Quo Vadis, University? A Roadmap for AI and Ethics in Higher Education

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Abstract: In recent years, academic interest in new developments in Artificial Intelligence (AI) and its ethical challenges in higher education has increased. The new emerging technologies that have become popular among the university community in recent times require an exhaustive study to evaluate their impact on academic integrity and plagiarism. The main stakeholders in higher education (SoTL, educational authorities, and policymakers) must understand the new trends and the most relevant studies to have action guides that preserve academic integrity standards in deploying AI in the university. This research analyzes scientific articles published in high-impact journals indexed in the Journal Citation Reports (JCR) (*n*=254) and carries out a bibliometric study using VOSviewer 1.6.18 and WordStat 2023.1. The Normalized Impact per Document (NID) and per Year (NIY) are studied, and four thematic groups and twelve main themes are identified and discussed, allowing the internal research structure of this field of study to be determined. Based on the findings, a roadmap for implementing AI in higher education is proposed, preserving ethical standards and based on three levels (Micro, Meso, Macro). This study offers practical implications for SoTL, academic authorities, and policymakers. Furthermore, the evidence found allows editors of high-impact journals to advise on unclosed gaps and new research trends and new research trends in the area.

Keywords: AI, Ethics, Higher education, University, SoTL

1. Introduction

The generalization of Artificial Intelligence (AI) represents a technological revolution that is transforming all areas of society (Wang, Sun and Chen, 2023). Academic experts highlight the significant changes that will occur in job profiles and work practices. Even though AI is emerging as an exciting technology, there is still considerable uncertainty about how it can be ethically and productively integrated into today's society (Bearman and Ajjawi, 2023). Specifically, it highlights the evolution of Large Language Models (LLM), which have gained prominence since 2010. Based on the generalization of new uses of transformers, these models are redefining the capabilities of artificial intelligence and its practical implications, which marks a clear distinction from previous AI advances that began in the 1950s (Canchila, et al., 2024).

The recent incorporation of Artificial Intelligence (AI) in the university classroom is modifying the teaching-learning process. The debate on its use in university education continues; practical applications are already beginning to influence some aspects of the educational process, though they still need to be fully integrated into current teaching methods. This transformation promises to empower teachers and students but, at the same time, presents new ethical and pedagogical dilemmas (Adams and Pente, 2023). This study focuses on the perspective of university efficiency of three stakeholders: Scholarship of Teaching and Learning (SoTL), academic authorities, and policymakers. SoTL represents a systematic, scholarly inquiry into student learning aimed at improving the practice of teaching in higher education (Felten, 2013).

On the one hand, this framework integrates rigorous academic methods to explore and enhance both the teaching process and its outcomes, contributing to a scholarly approach to educational practice. On the other hand, SoTL, university authorities, and policymakers need to understand the complexity, opportunities, and limitations presented by applying this new technology, as it is the basis for strengthening the discourse on AI between teachers and researchers (Watanabe, 2022). The university must be critical in preparing students to face the implications of living in an AI-mediated world.

However, recent studies confirm the need for more critical and deep reflection on the pedagogical approaches and ethical risks involved in the application of AI in higher education (Bearman, et al., 2022; Zawacki-Richter, et

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al., 2019). The rapid diffusion of this technology and the consequences of its use force us to clarify the evolution of the academic debate in the field of study. Academics need a clear view of challenges and opportunities to help us understand critical issues and their interconnectedness and analyze hot articles and hot journals. In addition, the SoTL, university authorities, and policymakers must be aware of the framework offered by the literature on AI and academic integrity to facilitate opportunities in new teaching-learning processes and address the main challenges of this technology in higher education.

The heterogeneity of perspectives the literature addresses and the absence of an integrated vision make us wonder about the coherence of policies on AI at the university and its adoption in higher education. In the title of the article, we urge higher education institutions ("Quo Vadis, University?"), to contribute to the clarity of ideas, their aggregation from three levels (Micro, Meso, and Macro), and obtaining an overall purpose that facilitates the adoption and deployment of AI in the university.

This article provides a new approach to AI's challenges and opportunities for Higher Education, overcoming a vision focused on specific uses and applications of AI beyond partial and incomplete debates. This study integrates an aggregate vision that allows overcoming different partial visions in the academic discussion. To this purpose, gaps not closed by the literature and some necessary new theoretical developments are discussed. Formulating necessary future lines of action suggests meaningful publication opportunities for scholars and journal editors while establishing the bases for discussion on an effervescent field that can guide policymakers and university authorities in policy design and the SoTLs in their development control and improvement.

This research aims to clarify the ethical uses of artificial intelligence in higher education and propose a roadmap that facilitates the implementation of AI in higher education, guaranteeing the preservation of academic integrity and ethical standards. A relevant contribution of this study is to guide and advise SoTL, university authorities, and policymakers.

This article is structured as follows: First, the theoretical framework is reviewed. Second, the materials and methods of analysis are reported. Third, the results are presented and discussed (trend, clusters, and main topics; academic efficiency; hot articles and hot journals), emphasizing identified publication opportunities. Fourth, the discussion of the findings is specified in a roadmap for stakeholders that is structured into three levels (Micro, Meso, Macro). Finally, some conclusions are expanded, focusing on the study's limitations and future lines of research.

2. Theoretical Framework

New developments in AI have burst into higher education, becoming a powerful agent of change that provides promising opportunities and proactive changes. However, it will also alter the implementation of AI in higher education, altering established conventions, and it is necessary for teachers and researchers to adapt to its benefits and drawbacks. This type of scientific debate is common when new technologies are introduced in education (Qadir, 2022).

ChatGPT is the most widespread text-generative AI in the classroom (Huang, 2023). Developed based on the OpenAI language model, it performs complex tasks and generates human-like responses, such as summaries or answers to multiple-choice exams (Susnjak, 2022). It's not the only one. Thanks to its nature, driven by deep learning algorithms, other AIs can create texts, such as Gemini (from Google) and digital images, such as ChatGPT 4, among others (Lim, et al., 2023).

However, given AI's remarkable capacity to provide answers and generate content, university teachers point out the potential risks of AI, especially the negative impact on students' academic integrity and ethics (Mhlanga, 2023), weakening of their critical thinking (Susnjak, 2022), and adverse effects on evaluation processes (Chatterjee and Dethlefs, 2023; Rudolph, Tan and Chan, 2023; Stokel-Walker, 2022).

Faced with these threats, two scenarios have been proposed: prohibition and control.

Faced with the fear of the consequences of the developments in AI, various governments and educational institutions have prohibited or limited the use of these technologies (Lim, et al., 2023). However, previous attempts to ban emerging technologies in education have failed (Finkle and Masters, 2014; Spies et al., 2010), so it is likely that a similar situation could occur with AI (Farrokhnia, et al., 2023). The alarm has also been raised in academic publications, and their scientific integrity (Cotton, Cotton and Shipway, 2023; Shiri, 2023) has given rise to reactive regulations (Nature, 2023). Specific software like Scribbr, QuillBot, or ZeroGPT has been used to detect AI-generated content in students' tasks. However, it is proven to be a temporary solution (Rudolph, Tan, and Chan, 2023) since the precision of technological content detection software cannot compete with the

improvement of successive AI models (Farrokhnia, et al., 2023). OpenAI's plagiarism detection software (AI Classifier) is no longer operational due to its high rate of inaccuracy (OpenAI, 2023).

At the opposite extreme are higher education institutions, especially in developed countries, that see AI as an ally.

Various research advocates designing learning tasks adapted to the use of these technologies (Farrokhnia, et al., 2023), enhancing skills such as creativity or critical thinking (González-Pérez and Ramírez-Montoya, 2022), and developing personalized and immersive learning experiences (Shen, et al., 2023). It is proposed that the evaluation acts be modified to avoid academic fraud derived from AI. In this sense, it is considered appropriate to resort to formative evaluation that involves students (Rushton, 2005; Banihashem, et al., 2022).

In this context, the Scholarship of Teaching and Learning (SoTL) is essential in guiding teachers in imbricating AI in pedagogical methodologies. The SoTL is a conception of teaching practice to improve the quality of teaching and learning processes in the university environment (Cranton, 2011) that is aimed at "instructors, staff, and learners in developing the necessary skills, knowledge, and behaviors to model and implement strategies that promote academic integrity in their teaching, learning, research, assessment and academic practices" (Kenny and Eaton, 2022, p. 578). SoTL is based on six main principles: (1) Inquiry Focused on Student Learning: SoTL identifies teaching challenges observed directly within the classroom setting. These challenges drive the inquiry, reflecting a practical and immediate relevance to educational practice (Bass, 1999); (2) Grounded in Context: SoTL research is deeply embedded in specific educational contexts, including disciplinary and institutional environments. This grounding ensures that the studies are relevant and applicable locally, enhancing their utility and impact (Felten, 2013); (3) Methodologically Sound: SoTL mandates appropriate and rigorous research methodologies. While the choice of methods may vary across disciplines, they must effectively address the research questions posed (Felten, 2013); (4) Conducted in Partnership with Students: Effective SoTL research involves students as partners. This collaboration not only enriches the learning experience but also embodies a democratic, participatory approach to education (Hutching and Huber, 2005); (5) Appropriately Public: The findings from SoTL research should be publicly shared to contribute to the community's knowledge base and allow for peer evaluation. This principle emphasizes the importance of transparency and communication in academia (Shulman, 2004); (6) Critically Reflective: Researchers are expected to engage in critical reflection concerning their methodologies and outcomes, which is essential for the continuous improvement of teaching practices.

SoTL plays a critical role in elevating teaching to a level of serious academic inquiry. By adhering to rigorous principles and openly sharing findings, SoTL practitioners affirm education's scholarly legitimacy and academic value (Bernstein, 2008). Furthermore, SoTL fosters a more reflective and evidence-based approach to teaching, thereby enhancing the educational experience for instructors and students.

Research on AI-related needs, preferences, and supports can help university authorities identify best practices for integrating this new technology into the curriculum (Hamilton, 2023) and offering a personalized and inclusive learning experience. It is the response of numerous universities to the need for students to develop the appropriate skills to successfully face the future work environment (Watanabe, 2022).

3. Materials and Methods

This research followed the principles and protocols of the PRISMA 2020 statement (Figure 1), commonly used in conducting systematic reviews and meta-analyses on multiple topics (Sarkis-Onofre, et al., 2021; Rethlefsen, et al., 2021), with emphasis on AI in different productive sectors (Regona, et al., 2022; Mustapha, et al., 2023) and AI and university students (Zhai, 2023; Crompton and Burke, 2023; González-Calatayud, Prendes-Espinosa and Roig-Vila, 2021). Based on the established objectives, an analysis of the underlying academic debate in the articles included in the literature review was proposed. Additionally, academic efficiency was analyzed to identify and discuss research trends and directions based on hot articles and hot journals.

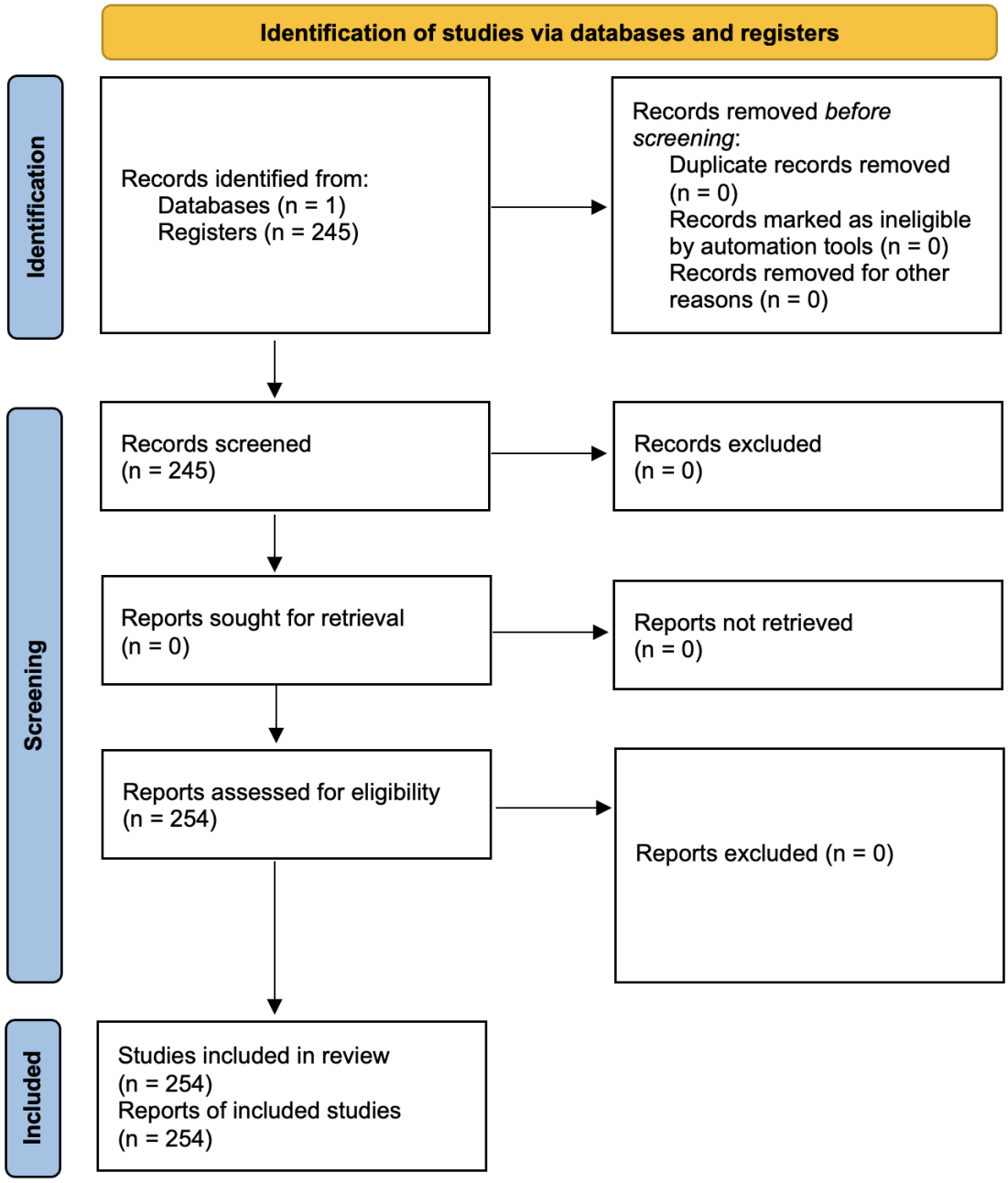

Figure 1: PRISMA statement flow diagram

Web of Science (WoS) was used to create the database for this study. WoS, owned by Clarivate Analytics, is the collection of databases of bibliographical references and citations of scientific publications that collect information from 1900 to the present. In this research, articles published in journals included in the Social Sciences Citation Index (SSCI) and Science Citation Index Expanded (SCIE) were selected, guaranteeing the high impact of the academic literature analyzed since all the articles evaluated in this study are included in the Journal Citation Reports (JCR). The Boolean search string was introduced in WoS as follows: *(AK="artificial intelligence" AND (AK="higher education" OR AK=universit* OR AK="academic integrity" OR AK=plagiarism)) OR (AK=ai AND (AK= "higher education" OR AK=universit * OR AK="academic integrity" OR AK= plagiarism)) OR (TI="artificial intelligence" AND (TI="higher education" OR TI=universit* OR TI="academic integrity" OR TI=plagiarism)) OR (TI=ai AND (TI= "higher education" OR TI=universit* OR TI="academic integrity" OR TI= plagiarism)).*

The bibliometric analysis used VOSviewer v.1.6.18, a software used in scientometric research, and contributes to the visualization of connections and trends (Van Eck and Waltman, 2010). Among many other fields, VOSviewer has been used to study the academic debate on e-learning (Tibaná-Herrera, Fernández-Bajón and Moya-Anegón, 2018) or exploratory research on AI ethics in education (Yu and Yu, 2023). In this study,

VOSviewer was used to analyze the co-occurrence of author keywords of the analyzed articles, setting a minimum threshold of three articles to identify the main thematic clusters that underlie the academic debate on AI, university, and academic integrity.

In addition to the keyword analysis with VOSviewer v.1.6.18, the abstracts of the articles are analyzed with WordStat v. 2013.1, a content analysis software that integrates text mining tools and allows topic and trend extraction. Content analysis performed with WordStat complements other statistical and bibliometric software analyses. WordStat has been used in the field of study of insurance sectors (Ellili, et al., 2023), AI in manufacturing (Zeba, et al., 2021) or AI for digital sustainability (Pan and Nishant, 2023), among others.

In this study, WordStat v. 2003.1 was used for the content analysis of the abstracts using an Exploratory Factor Analysis (EFA) using a VARIMAX rotation to observe the variability in the sentences analyzed, according to the eigenvalues and the correlations expressed by the factor loadings of the observed variables (words) with the factors (topics) (Van Haneghan, 2021). The minimum factor loading was determined at the threshold of 0.2, and a segmentation by sentence was followed. In addition, WordStat calculated the weighted average of word correlations according to Normalized Pointwise Mutual Information (NPMI).

The Normalized Impact per Year (NIY) guarantees that the Roadmap resulting from this study allows us to understand the sources that generate academic debate. The NIY identifies articles with a relevant impact in a homogeneous and harmonized way (e.g., above the mean, the median, or in the first quartile of the total distribution of articles: NIY-Q1) (Castelló-Sirvent, 2022). The NIY offers scholars relevant information on the vortexes generating academic debate in a rapidly spreading study area. According to its definition, the NIY considered the total impact of a scientific article from the total number of citations obtained for its calculation. This absolute impact is harmonized when it is related to the number of years elapsed between the article's publication and the bibliometric study (Da Silva, Castelló-Sirvent and Canós-Darós, 2022).

Hot articles are considered to have been published in the last two years from the completion date of a bibliometric study and have an NIY located in the first decile. Under specific circumstances that justify it in a bibliometric particular survey, the requirement criterion can be modified, in more or fewer years, according to the characteristics of the bibliometric study or, particularly, according to the novelty and enthusiasm with which it has been performed and popularized a new topic introduced into the academic debate.

This research considers all the articles published in the last two years with NIY in the first decile as hot articles. Similarly, hot journals have published articles with NIY Average in the first decile of the NIY distribution.

Additionally, the Normalized Impact per Document (NID) can be calculated for all articles published by a journal or by authors from a given institution or country. In this study, the NID is used to apply the academic production published by scholars whose academic affiliation is linked to a particular country. In this way, the NID by country is obtained, which makes it possible to identify and evaluate academic efficiency by country.

4. 4. Results

4.1 Academic Debate

After applying the Boolean search criteria, articles published in high-impact journals indexed in the Journal Citation Reports (JCR) (*n*=254) in the study area were obtained according to the requirements described in the Materials and Methods section. According to the PRISMA statement, the review of the selected articles guaranteed no duplicates or exclusion criteria. Figure 2 shows the intertemporal evolution of articles published since the first available document according to the search criteria established in this research. As of 2020, the publication of articles in the specific area and the barrier of 10 articles per year in JCR journals have been exceeded. Table 1 compares periods (P1: 1961-2019; P2: 2020-2023) for years, articles, citations, and NIY (Average).

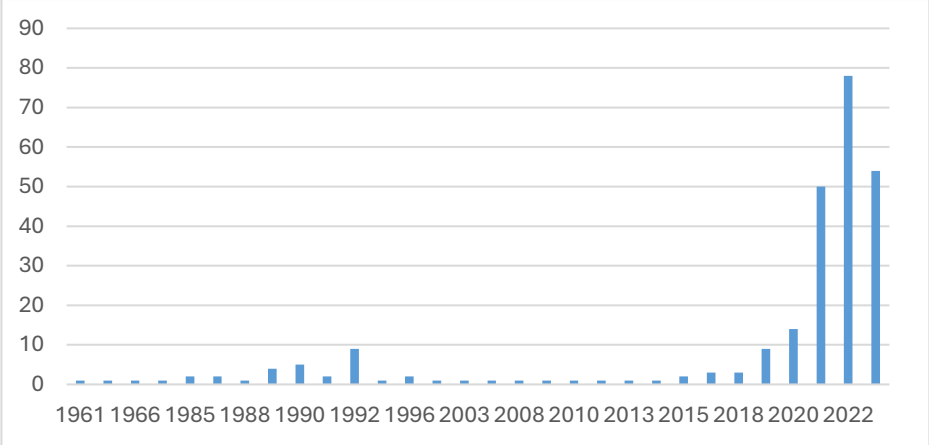

Figure 2: Trend of academic interest in the research area

Table 1 summarizes the articles published according to the threshold set in 2020.

Table 1: Detail analysis

	P1	P2	Total
Period	1961-2019	2020-2023	
Years	59	4	
Articles	58	196	254
Citations	461	779	1,240
NIY (Average)	1.45	1.73	

Note. The articles included in the 2023 data are those available in WoS on 7/31/2023.

NIY = Normalized Impact per Year

The information presented is divided into two periods (P1: 1961-2019; P2: 2020-2023). It shows the total number of articles published, their academic impact measured as the total citation count earned, and the Normalized Impact per Year (NIY) average. The available evidence confirms the trend change observed in Figure 2. The total academic production in 4 years was 3.4 times higher than that published in the previous 59 years. Besides, after 2020, a significant increase in the average NIY is identified.

The results of the Exploratory Factor Analysis (EFA) of the abstracts carried out with WordStat v.2023.1 report 12 topics. Table 2 shows both results.

In the left column, the four clusters identified with VOSviewer v.1.6.18 are presented and connected with the topics reporting on Normalized Pointwise Mutual Information (NPMI), eigenvalue (EI), and frequency (FR), according to the analysis carried out with WordStat v. 2023.1.

Table 2: Main Topics

Cluster	Topic	NPMI	EI	FR
Artificial intelligence on education (red)	Artificial intelligence	0.55	2.55	715
	Higher education institutions	0.51	2.30	452
	Colleges and universities	0.45	2.22	529
	Students academic performance	0.47	1.81	234
	Design methodology approach	0.50	1.50	303
	Effects	0.42	1.36	94
Attitudes and knowledge (green)	Ideological and political courses	0.47	3.52	42
	Results show	0.43	2.01	151
	Decision making	0.39	1.93	54

Cluster	Topic	NPMI	EI	FR
	Research methods	0.48	1.68	231
	College students	0.42	1.65	536
	Thinking skills	0.43	1.63	192
	Colleges and universities	0.45	1.39	421
	Impact of AI for Social work	0.48	1.58	472
	Key factors	0.43	1.54	187
Machine learning and prediction (blue)	Control group	0.34	1.45	84
	Neural network	0.47	1.87	218
	Information services	0.40	1.80	229
	Language and Machine learning	0.43	1.60	222
	Science System	0.40	1.36	185
	Tools and methods	0.43	1.33	144
Technology design and self-efficacy (yellow)	Future development	0.41	1.55	280
	Information	0.42	1.41	160
	Intelligent systems	0.43	1.40	113

Note. Cluster information according to VOSviewer v.1.6.18 and Topic, NPMI, EI, and FR information according to WordStat v.2023.1. NPMI = Normalized Pointwise Mutual Information. EI = Eigenvalue. FR = Frequency

The analysis with VOSviewer v.1.6.18 for the co-occurrences of the authors' keywords reports four clusters according to a threshold of three published articles (Figure 3).

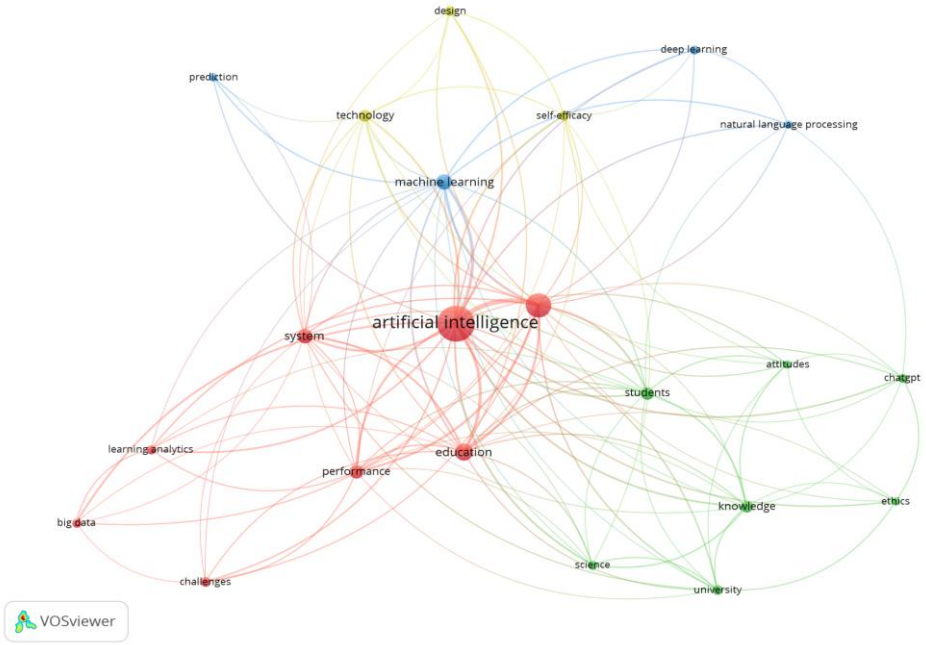

Figure 3: Author Keyword clusters by co-occurrences

Artificial intelligence on education cluster (red) connects relevant research on underlying constraints in the learning environment, such as engaging students with different affective characteristics (Zawacki-Richter, et al., 2019) or secular challenges of higher educational institutions (Chatterjee and Bhattacharjee, 2020). In this cluster, implementations of evaluation of the impact of AI on human agency (Cox, 2021) or big data applications

to improve the Student Evaluation of Teaching (SET) massively training Natural Language Processing (NLP) models (Rybinski and Kopciuszewska, 2021) stand out.

Other notable research in the central academic debate on artificial intelligence in education stems from the studies by Deo, et al. (2020) on learning performance prediction in Science, Technology, Engineering, and Mathematics (STEM) teaching, AI analysis on creativity (Wang, Sun and Chen, 2023) or business performance (Khalid, 2020).

Attitudes and knowledge cluster (green) connects studies that use technology-based interventions to change academic integrity (AI) knowledge and attitudes of students (Cronan, et al., 2017) with research that deepens the use of Generative AI (e.g., Chat GPT), as an appropriate tool for developing critical thinking skills and preserving academic integrity (Rusandi, et al., 2023). This cluster also integrates research aimed at delving into the challenges related to making students literate about AI and enhancing their ethical awareness (Kong, Cheung and Zhang, 2023), as well as, in this sense, improving the understanding of some contingent factors and paradoxes that drive and feed the ethical conflict of the use of AI by students (Lim, et al., 2023).

Machine learning and prediction cluster (blue) concentrates research on prediction methods and applications in the context of higher education and university research. Research on student academic performance in online engineering degrees (Jiao, et al., 2022), intelligent libraries (Cox, et al., 2019), or from an approach linked to knowledge transfer in transnational innovation ecosystems according to transnational industries and universities cooperation procedures (TIC, TUC) (Cai, Ramis and Martínez, 2019).

The technology design and self-efficacy cluster (yellow) emphasizes published articles focused on the study of technological and design factors that are facilitators (or inhibitors) of the success in the adoption of AI in the context of higher education, both from the approach from the teachers (Wang, Liu and Tu, 2021) and from the perspective of the students (Almaiah, et al., 2022).

4.2 Academic Efficiency

Table 3 presents the count of countries, citations, and academic efficiency expressed according to the Normalized Impact per Document (NID), assuming a minimum threshold of three articles published in the area.

Table 3: Academic efficiency by countries

Country	Documents	Citations	NID
Germany	4	347	86.8
Serbia	4	61	15.3
Romania	5	66	13.2
Finland	3	36	12.0
Portugal	3	32	10.7
England	11	96	8.7
Canada	4	33	8.3
India	11	88	8.0
Malaysia	6	42	7.0
Indonesia	3	20	6.7
Poland	4	23	5.8
Netherlands	3	15	5.0
Pakistan	3	15	5.0
Usa	22	104	4.7
Jordan	3	14	4.7
Nigeria	3	14	4.7
Mexico	4	17	4.3
Sweden	5	21	4.2
Australia	9	37	4.1

Country	Documents	Citations	NID
Russia	4	15	3.8
Italy	6	21	3.5
Taiwan	12	40	3.3
Saudi Arabia	16	52	3.3
Spain	9	29	3.2
Peoples R. China	92	253	2.8

Note. NID = Normalized Impact per Document

The results reveal high academic efficiency for countries with NID-Q1 scores, such as Germany, Serbia, Romania, Finland, Portugal, England, and Canada. Specifically, Germany and Serbia place their academic efficiency in the first decile (NID > 13.4) of the analyzed distribution. Taiwan, Audi Arabia, Spain, and China have the lowest academic efficiency.

4.3 Hot Articles and hot Journals

According to the results, hot articles are the studies published in 2022 and 2023 with a NIY in the first decile of the distribution studied (NIY > 4.0). Research on the transformation of university education stands out (Okunlava, Syed Abdullah and Alias, 2022; Salas-Pilco and Yang, 2022), AI, plagiarism and honesty in Higher Education (King, 2023; Kleebayoon and Wiwanitkit, 2023), support for students with depression to improve their mental health (Liu, et al., 2022), and medical research (Dahmen, et al., 2023) (For more information, see Appendix; Table 4).

The analysis of hot journals in the area of knowledge evaluated by this study shows the Journals located in the first decile (NIY > 3.2): Cellular and Molecular Bioengineering, Learning Media and Technology, Internet Interventions-The Application of Information Technology in Mental and Behavioural Health, International Journal of Educational Technology in Higher Education, Heliyon, Journal of Medical Internet Research, Knee Surgery Sports Traumatology Arthroscopy, Distance Education, International Journal of Management Education, Library Hi Tech, Education and Information Technologies, Innovations in Education and Teaching International, and Computer Applications in Engineering Education (For more information, see Appendix; Table 5).

5. Discussion

The empirical evidence suggests that scholars have focused their research efforts on AI, universities, and academic integrity on specific applications and use cases, but a complete global vision that addresses the significant challenges that underlie the most immediate future is not offered.

The findings of this study also show that as of 2020, scholarly interest in the impact of the ethical use of AI in higher education has increased drastically, given the need to control the moral integrity of this technology after its widespread use among students. The academic impact measured by the total number of citations and by the NIY average of the articles has been more significant since 2020, which reinforces the existence of an academic debate that is spreading transversally throughout different areas of knowledge beyond the AI and the pedagogical use of this technology (Zawacki-Richter, et al., 2019).

This research offers a Roadmap of AI and academic integrity for SoTL and policymakers, drawing an inspiring map of AI along four main lines of development in the university context:

- education (e.g., effects, academic performance, or design methodology approaches) (Chen, Chen and Lin, 2020)
- attitudes and knowledge (e.g., thinking skills, decision-making, or impacts on social work) (Cox, 2021).
- machine learning and prediction (e.g., language, tools, and methods) (Kuleto, et al., 2021)
- technology design and self-efficacy (e.g., intelligent systems) (Chang, et al., 2022)

Next, the discussion of the implications of this study for SoTL is articulated according to the Micro, Meso, and Macro levels and based on previous taxonomies (Kenny and Eaton, 2022; Poole and Simmons, 2013; Williams, et al., 2013; Poole, 2009).

The Micro-level includes teachers, instructors, and stakeholders who need to identify and address the main lines of self-training and future development trends of the university space in the presence of AI.

The Meso-level includes academic authorities and university managers (e.g., Rectors, Deans, Managers, and other staff members). This type of stakeholder adopts an institutional role and focuses on their institution's organizational and strategic design aspects. They need to articulate coherent actions aligned with the supra-legislative provisions established by policymakers, as determined by their possible frameworks for action. University managers focus their interest on establishing institutional visions at the crossroads of implementation of AI in their universities, as well as the appropriate procedures for adjustment with agents located at the Micro-level.

Politicians, policymakers, and public policy design and evaluation analysts configure the Macro-level. These actors are interested in answering the main questions that arise on the academic horizon and are responsible for designing policies and establishing the regulatory framework that facilitates (or hinders) the adoption of structural changes in AI in universities.

The analysis of the academic literature published in the field of study suggests a broad spectrum of topics yet to be addressed sufficiently and various gaps that must be closed in the coming years. The roadmap articulating the different research lines on this topic is drawn below. The impact of AI and the ethical behavior of students' use of it is a central issue not only for the academic community but also for society. Figure 4 presents a diagram to summarize the roadmap for AI and academic integrity in higher education.

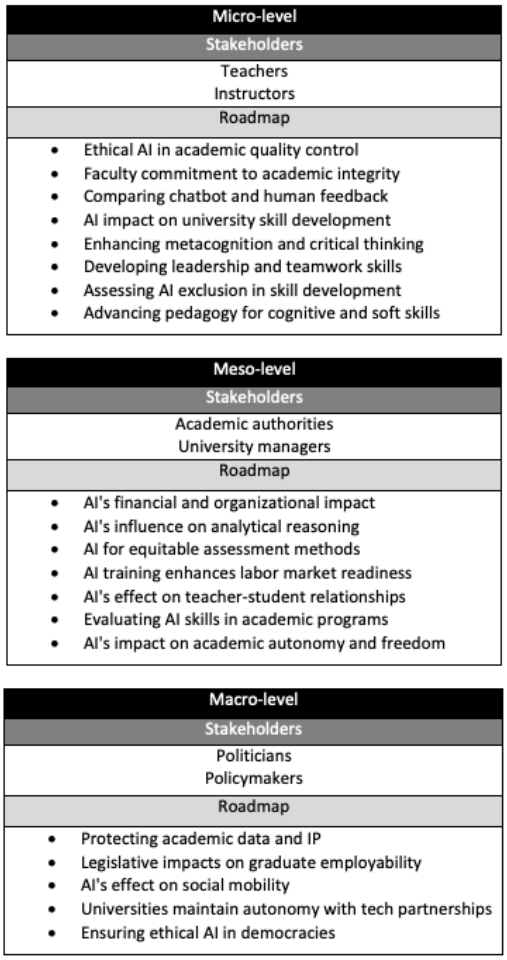

Figure 4: Proposed Roadmap

5.1 Micro-Level

The roadmap proposed in Figure 4 suggests concrete actions for stakeholders who occupy decisive roles at the Micro-level. The proposed Roadmap suggests teachers' attention on: (a) quality control of academic results after the integration of ethical standards in the use of AI by students or kept outside of AI and preserving robot-proof university environments (Aoun, 2017); (b) faculty interest in preserving academic integrity in AI environments; (c) effectiveness of feedback automatically generated by chatbots compared to feedback offered by human

instructors; (d) longitudinal and purchased analysis of the impact of the implementation of AI in the university according to the development of different skills (e.g., language or communication), higher cognitive abilities (e.g., metacognition or critical thinking) and soft skills (e.g., leadership or teamwork) and (e) evaluation of the effect of academic responses that keep AI out of the development of skills, higher cognitive skills, and soft skills, calling for new pedagogical approaches (Bearman and Ajjawi, 2023).

5.2 Meso-Level

The proposed roadmap suggests concrete actions for stakeholders who occupy decisive roles at the Meso-level (Figure 4). From the perspective of university authorities and academic managers of faculties and business schools, the tracks that will be consolidated in the coming years in connection with AI, academic integrity and case studies, policies and programs are relevant in accordance with an agenda of emerging research on: (a) financial (cost-benefit) and organizational (interaction-efficiency) impact of AI implementation in university environments; (b) long-term effects on students' analytical reasoning (and as a possible negative externality on industries and society); (c) how AI can provide more fair and equitable evaluation methods, specifically, with minority groups at risk of exclusion, helping to overcome woke ideologies and consequences of anxiety; d) how AI training can better prepare students for a rapidly changing labor market, improving their resilience, especially in the foreseeable context of increasing technological unemployment; (e) how AI could limit the development of interpersonal relationships between teachers and students, negatively impacting engagement and interaction; (f) evaluation of academic programs designed to incorporate skills for the appropriate use of AI, both in students and teachers; (g) impact of AI on academic autonomy and intellectual freedom in university environments from an approach based on affective polarization (Welker, et al., 2023) and cross-cultural moral foundations (Atari, et al., 2023).

5.3 Macro-Level

According to the proposed Roadmap (Figure 4), policymakers must evaluate trends at a Macro-level that allow examining the effects of new legislative frameworks for the development of AI in the university, with emphasis on: (a) privacy, security of personal data and intellectual property of students, teachers and researchers; (b) effects that legislative changes and new public policies could have on the employability of future graduates and their impact on welfare systems; (c) how the development of AI in universities affects social mobility and equality of opportunity, particularly among certain vulnerable groups and in environments of pre-existing poverty; (d) how higher education institutions can preserve their autonomy, freedom of thought and independence by establishing collaboration agreements with large technology companies for the development of AI in universities; (e) how liberal democracies can establish effective international alliances that ensure the ethical and safe development of AI.

6. Conclusions

Scholars' interest in AI, ethics, and university has recently increased. The academic production published in high-impact journals has tripled since 2020 compared to the previous 59 years. Although the evidence suggests that the internal research structure is configured from four clusters (Artificial intelligence on education, Attitudes and knowledge; Machine learning and prediction, Technology design and self-efficacy), the content analysis shows the granularity of the Current academic debate according to twelve main topics. Current research focuses on specific applications of AI in higher education environments, studying specific challenges and opportunities. The research agenda does not include debates that can be extended to a global vision according to a SoTL-based approach. This fragmentation suggests a need for more specificity in the general direction of university policy regarding AI. Throughout the article, we ask ourselves, "Quo Vadis, University?" and the evidence found allows us to configure a roadmap that connects the dots and lets us glimpse what university policy should be like in the emergence of this contingent factor.

This study extends the discussion of the findings and formulates and develops seventeen promising lines of investigation. One of the main contributions of this research is to offer a helpful guide to scholars who wish to direct their research towards emerging topics in AI, ethics, and universities. The study results and discussion provide research opportunities and allow academics to be advised in future research projects. Furthermore, the discussion section proposes a roadmap configured according to three levels (Micro, Meso, and Macro) to integrate AI in higher education from an ethical perspective that guarantees academic integrity.

This article delineates a strategic framework for integrating artificial intelligence (AI) into higher education, focusing on operational levels: Micro, Meso, and Macro. At the Micro-level, educators must enhance academic quality and integrity within AI-enhanced learning environments. This includes evaluating the impact of AI on

student performance across various competencies—ranging from technical skills to soft skills like teamwork and leadership. Furthermore, the effectiveness and potential biases of AI-driven feedback versus traditional human feedback must be critically assessed.

Moving to the Meso-level, the roadmap highlights the need for university leaders to consider AI adoption's financial and organizational implications. This includes analyzing AI's influence on student analytical skills and its broader socio-economic repercussions. Universities must develop inclusive evaluation methods that address diversity and fairness, preparing students for dynamic employment landscapes while maintaining interpersonal engagement within the educational process.

At the Macro-level, policymakers are urged to scrutinize AI's legislative and ethical dimensions in academia. This encompasses safeguarding privacy and intellectual property and ensuring equitable social outcomes through education. The roadmap suggests that higher education institutions foster autonomy and collaboration with tech giants, promoting an ethically sound and globally coherent AI integration strategy.

These recommendations aim to foster a balanced, equitable, and forward-thinking adoption of AI in the academic sphere, aligning technological advancements with educational integrity and societal well-being.

This study has several limitations. Firstly, to guarantee the highest standards of academic impact delimited by the research objectives, the search for articles was carried out in journals indexed in JCR. Future articles should expand the databases used, considering repositories that have a faster publication speed even when they sacrifice peer review processes (e.g., Arxiv) to amplify the knowledge base and include updated references in a field of rapidly evolving study.

This research has limited the scope of its recommendations to three stakeholders (professors and instructors, university managers, and policymakers). Future research should complement this approach with other approaches (e.g., the 4M Framework) and the new analytical perspective offered by the stakeholders considered in the Quintuple Innovation Helix Framework. Additionally, a promising avenue of research for scholars arises from the differential analysis of the implementation of AI in the universities of liberal democracies compared to the adoption of AI in other countries far from this secular tradition.

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Appendix. Hot articles and hot journals

Table 4: Hot articles. Top 25 by NIY

Article	Authors	Journal	Year	Citations	NIY
Systematic review of research on artificial intelligence applications in higher education - where are the educators?	Zawacki-Richter, O; Marin, VI; Bond, M; Gouverneur, F	International Journal Of Educational Technology In Higher Education	2019	292	58.4
A Conversation on Artificial Intelligence, Chatbots, and Plagiarism in Higher Education	King, MR	Cellular And Molecular Bioengineering	2023	38	38.0
Adoption of artificial intelligence in higher education: a quantitative analysis using structural equation modelling	Chatterjee, S; Bhattacharjee, KK	Education And Information Technologies	2020	66	16.5
Generative AI and the future of education: Ragnarok or reformation? A paradoxical perspective from management educators	Lim, WM; Gunasekara, A; Pallant, JL; Pallant, JI; Pechenkina, E	International Journal Of Management Education	2023	10	10.0

Article	Authors	Journal	Year	Citations	NIY
A decolonial approach to AI in higher education teaching and learning: strategies for undoing the ethics of digital neocolonialism	Zembylas, M	Learning Media And Technology	2023	9	9.0
Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020	Ouyang, F; Zheng, LY; Jiao, PC	Education And Information Technologies	2022	17	8.5
Prerequisites for artificial intelligence in further education: identification of drivers, barriers, and business models of educational technology companies	Renz, A; Hilbig, R	International Journal Of Educational Technology In Higher Education	2020	34	8.5
Exploring Opportunities and Challenges of Artificial Intelligence and Machine Learning in Higher Education Institutions	Kuleto, V; Ilic, M; Dumangiu, M; Rankovic, M; Martins, OMD; Paun, D; Mihoreanu, L	Sustainability	2021	24	8.0
Using AI chatbots to provide self-help depression interventions for university students: A randomized trial of effectiveness	Liu, H; Peng, HM; Song, XY; Xu, CZ; Zhang, M	Internet Interventions-The Application Of Information Technology In Mental And Behavioural Health	2022	15	7.5
The intelligent library Thought leaders' views on the likely impact of artificial intelligence on academic libraries	Cox, AM; Pinfield, S; Rutter, S	Library Hi Tech	2019	36	7.2
Blockchain Technology Enhances Sustainable Higher Education	Bucea-Manea-Tonis, R; Martins, OMD; Bucea-Manea-Tonis, R; Gheorghita, C; Kuleto, V; Ilic, MP; Simion, VE	Sustainability	2021	21	7.0
Exploring the impact of Artificial Intelligence and robots on higher education through literature-based design fictions	Cox, AM	International Journal Of Educational Technology In Higher Education	2021	20	6.7
Application of Artificial Intelligence powered digital writing assistant in higher education: randomized controlled trial	Nazari, N; Shabbir, MS; Setiawan, R	Heliyon	2021	19	6.3
Building University-Industry Co-Innovation Networks in Transnational Innovation Ecosystems: Towards a Transdisciplinary Approach of Integrating Social Sciences and Artificial Intelligence	Cai, YZ; Ferrer, BR; Lastra, JLM	Sustainability	2019	31	6.2
Artificial intelligence bot ChatGPT in medical research: the potential game changer as a double-edged sword	Dahmen, J; Kayaalp, ME; Ollivier, M; Pareek, A; Hirschmann, MT; Karlsson, J; Winkler, PW	Knee Surgery Sports Traumatology Arthroscopy	2023	6	6.0
Future Medical Artificial Intelligence Application Requirements and Expectations of Physicians in German University Hospitals: Web-Based Survey	Maassen, O; Fritsch, S; Palm, J; Deffge, S; Kunze, J; Marx, G; Riedel, M; Schuppert, A; Bickenbach, J	Journal Of Medical Internet Research	2021	18	6.0
The Potential of Blockchain Technology in Higher Education as Perceived by Students in Serbia, Romania, and Portugal	Kuleto, V; Bucea-Manea-Tonis, R; Bucea-Manea-Tonis, R; Ilic, MP; Martins, OMD; Rankovic, M; Coelho, AS	Sustainability	2022	11	5.5
Artificial Intelligence, Chatbots, Plagiarism and Basic Honesty: Comment	Kleebayoon, A; Wiwanitkit, V	Cellular And Molecular Bioengineering	2023	5	5.0

Article	Authors	Journal	Year	Citations	NIY
Remote proctored exams: Integrity assurance in online education?	Paredes, SG; Pena, FDJ; Alcazar, JMD	Distance Education	2021	15	5.0
Can artificial intelligence transform higher education?	Bates, T; Cobo, C; Marino, O; Wheeler, S	International Journal Of Educational Technology In Higher Education	2020	19	4.8
Stress, Coping, and Resilience Before and After COVID-19: A Predictive Model Based on Artificial Intelligence in the University Environment	Morales-Rodriguez, FM; Martinez-Ramon, JP; Mendez, I; Ruiz-Esteban, C	Frontiers In Psychology	2021	14	4.7
Psychometric Properties of the SAS, BAI, and S-AI in Chinese University Students	Pang, ZY; Tu, DB; Cai, Y	Frontiers In Psychology	2019	23	4.6
Artificial intelligence applications in Latin American higher education: a systematic review	Salas-Pilco, SZ; Yang, YQ	International Journal Of Educational Technology In Higher Education	2022	9	4.5
Artificial intelligence (AI) library services innovative conceptual framework for the digital transformation of university education	Okunlaya, RO; Abdullah, NS; Alias, RA	Library Hi Tech	2022	9	4.5
Effectiveness of ideological and political education reform in universities based on data mining artificial intelligence technology	Huang, XY; Zhao, JZ; Fu, JY; Zhang, XX	Journal Of Intelligent & Fuzzy Systems	2021	13	4.3

Note. NIY = Normalized Impact per Year

Table 5: Hot journals. Top 25 by first quartile in Average NIY

Journal	Articles	Citations	NIY (Av.)
Cellular And Molecular Bioengineering	2	43	21.5
Learning Media And Technology	1	9	9.0
Internet Interventions-The Application Of Information Technology In Mental And Behavioural Health	1	15	7.5
International Journal Of Educational Technology In Higher Education	12	383	7.4
Heliyon	1	19	6.3
Journal Of Medical Internet Research	1	18	6.0
Knee Surgery Sports Traumatology Arthroscopy	1	6	6.0
Distance Education	1	15	5.0
International Journal Of Management Education	2	10	5.0
Library Hi Tech	3	51	4.9
Education And Information Technologies	7	86	4.0
Innovations In Education And Teaching International	1	4	4.0
Computer Applications In Engineering Education	1	11	3.7
Electronics	3	24	3.1
Sustainability	14	121	3.1
Journal Of Intellectual Capital	1	12	3.0
British Journal Of Social Work	1	5	2.5
Assessment & Evaluation In Higher Education	1	7	2.3
Applied Sciences-Basel	3	15	2.1
Frontiers In Psychology	6	43	2.0
Biology Of Sport	1	2	2.0

Journal	Articles	Citations	NIY (Av.)
Expert Systems	1	2	2.0
Information Technology & People	1	2	2.0
Mobile Networks & Applications	1	6	2.0
Science Technology & Human Values	1	14	2.0

Note. Av.NIY = Average normalized impact per year for all articles published by each journal