pp. 237–273, 2023.

[40] S. Handoyo, "Evolving paradigms in accounting education: a bibliometric study on the impact of information technology," The International Journal of Management Education, vol. 22, no. 3, 100998, 2024.

[41] R. I. Andreassen, "Digital technology and changing roles: a management accountant's dream or nightmare?," Journal of Management Control, vol. 31, pp. 209–238, 2020.

[42] U. Das, "Online learning: challenges and solutions for learners and teachers," Management and Labour Studies, vol. 48, no. 2, pp. 210–213, 2022.

[43] A. Ayanso, "Big data: transcending disciplines in higher education," The Evolution, 2017. [Online]. Available: https://evolllution.com/managing-institution/higher_ed_business/big-data-transcending-disciplines-in-higher-education (Accessed: Aug. 31, 2024).

[44] F. Franke and M. R. Hiebl, "Big data and decision quality: the role of management accountants' data analytics skills," International Journal of Accounting & Information Management, vol. 31, no. 1, pp. 93–127, 2023.

[45] M. Ghasemi, V. Shafeiepour, M. Aslani, and E. Barvayeh, "The impact of information technology (IT) on modern accounting systems," Procedia - Social and Behavioral Sciences, vol. 28, pp. 112–116, 2011.

[46] M. Gotthardt, D. Koivulaakso, O. Paksoy, C. Saramo, M. Martikainen, and O. Lehner, "Current state and challenges in the implementation of smart robotic process automation in accounting and auditing," ACRN Journal of Finance and Risk Perspectives, 2020.

[47] M. Mirzaey, B. J. Mohammad, and Y. Hojatpour, "How artificial intelligence is challenging accounting profession," Journal of International Scientific Publications, 2018.

[48] C. Greenman, "Exploring the impact of artificial intelligence on the accounting profession," Journal of Research in Business, Economics and Management, vol. 8, no. 3, pp. 1451, 2017.

[49] V. Dolce, F. Emanuel, M. Cisi, and C. Ghislieri, "The soft skills of accounting graduates: perceptions versus expectations," Accounting Education, vol. 29, no. 1, pp. 57–76, 2019.

[50] T. Dalwai, S. S. Mohammadi, G. Chugh, and A. Somerville, "Big data analytics and accounting education: A systematic literature review," in Fourth Industrial Revolution and Business Dynamics, N. R. Al Mawali, A. M. Al Lawati, and A. S., Eds. Singapore: Palgrave Macmillan, 2021.

[51] A. F. Abbas, A. Jusoh, A. Mas'od, A. H. Alsharif, and J. Ali, "Bibliometrix analysis of information sharing in social media," Cogent Business & Management, vol. 9, no. 1, 2022.

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