

Rethinking the Adoption of Artificial Intelligence in Higher Education: A Bibliometric Study of Barriers, Ethical Issues, and Governance Challenges

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Article Info	Abstract
<p>Keywords: Artificial Intelligence, Higher Education, Bibliometric Analysis, Governance, Ethics.</p> <p>JEL: A2, G3, N7</p> <p>Received: 2 September 2025 Accepted: 19 September 2025 Published: 21 September 2025</p>	<p>This paper presents a bibliometric analysis of recent research on the integration of artificial intelligence (AI) in higher education, with a particular focus on the obstacles encountered, the ethical dilemmas raised, and the associated governance issues. The study is based on a corpus of 803 peer-reviewed articles extracted from the Web of Science database for the period 2020–2024.</p> <p>The analysis was conducted using the VOSviewer and Biblioshiny tools, which identified the most frequently co-occurring keywords, major contributors, global collaboration networks, and structuring thematic clusters. The results highlight a strong focus on technology acceptance models (particularly UTAUT and TAM) and the pedagogical integration of AI. However, several critical gaps remain, particularly regarding personal data protection, algorithmic bias, the lack of robust regulatory frameworks, and the underrepresentation of developing countries in scientific publications and academic collaboration networks.</p> <p>The study highlights the importance of strengthening ethical governance mechanisms, developing inclusive policies to support the growth of AI in the Global South, and promoting more balanced scientific partnerships at the international level.</p>

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Introduction

Over the past few years, artificial intelligence (AI) has gained momentum as a catalyst for transformation in higher education, altering how institutions deliver instruction, conduct academic research, and manage administrative tasks, while giving rise to issues related to ethics, equity and the cognitive hegemony of Northern countries (Leite, 2025 ; Sahar & Munawaroh, 2025 ; Chan et al., 2024; Kumar et al, 2024).

However, despite the extensive body of literature that has been published on technology acceptance models such as 'TAM or UTAUT' (Dwivedi et al., 2023; Oulamine et al., 2024, 2025), research has tended to neglect structural challenges such as algorithmic biases, transparency, or responsible AI governance, particularly in educational contexts in the Global South (Tlili et al., 2023; Perdana et al., 2025; Valencia-Arias et al., 2025).

Building on recent scholarship, this study adopts concise conceptual anchors to frame its analysis. In the context of higher education, AI governance refers to the institutional frameworks policies, principles, and regulatory mechanisms established to supervise and guide the use of AI, thereby ensuring accountability, transparency, and compliance with ethical–legal standards (Oncioiu & Bularca, 2025). AI ethics denotes the normative principles that underpin the fair, transparent, and responsible development and deployment of AI systems, while safeguarding human values and social justice (Radanliev, 2025). Structural barriers encompass institutional, technological, and socio-economic constraints that hinder the equitable adoption of AI, disproportionately affecting contexts where infrastructural deficiencies and limited institutional support prevail, particularly in developing regions (Xiao et al., 2025).

Consequently, the present study pursues a twofold objective: firstly, to propose a systematic bibliometric mapping of research on AI adoption in higher education, with a particular focus on themes related to ethics, governance and structural barriers; and secondly, to identify gaps, geographical polarities and prospects for the field's evolution.¹

The methodology combines the use of VOSviewer and Biblioshiny (R Studio) to analyse a corpus of 803 articles indexed in the Web of Science database between 2020 and 2024. The analysis draws on recommended practices in bibliometrics applied to digital education, mobilising in particular co-occurrence maps, collaborative networks, and thematic clusters (Yang et al., 2025; Donthu et al., 2021; Aria & Cuccurullo, 2017). This study will help facilitate the design of more inclusive governance policies and the emergence of contextually grounded empirical research by relating emerging trends to identified theoretical gaps.

Nevertheless, this study is designed to contribute to existing literature by critically analysing economic dynamics of scientific production on AI in higher education. In addition, it identifies epistemic imbalances and margins of inclusion in the global South. The utilisation of sophisticated

¹ This article builds upon a scientific communication presented at the 12th International Peer-Reviewed Congress of the World Commission of Scholars and Researchers, held at Ajloun National University (Hashemite Kingdom of Jordan) on July 5–6, 2025.

bibliometric instruments is also intended to interrogate the theoretical conceptualisation of the domain and the mechanisms of geographical and paradigmatic exclusion that pervade it.

This research aims to address five core questions that underpin the current landscape of artificial intelligence in higher education:

1. In what ways has the scholarly discourse on AI in higher education evolved over the past few years, particularly in terms of volume, focus, and direction?
2. Who are the leading contributors shaping this domain—across authors, academic institutions, journals, and countries and how do their networks influence the dissemination of knowledge?
3. What conceptual frameworks and methodological strategies are predominantly employed in the existing literature?
4. Which key themes are emerging around ethical concerns and governance challenges in the integration of AI within educational systems?
5. Which regions, populations, or conceptual angles remain understudied, thereby warranting deeper empirical or theoretical investigation?

As part of a dynamic of rigorous scientific production, the present study aims to contribute to the intellectual structuring of the field and the emergence of research agendas better adapted to the realities of higher education systems around the world.

1. Méthodologie.

The present study adopts a comprehensive bibliometric strategy to analyze the conceptual architecture and scholarly development of AI-related research within the context of higher education. The methodology employed is founded upon objective and reproducible indicators, with the aim of mapping publication dynamics, identifying influential authors, institutional collaborations and emerging themes (Aria & Cuccurullo, 2017; Donthu et al., 2021).

To examine the field comprehensively, the study applies a dual methodological framework. The first component involves performance-based indicators, capturing citation-based productivity and influence. The second focuses on mapping intellectual structures, enabling a visual representation of conceptual and collaborative links across scholars and institutions (Cobo et al., 2011; Zupic & Čater, 2015).

1.1 Data collection and selection process

The bibliographic data was extracted from the Web of Science Core Collection (WoSCC) database, a renowned repository due to its multidisciplinary coverage and the quality of its indexing.

Traditionally, Web of Science and Scopus are the two most widely used databases for bibliometric analyses. Recent comparative studies (Singh et al., 2020) highlight that Web of Science remains the

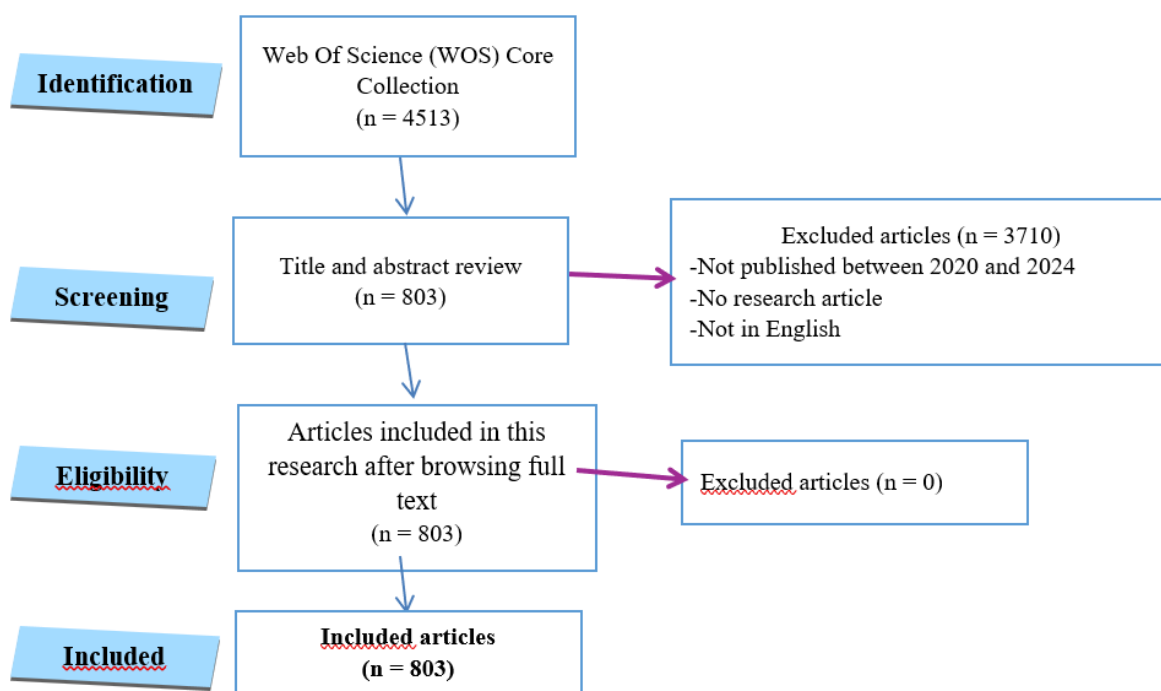
most selective, ensuring high-quality and peer-reviewed coverage, while more than 99% of its indexed journals are also covered by Scopus.

A Boolean search strategy was used to retrieve studies on AI, higher education, adoption, and governance.

TS = (“artificial intelligence” OR “AI”) AND TS = (“higher education” OR “university” OR “education”) AND TS = (“adoption” OR “acceptance” OR “implementation”) AND TS = (“ethics” OR “governance” OR “obstacles” OR ‘regulation’ OR “challenges”).

The initial search identified 4,513 records in the Web of Science Core Collection. We then applied the following inclusion criteria: (i) publication period restricted to 2020–2024, (ii) language limited to English, and (iii) document type restricted to peer-reviewed scientific articles. This step excluded 3,710 records that did not meet these requirements. Subsequently, two independent reviewers screened the titles and abstracts of the remaining records to assess relevance to the study’s objectives. At this stage, duplicates and ineligible entries were removed, leading to a final dataset of 803 articles. In accordance with best practices in recent literature (El Gareh et al., 2025), the process followed PRISMA 2020 guidelines (Page et al., 2021), ensuring methodological transparency and reproducibility (see Figure 1).

Figure 1: PRISMA Flowchart



Source : Authors' own elaboration.

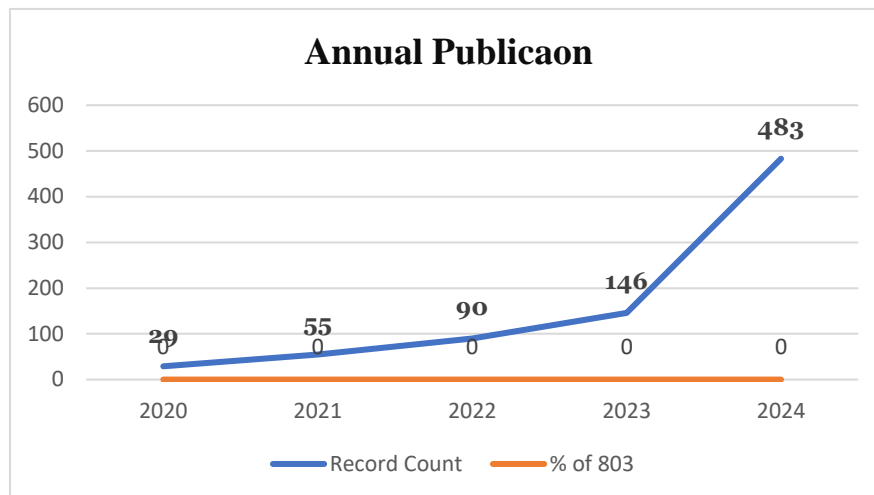
2. Analysis of results

2.1. Descriptive analysis of publications

The present bibliometric study is based on a corpus of 803 publications in English from the Web of Science database (2020-2024). The analysis reveals a significant increase in scientific production on artificial intelligence (AI) in higher education, with an average annual rate of 21.79%. This dynamic appears to be

more pronounced than in other related fields, such as digital health or organisational transformation, where progress appears to be more moderate in recent literature (Yang et al., 2025; Benatiya Andaloussi, 2024; Leite, 2025).

Figure 2 : Annual Publication.



Source: Author (Web of science Database)

The field displays an average of 14.42 citations per article, which is indicative of a certain level of visibility despite the youth of the corpus (average age: 1.6 years). Nevertheless, this figure remains lower than that observed in other prominent fields, such as AI in cybersecurity (Chan, 2023). The thematic content of the keywords is notable for its high level of semantic diversity, with 942 "Plus" keywords and 2,595 author keywords reflecting the conceptual richness and heterogeneity of the field (Zupic & Čater, 2015).

Furthermore, the dynamics of collaboration prove to be of significance. The mean number of co-authors per article was 4.81, and 31.5% of publications were in international collaboration, levels comparable to those observed in digital economics (Donthu et al., 2021). The overwhelming prevalence of the "article" format (92% of the corpus) underscores a pronounced orientation towards academic journals, though the limited utilisation of critical reviews and conference proceedings may signify an absence of theoretical reflexivity.

Table 1: Main Information About Data

Description	Résultats
MAIN INFORMATION ABOUT DATA	
Timespan	2020:2024
Sources (Journals, Books, etc)	495
Documents	803
Annual Growth Rate %	21,79
Document Average Age	1,6
Average citations per doc	14,42
References	0

DOCUMENT CONTENTS	
Keywords Plus (ID)	942
Author's Keywords (DE)	2595
AUTHORS	
Authors	3649
Authors of single-authored docs	78
AUTHORS COLLABORATION	
Single-authored docs	80
Co-Authors per Doc	4,81
International co-authorships %	31,51
DOCUMENT TYPES	
Article	743
article; early access	54
article; proceedings paper	2
article; retracted publication	4

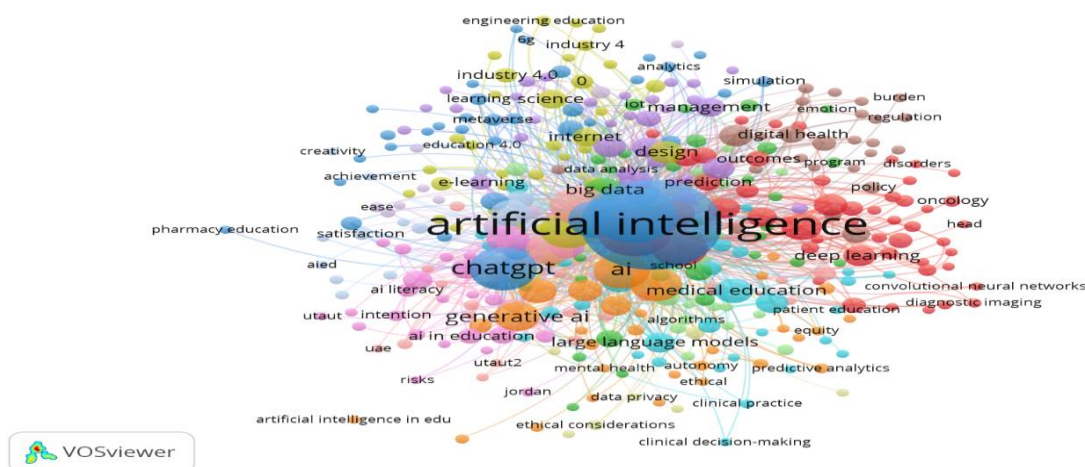
Source : Web of Science, traitement Biblioshiny, 2020–2024

2.2. Cooccurrence and emerging themes

A keyword co-occurrence analysis, conducted utilising the VOSviewer software, has led to the identification of five overarching thematic clusters within the extant literature concerning the application of artificial intelligence in higher education. These clusters reveal the tensions between technological dynamics and ethical, educational and political issues. The following table provides a synopsis of the primary themes according to their respective clusters. This analysis incorporates critical reading based on keyword density and centrality.

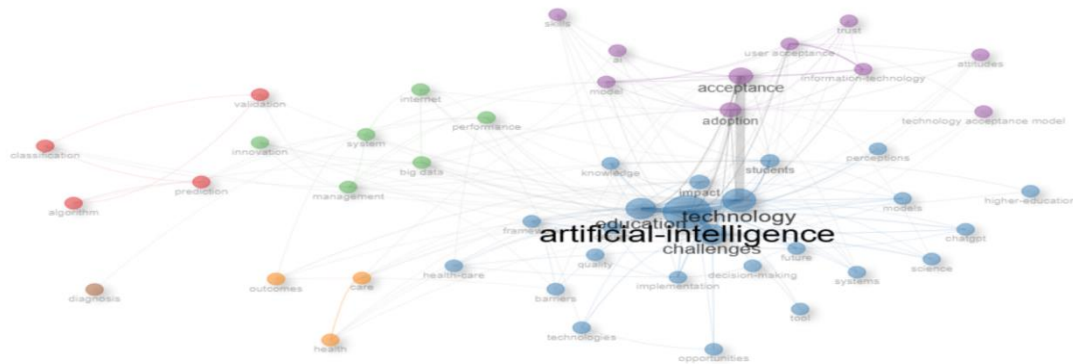
As illustrated in Figure 3, the results demonstrate a structuring of the field around predominantly technological concerns, with a paucity of critical, cross-sectional or decolonizable approaches. This thematic mapping should not be interpreted as a neutral reflection, but rather as the product of editorial choices, institutional biases and dominant innovation logics.

Figure 3: Complete keyword co-occurrence map (VOSviewer).



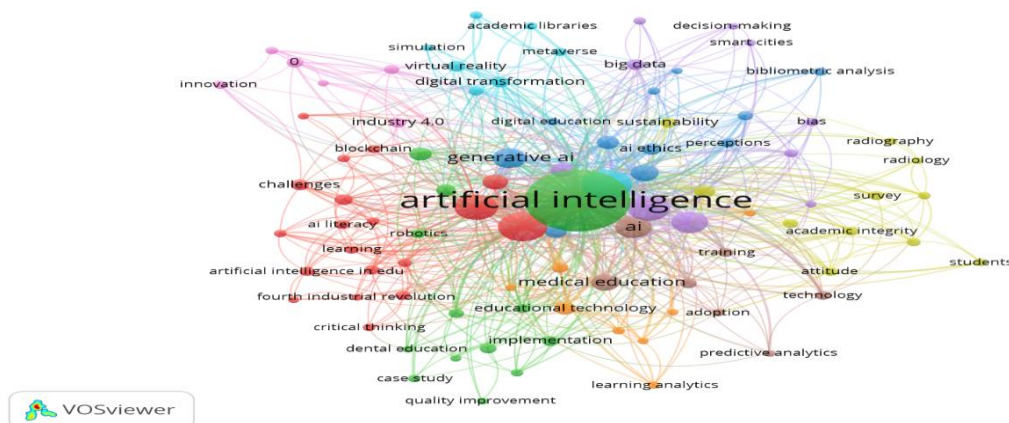
A simplified version of this mapping, presented in Figure 4, provides a clearer understanding of the interconnections between key concepts. The most central nodes, such as artificial intelligence, education and acceptance, confirm their structuring role in literature.

Figure 4. purified network of co-occurrences: centrality of dominant concepts.



The in-depth thematic analysis displayed in Figure 5 underscores the emergence of novel research domains, including virtual reality, academic integrity, the metaverse, and digital transformation. These themes are indicative of emergent niches that are poised to assume greater centrality in the forthcoming years.

Figure 5: Map of emerging themes in recent literature.



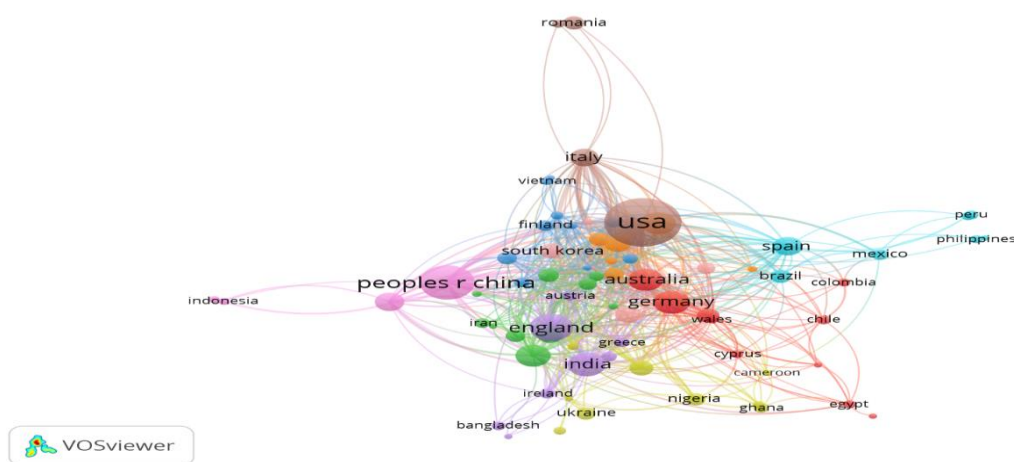
2.3. Collaborative networks between countries

Analysis of co-publication networks between countries, visualized via VOSviewer (Figure 6), highlights a polarized geopolitical structuring of research into artificial intelligence applied to higher education. The USA, China, the UK, India and Canada occupy a central position in the network, both in terms of volume of production and density of collaborations. These countries form an interconnected scientific core, exerting significant influence on the international research agenda.

Conversely, several countries in the global South, notably Malaysia, Saudi Arabia, Brazil and South Africa, appear on the periphery of the graph, with limited connections. South-South partnerships remain marginal, illustrating a persistent epistemic asymmetry in the circulation of knowledge. This marginalization can be attributed to structural factors such as language barriers, unequal distribution of funding, or logics of academic dependency.

Beyond simple scientific connections, the map highlights logics of domination and under-representation, rarely examined in conventional bibliometric analyses. It highlights the need to promote alternative forms of cooperation, based on equity, reciprocity and co-construction, particularly between institutions in the South. This represents an important lever for reducing current imbalances and reinforcing the diversity of epistemologies mobilized in the field of educational AI.

Figure 6. Map of international collaborations between countries (VOSviewer, 2020-2024).



2.4. Analysis of influential authors

The identification of the most influential authors is based on three bibliometric indicators: number of publications, citation volume and local h-index. These criteria enable us to identify the researchers who have structured the field of artificial intelligence in higher education between 2020 and 2024. The results are summarized in Table 2.

Table 2. Most influential authors in the literature on AI in higher education (2020-2024).

Rank	Author	Publications	Citations	Local H-index
1	Kumar A.	6	112	4
2	Tlili A.	5	103	3
3	Huang R.H.	5	97	3
4	Al-Emran M.	4	88	3
5	Sharma R.	4	76	2

6	Khalil M.	3	71	2
7	Spector J.M.	3	66	2
8	Zawacki-Richter O.	3	65	2
9	Ifenthaler D.	2	59	2
10	Varea V.	2	54	1

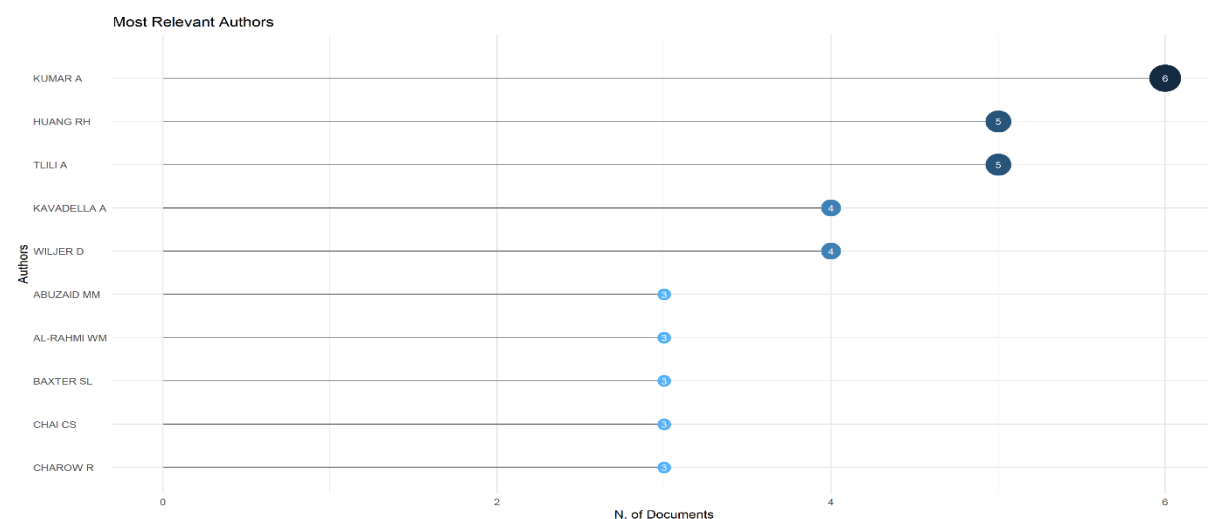
Source: Web of Science, Biblioshiny processing.

The results indicate a concentration of scientific production around a few dominant figures, often affiliated with institutions in Asia (China, India) or Europe. The central position of Kumar A., Tili A. or Huang R.H. confirms their role in the structuring of technological acceptance models and AI-assisted pedagogical approaches.

Nevertheless, this increased visibility does not necessarily reflect a diversity of perspectives. The underrepresentation of authors from low-resource countries, coupled with the relative absence of critical or alternative voices, suggests a bias towards centrality in the dynamics of scientific recognition. As Chan et al., 2024 have observed, academic notoriety is frequently associated with proximity to dominant publication circuits, rather than with theoretical or contextual innovation.

Moreover, an analysis of the co-authors' network discloses a comparatively compartmentalised community structure. The paucity of interconnections between the various sub-fields (namely technological acceptance, governance, health, and pedagogy) serves to impede the cross-fertilization of approaches.

Figure 7. Most productive authors in the field of AI in higher education (2020-2024)



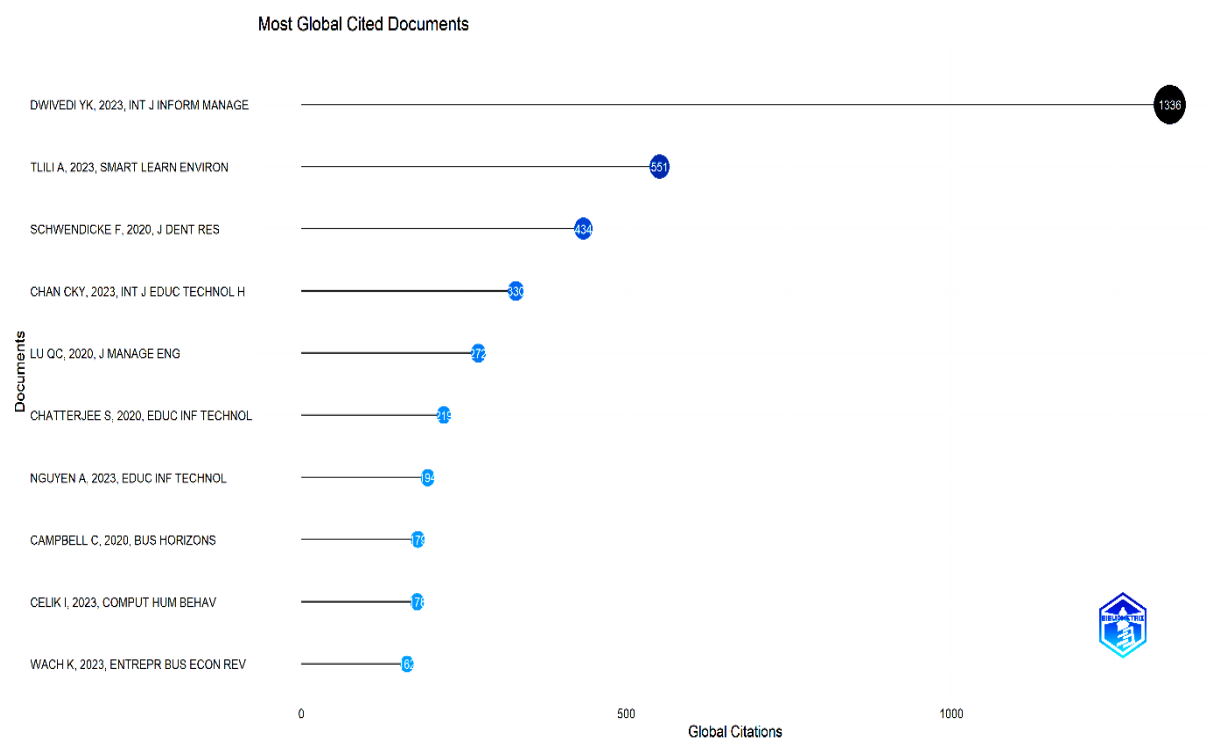
2.5. Most cited documents and dominant sources

The identification of the most influential documents and sources is based on two complementary axes: the most cited individual publications and the most productive and centralized journals in the field. This dual approach makes it possible to assess both high-impact content and the dominant distribution channels for AI research in higher education.

2.5.1. Most cited papers

The most cited publications highlight seminal work on AI adoption, technological acceptance models, and ethical governance issues. These include articles by Dwivedi et al (2021) on the theoretical foundations of acceptance, and by Schwendicke (2020) on the use of AI in healthcare and education. These works feature prominently in the corpus bibliographies, making them major conceptual landmarks. However, the analysis also reveals an over-representation of Anglo-Saxon articles, to the detriment of regional or alternative perspectives.

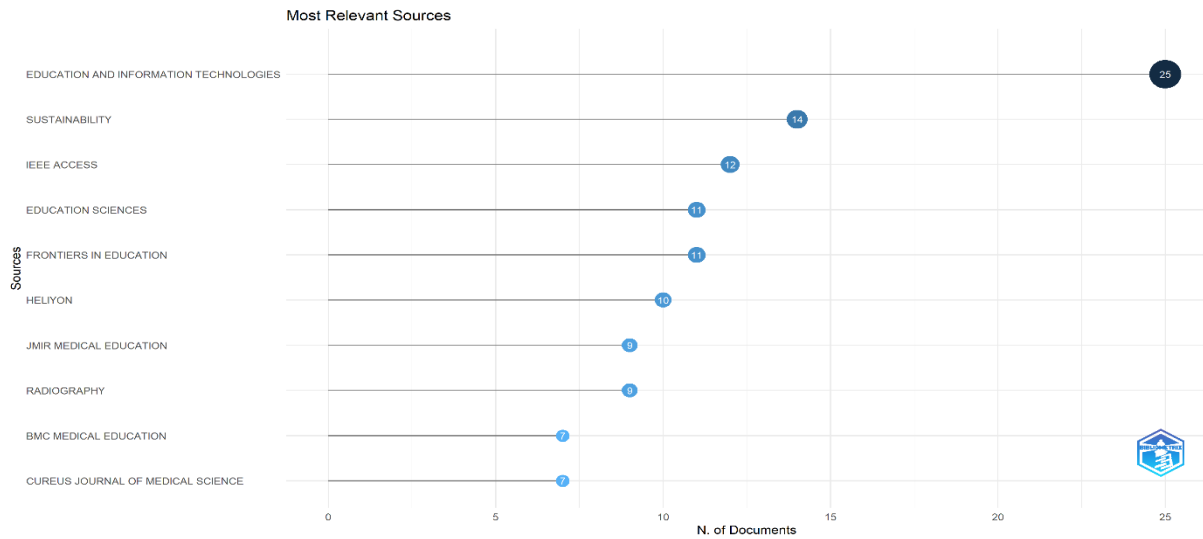
Figure 8. Most frequently cited documents in the corpus (2020-2024).



2.5.2. The most productive journals

In the realm of academic publishing, prominent journals such as Education and Information Technologies, Sustainability, and Frontiers in Artificial Intelligence have emerged as dominant sources within the corpus, characterised by their substantial publication volumes. This occurrence is indicative of the mounting interest in the nexus between AI, education and sustainability. However, these journals have been observed to favour positivist and techno-centric approaches, thus resulting in a relative paucity of critical or contextual analyses. This phenomenon is indicative of an epistemological bias that has been previously identified in the literature. As illustrated in Figure 9, the ten most prolific sources are identified.

Figure 9. Most productive journals by number of publications (2020-2024).

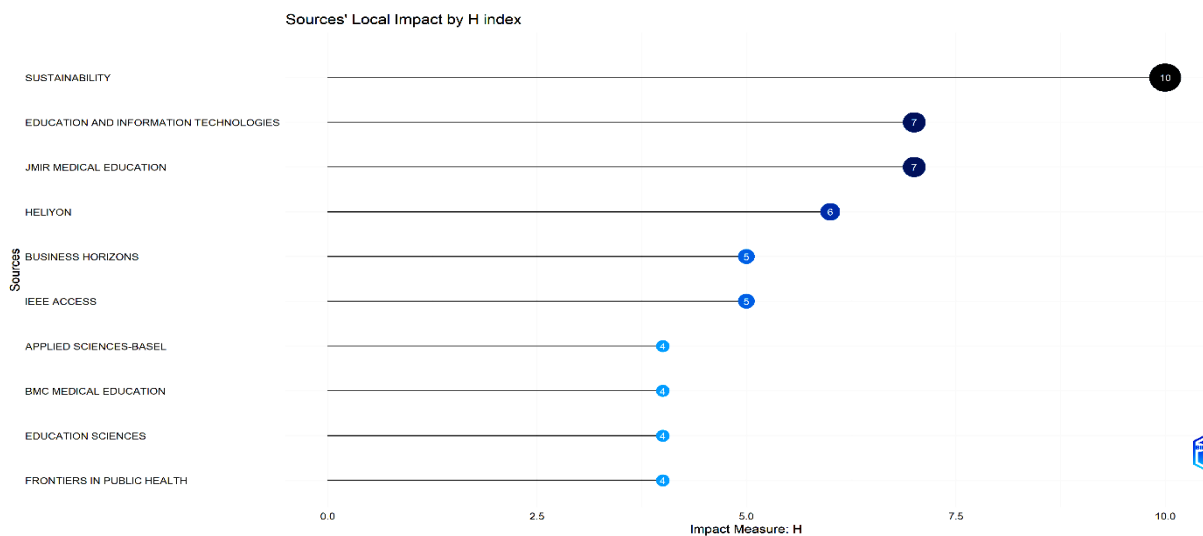


2.5.3. Local impact of sources

The local h-index is a metric used to assess the relative influence of journals in a given corpus. It has been demonstrated that certain journals, despite their reduced productivity, assume a significant theoretical structuring function. For instance, the journals *Computers in Human Behavior* and *International Journal of Educational Technology in Higher Education* are distinguished by their notably high citation-to-publication ratios. This underscores the necessity of integrating quantitative indicators with a qualitative assessment of scientific impact.

This section underscores an editorial cartography characterised by a select group of high-impact factor journals, thereby concentrating scientific visibility around a prevailing paradigm. In order to expand the scope of research, it is essential to promote journals that favour critical, interdisciplinary approaches from non-Western contexts.

Figure 10. Most influential journals by local H-index.



2.6. Conceptual structures, co-citation and intellectual trends

The present section is concerned with the intellectual structuring of the research field in question, and it does so through three complementary types of analysis: namely, keyword co-occurrence, author co-citation and thematic evolution. The objective of this approach is to identify the predominant scientific orientations, dominant paradigms and unexplored gaps.

2.6.1. Keyword co-occurrence: dominant themes

The keyword co-occurrence analysis (Figure 10) identified five thematic clusters, each of which represents a major conceptual pole in the literature on AI in higher education. The following table (3) provides a summary of these clusters:

Tableau 3: Synthesis of thematic clusters identified in publications on AI in higher education: dominant keywords, themes and critical interpretations.

1 (Red)	Innovation, algorithms and health	algorithms, innovation, care, health, big data	Technological approach focused on performance, little contextual discussion.
2 (Green)	Technology acceptance	technology acceptance model, perceived usefulness, trust, intention, self-efficacy	Pre-eminence of TAM/UTAUT models; little integration of socio-cultural variables.
3 (Light blue)	Governance and ethics	privacy, ethics, feedback, science, knowledge	Under-represented issues despite their growing importance in international debates.
4 (Yellow)	Learning and barriers	education, barriers, school, access, impact	Problems of access to AI and educational inequalities; often addressed without a critical framework.
5 (Violet)	Immersive technologies and generative AI	virtual reality, chatgpt, immersive learning, simulation	Emerging themes still unstructured; strong potential for pedagogical innovation.

This structuring highlights an imbalance between technocentric approaches (clusters 1 and 2) and critical or inclusive concerns (clusters 3 to 5). Work on algorithmic justice, digital sovereignty or the inclusion of developing countries remains peripheral.

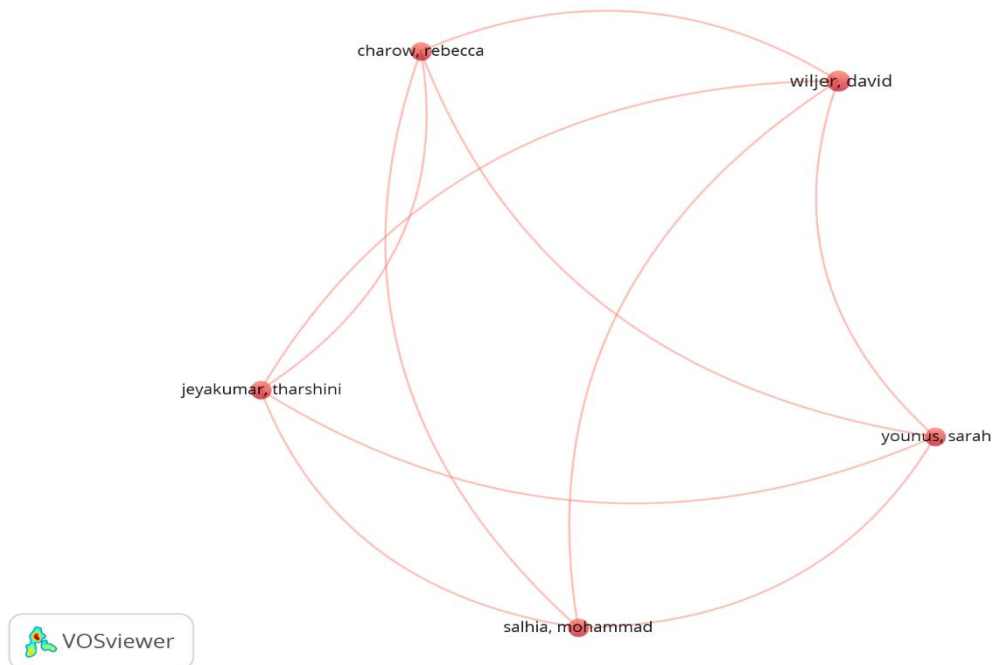
2.6.2. Co-citation of authors: dominant paradigms

Co-citation analysis (Figure 11) reveals the most influential authors in structuring the field. These include Dwivedi et al (2021, 2023), Tlili et al (2023), Donthu et al (2021), and Schwendicke (2020). These researchers are mainly involved in:

- Assessing the impact of AI in educational systems;

- Technology acceptance models (TAM, UTAUT);
- Bibliometric methods and systematic reviews.

Figure 11. Lead author co-citation network (VOSviewer).



Nevertheless, this centrality is characterised by a paucity of theoretical diversity. It is notable that researchers from the Global South, or those who adopt critical approaches, are under-represented in the central clusters. This suggests a geographical and epistemic polarization of considerable magnitude. The figure under scrutiny highlights the absence of critical paradigms in the most influential clusters.

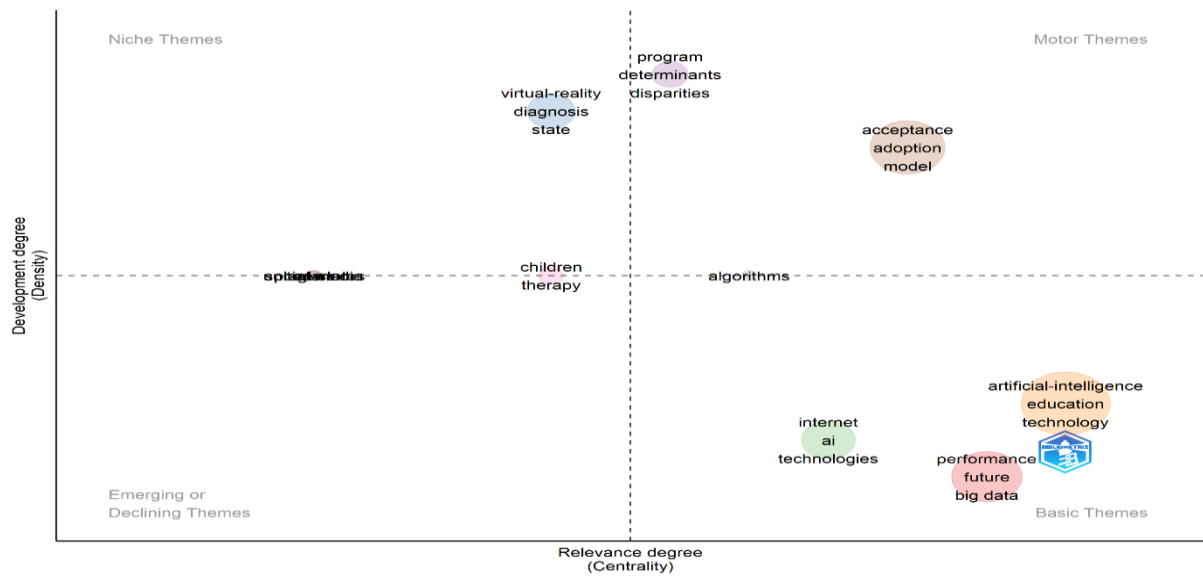
2.6.3. Thematic map: density and centrality of research axes

The quadripolar map (Figure 12), based on the density and centrality axes, classifies the themes into four categories:

- Field drivers (high density, high centrality): acceptance models, personalization of learning;
- Promising emerging themes (high density, low centrality): generative AI, academic integrity;
- Cross-cutting themes (low density, high centrality): data protection, governance;
- Marginal areas (low density, low centrality): inclusion, digital divide, developing countries.

This typology confirms the dominance of technological concerns, to the detriment of critical, socio-political and contextual frameworks.

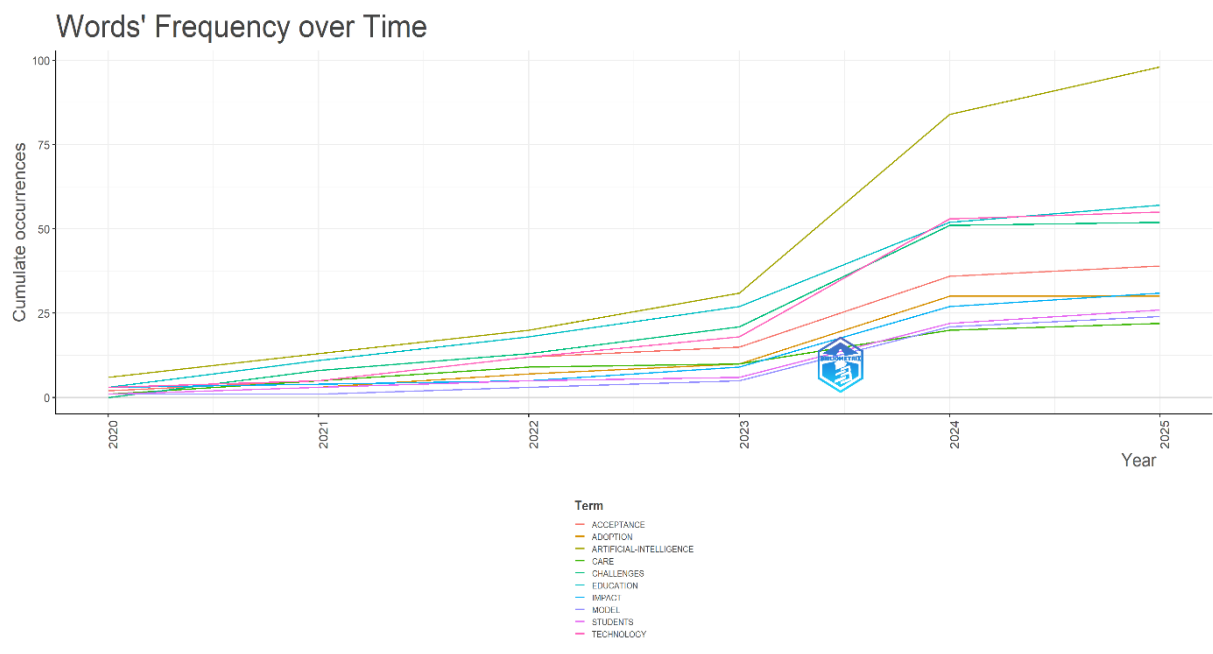
Figure 12. Quadripolar thematic map of research axes.



2.6.4. Emerging trends: keyword evolution

Diachronic analysis (Figure 13) shows a sharp rise in the frequency of terms related to generative AI (ChatGPT, large language models) from 2023 onwards, as well as renewed interest in “trust in AI”, implementation, and academic integrity. However, questions of governance and ethics remain poorly connected to the dominant pedagogical dynamics.

Figure 13. Diachronic visualization of keywords (2020-2024) generated by Biblioshiny.



This map illustrates the rapid rise of terms related to generative AI from 2023 onwards (e.g. ChatGPT, LLM), and highlights the persistent gaps around governance and ethical issues.

3. Discussion and implications

Bibliometric results confirm the predominance of technological acceptance models (TAM, UTAUT) in research on AI in higher education (Dwivedi et al., 2023; Tlili et al., 2023). Nevertheless, this techno-centric orientation has the effect of limiting the integration of critical perspectives on governance, equity and ethics. As Chan et al. (2024) observe, the dearth of theoretical reflection on digital sovereignty or algorithmic bias persists as a conspicuous lacuna in the extant literature.

Cluster analysis also demonstrates a marked geographical imbalance, with publications predominantly concentrated in Northern countries (USA, China, UK), resulting in the marginalisation of emerging contexts. This pattern perpetuates structural inequalities in the production and dissemination of knowledge (Benatiya Andaloussi, 2024). This observation is in alignment with the findings of Sahar and Sahar et Munawaroh (2025), who noted the underrepresentation of developing countries in mainstream scientific cartographies.

Moreover, the advent of terms such as ChatGPT and predictive learning evinces an emergent orientation towards generative AI. Nevertheless, there is a paucity of works that interrogate their actual pedagogical impact or their socio-technical implications (Chan et al., 2024). This dichotomy between technicist research and critical approaches, as posited by Donthu et al. (2021), signifies a paradigmatic fragmentation that impedes the theoretical consolidation of the field.

In response, this study posits a reconfiguration of research priorities around three axes: (1) a more effective integration of normative and regulatory frameworks; (2) a more balanced representation of Southern contexts; and (3) the development of transdisciplinary research models sensitive to the ethical, social and political dimensions of educational AI.

This mapping reveals a notable absence of unifying theoretical frameworks, a strong polarization around techno-centric models, and a weak representation of critical approaches. The study thus highlights a paucity of paradigmatic diversity that limits the field's progress towards a more ethical, contextual and inclusive understanding of AI uses in higher education. The call for a research agenda that is more open to alternative epistemologies, algorithmic governance issues, and the social dynamics of knowledge is a key tenet of this approach.

3.1. Practical and managerial implications

The results of this bibliometric study provide concrete indications for academic decision-makers, educational technology developers and higher education institutions faced with AI integration. Firstly, the preponderance of research focused on technological acceptance models underscores an often-instrumental conception of AI, thereby overlooking issues of equity, digital sovereignty and inclusion. It is therefore recommended that the strategic agenda of establishments be broadened beyond the adoption of technology, to include ethical and contextual dimensions.

Secondly, geographical asymmetries in scientific collaborations and publications point to an underrepresentation of Southern countries. Consequently, it is incumbent upon higher education leaders

to foster equitable partnerships and to enhance local scientific production capacities, with a view to achieving a more balanced technological governance.

The paucity of concepts such as algorithmic bias, transparency and digital justice in thematic clusters indicates an urgent necessity to raise awareness of the systemic risks induced by AI uses. A suitable managerial response to this issue would be to establish interdisciplinary ethics committees within universities and to incorporate critical AI training into teaching curricula.

Conclusion

The objective of this bibliometric research was to systematically explore scientific publications dealing with the integration of artificial intelligence (AI) into higher education, with a particular focus on issues of governance, ethics and equity. Utilising the VOSviewer and Biblioshiny tools, a comprehensive map was constructed, delineating the prevailing structures of scientific production. This analysis revealed persistent imbalances between developed and developing countries, along with lacunae concerning issues of algorithmic justice and institutional regulation.

The originality of this study lies in its willingness to go beyond purely descriptive approaches to propose a critical reading of trends, an interrogation of thematic clusters, and a putting into perspective of the results through theoretical and geopolitical dimensions. The present study has utilised a multifaceted approach encompassing co-occurrence analysis, author network mapping and bibliographic coupling, thereby unveiling both prevailing trends and areas of lacunae, particularly with regard to digital sovereignty, ethical frameworks concerning AI, and the scientific engagement of Southern nations.

Moreover, the methodology employed in this study can be transposed to other emerging fields where technological dynamics give rise to ethical and systemic tensions. It is suggested that fields such as digital health, algorithmic justice and professional training would benefit from analysis with a critical bibliometric approach similar to the one outlined above. Such an analysis would allow for the questioning of logics of inclusion, cognitive biases and forms of structural domination.

Research limitations and prospects

It is imperative to acknowledge the methodological limitations of this study. Firstly, it should be noted that the corpus is limited to publications indexed in Web of Science, thus excluding other relevant sources, such as Scopus, Dimensions or regional databases. This choice has the potential to impact the geographical and linguistic representativeness of the field. Secondly, the results are based mainly on automated scientific mapping tools, whose clustering algorithms do not always identify the semantic depth of content. A complementary analysis of full texts, in particular of the most cited articles within each cluster, would enrich the proposed interpretations.

This study underscores the absence of unifying theoretical frameworks in research on AI in higher education. Future research would benefit from the integration of bibliometric results with critical social science approaches, including theories of governance, the sociology of technology and

epistemologies of the South. In addition, the incorporation of alternative indicators, such as altmetrics, measures of author diversity, and indicators of North-South collaboration, could facilitate a more comprehensive analysis of publication dynamics.

This study thus paves the way for a new generation of research rooted in more holistic frameworks, sensitive to global issues and epistemic imbalances. Future work could concentrate on the following three areas:

- (i) the more systematic integration of critical approaches from the social sciences, such as socio-technical systems theory or digital epistemology;
- (ii) the joint exploitation of complementary databases (Scopus, Dimensions, Lens.org) to improve the coverage and comparability of results; and
- (iii) the establishment of trans-regional collaborations (particularly North-South) aimed at rebalancing academic representation and enriching contextual analysis frameworks. It is recommended that particular attention be paid to the combination of advanced bibliometric analyses with qualitative and interpretive approaches. This would allow for a more comprehensive capture of the complexity of AI research dynamics in global education systems.

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