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Prevailing Themes and Future Research Agendas in Higher Education: A Systematic Scoping Review of Reviews (2024-2025)

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ABSTRACT

Introduction: The existing scholarship related to higher education, while extensive, lacks comprehensive analyses of prevailing research themes. Numerous reviews provide detailed charts of niche topics, yet they fall short of offering a comprehensive overview. To accurately chart the major tendencies within the broader field of higher education, our analysis includes all review types, arguing that they collectively provide a more complete picture and reveal the field's dominant themes.

Purpose: To provide a high-level synthesis of the current scholarly landscape by analyzing the primary themes and recommended research agendas outlined in secondary literature, including systematic, scoping, bibliometric, and conceptual reviews.

Method: We employed a systematic scoping review methodology to map the breadth of literature. The review questions were formulated using the PCC (Problem, Concept, Context) framework to ensure a comprehensive scope. The conduct and reporting of this review followed the guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). 128 reviews of diverse types published in 2024-2025 were selected from the Scopus database. The included reviews were based on publications within the timeframe from 2010 to 2025.

Results: This systematic scoping review reveals that systematic reviews (55%) constitute the dominant methodological approach in higher education research, followed by bibliometric (12%) and scoping reviews (9%). The analysis identifies eight prevailing thematic clusters that directly inform future research agendas, consolidating them into four synthesized directions: technology and digital transformation; curriculum and learning outcomes; equity, ethics, and education's social role; and systemic shifts including internationalization and sustainability. Notably, the field shows concentrated emphasis on artificial intelligence integration and AI competency development, signaling a pivotal direction for future higher education research.

Conclusion: This review has synthesized the current intellectual landscape of higher education to map its prevailing themes and, consequently, to define a unified research agenda. The primary implication of this work is to focus the efforts of the research community by highlighting the most pertinent and promising directions for further investigation. Although this review provides valuable insights, its findings are limited by its reliance on a single database and its restriction to English-language reviews, potentially omitting significant literature from regional or non-English sources. Therefore, we recommend future research pursue a more expansive systematic mapping with a longer time span, multiple databases, and incorporate reviews published in various languages to achieve a truly comprehensive perspective.

KEYWORDS

higher education; systematic scoping review; review of reviews; university; artificial intelligence (AI); digital literacy; digital competence

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INTRODUCTION

Higher education is a complex social institution, characterized by a long history and a distinct academic culture. Its social significance is twofold: it reproduces a professionally stratified workforce and functions as a primary engine of innovation, contributing approximately 17% of total global research and development[1]. With over 235 million students enrolled worldwide[2], the sector's scale is immense. Consequently, it has become a multi-disciplinary field of study in its own right, attracting scholarly attention from education, sociology, psychology, and the humanities (Lund et al., 2020).

Despite a vast body of literature, the higher education research landscape lacks comprehensive, cross-cutting thematic analyses, with most studies restricted to specific national, regional, or disciplinary contexts (Pandey et al., 2025; You et al., 2024). Recent attempts to provide synthesis have emerged, though they remain focused on particular sub-fields. For instance, Eaton (2025) explores the impact of artificial intelligence on global education, advocating for a "post-plagiarism" framework, while Alzahmi et al. (2025) provide a bibliometric review of 25 years of research on organizational change in higher education. Similarly, Mahrishi et al. (2025) systematically review global trends of outcome-based education in engineering and its alignment with UN Sustainable Development Goals. While these studies represent a step forward, they collectively highlight that a comprehensive synthesis of the field's overarching research themes is still absent, encouraging further scholarly effort.

To delineate the intellectual landscape of contemporary higher education research, this scoping review of reviews analyses a comprehensive collection of recent (2024–2025) Scopus-indexed literature syntheses. The corpus encompasses both evidence-based reviews (e.g., meta-analyses, systematic, and scoping reviews) and traditional scholarly reviews (e.g., bibliometric, conceptual), which collectively cover primary research published between 2010 and 2025. The resulting synthesis of prevailing themes and emergent research agendas offers a foundational roadmap for the broader scholarly community. The timeframe (2024-2025) of our scoping review was determined by the launch of ChatGPT in November 2022, as it brought an avalanche of publications on the consequent transformations in higher education.

In the Social Sciences, the synthesis of research must navigate a spectrum of evidence. Although systematic reviews are traditionally valued for their methodological rigor, this preference can marginalize other vital forms of scholarship, such as narrative, descriptive, and bibliometric reviews. These approaches capture the nuanced, "softer" evidence necessary for charting broad intellectual tendencies. Therefore, our scoping review of higher education literature incorporates all review types to comprehensively delineate the field's prevailing themes.

This scoping review of reviews aims to map the current intellectual landscape of higher education research by synthesizing findings from review articles published within two distinct but purposeful timeframes: 2024–2025 and 2010–2025. The delimitation to the immediate two-year period, 2024–2025, is directly and purposely tied to the public release of ChatGPT in late 2022. This boundary was set to capture the consequent proliferation of literature examining the ensuing paradigm shifts within the higher education sector following this pivotal technological event.

Simultaneously, the selection of the broader 2010 to 2025 timeframe is justified by its unique positioning to capture a complete and transformative epoch in global higher education. The period around 2010 represents a critical inflection point, marking the convergence of several paradigm-shifting trends that collectively redefined the university's mission and operations. This era was characterized by a "great transition" where institutions were learning to operate in a new, multi-faceted paradigm. Structurally, this involved the full global implementation of the Bologna Process, moving beyond policy adoption to the tangible restructuring of curricula around competency-based approaches and the widespread establishment of the two-cycle degree system.

Digitally, the dawn of the modern EdTech revolution was catalyzed by the advent of Massive Open Online Courses (MOOCs) and the systematic institutional integration of Learning Management Systems (LMS) and blended learning, fundamentally challenging traditional pedagogical delivery. Concurrently, universities navigated a matured agenda of internationalization and embedded the global sustainability framework of the Sustainable Development Goals (SDGs) into their core functions, all while operating under sustained post-financial crisis pressure to demonstrate economic value and employability outcomes. By extending the timeframe to 2025, the review ensures the capture of the full maturation, interplay, and long-term consequences of these disruptive forces, including the recent impact of generative Artificial Intelligence, thereby providing a comprehensive lens to assess a definitive fifteen-year period of unprecedented and consolidated change. By analyzing reviews across these two timeframes, this study seeks to identify the field's prevailing themes and articulate a consolidated agenda for future re-

[1] OECD. (2023). Main Science and Technology Indicators. https://www.oecd.org/en/data/datasets/main-science-and-technology-indicators.html

[2] UNESCO Institute for Statistics (UIS). (2023). Total enrollment in tertiary education, regardless of age, both sexes. https://databrowser.uis.unesco.org/

search. The review is guided by the following research questions:

RQ 1: What are the key characteristics (e.g., methodological approaches, geographic focus, topics) of review articles on higher education published in 2024-2025?
RQ 2: What prevailing themes are synthesized in these reviews as central to contemporary higher education?
RQ 3: What gaps and priorities for further research are identified across these reviews, forming a collective future research agenda?

Method

This study employed a systematic scoping review methodology, guided by the frameworks of Arksey & O'Malley (2005), Levac et al. (2010), and Peters et al. (2020a), and reported in accordance with the PRISMA Extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018; Pollock et al., 2022). We conducted a scoping overview of reviews to synthesize meta-level evidence: the dominant themes and future research agendas identified across systematic, scoping, bibliometric, and conceptual reviews. This design is particularly suited for mapping cross-methodological tendencies and comparing the convergence or divergence of conclusions across different review genres. This meta-level approach is especially relevant for the period following 2023, as it allows for the examination of how accelerated digital transformation and AI integration may have reconfigured thematic priorities in the literature. The unit of analysis is the individual review article. Key themes and research agendas were extracted verbatim and subsequently consolidated using a predefined coding framework. To address heterogeneity, findings were stratified by review genre and, where applicable, by methodological quality indicators.

Protocol

While starting the systematic scoping review of reviews, we meticulously developed a research protocol. The authors hereby certify that this review report constitutes a faithful, precise, and transparent description of the conducted systematic scoping review of reviews. No deviations from the protocol were registered. Any departures from the original study design have been duly elucidated.

Search Eligibility Criteria

In this review, the problem, concept, and context (PCC) framework was engaged to devise an effective search strategy where each criterion was justified (Table 1).

Search Strategies

To identify prevailing themes in higher education research, this study analyzes review articles indexed in the Scopus database. A systematic search was performed on August 21, 2025, using the keyword "higher education" and related concepts. The search string included "higher education" AND "artificial intelligence" OR "education for sustainable development" OR "competence" OR "digital competence" OR "digital literacy" OR "critical thinking" OR "blended learning" OR "online learning". An initial filter was applied to include only documents indexed as "review" by Scopus. To ensure methodological consistency, the full text of each result was then screened, with particular attention to the methods section, to verify that it described a recognized review methodology. Although preliminary searches tested a wider set of keywords, they failed to retrieve a significant number of additional relevant publications; consequently, the final search strategy was streamlined to the most productive terms.

Study Selection

After the searches had been made and the Scopus filters (areas of research, language, types of sources, timespan) had been applied, the authors identified reviews subject to the eligibility criteria enumerated in Table 1. Duplicate publications were identified and removed using Zotero. Each reviewer independently screened the titles, and then the abstracts of the identified documents. The reviewers tagged each document with "to include" or "to exclude" marks to compare the outcome. When occasional disagreements arose, they were settled by mutual consent. No disputed issue required lateral expertise. Title/abstract screening $\kappa = 0.71$; full-text $\kappa = 0.82$. The full texts of potentially eligible studies were obtained through online databases, publisher platforms, or by request from the corresponding authors. Each article underwent a full-text review, during which it was thoroughly examined and independently assessed for relevance by two reviewers.

Quality of the Synthesis Included in the Review

The quality of the synthesis of the included reviews tends to be considered in the context of the type of reviews, frameworks applied, and rigour of all the review stages as the frontrunners. As we included in our synthesis reviews of all type that conformed to the eligibility criteria, we outlined the following features to address the issue of synthesis quality:

(1) type of the review;
(2) appliance of traditional frameworks that provide for better standards of identification, selection, screening of the publications and reporting of the findings as well as frameworks for guiding reviews to more focused research questions (PRISMA, PICO - PICOT, PCC, etc.);
(3) guidelines and recommendations beyond traditional evidence-based frameworks that were mainly published in methodological articles;

Table 1

Eligibility Criteria

Criterion	Inclusion	Exclusion	Rationale
Problem	Prevailing themes of reviews on higher education and further research agendas; themes are recurrent field-level topic explicitly reported as a primary theme in Results/Discussion of the review; research agendas are explicit statements of future research directions, recommendations, or priorities	Reviews going beyond higher education	Prevailing themes of reviews on higher education accumulate the trends in the subject area
Concept	Educational and closely associated concepts, including artificial intelligence, education for sustainable development, competence, digital competence, digital literacy, critical thinking, blended learning, and online learning	Other concepts	Themes of reviews may be based on educational or closely related concept. Pre-protocol searches found the most frequently used concepts
Context	All higher education institutions	Any other contexts	The focus on higher education determines the review context
Language	English	Other languages	The choice of English is justified by its status as a lingua franca of international science
Timeframe	All reviews on higher education published and indexed in the Scopus database for 2024-2025 whose own inclusion criteria for primary studies were limited to a timeframe between 2010 and 2025	All reviews published before 2024 or with a timeframe before 2010	The search was limited to reviews published in 2024–2025. The delimitation of the review to 2024–2025 is directly tied to the public release of ChatGPT in late 2022. This boundary was set to capture the consequent proliferation of literature examining the ensuing paradigm shifts within the higher education sector. The temporal scope of the primary literature within these included reviews was constrained to the period of 2010–2025.
Types of sources	In the Scopus database: full texts of reviews of all types	Unavailable full texts	This review aims to get a comprehensive understanding of the prevailing themes
Geography of affiliation	Any location	None	To avoid a geographic bias and to assemble a body of evidence that reflects the worldwide scope of scholarly discourse on this topic, enhancing the generalizability of the review's findings
Database	Scopus	Other bases	The study utilized the Scopus database because it provides robust indexing of peer-reviewed literature in the relevant field. Its strong coverage of Social Sciences and Education journals makes it well-suited for capturing the breadth of thematic developments in higher education research
Areas of Research	Social Sciences	Other areas	Analysis of publication categories reveals that the discourse is centered in the Social Sciences but is fundamentally interdisciplinary, with many works jointly classified under both Social Sciences and other related fields

(4) identified implications for higher education stakeholders based on a scale embracing "not identified", "identified as a separate sub-section", and "identified in the Discussion, Conclusion or other sections.

Extracting and Charting the Data

To reply to the research questions, we require the following data:

(1) the information for evaluation of the quality of the included reviews as stated herein;
(2) the themes of the currently published reviews of higher education that constitute the prevailing trends in research;
(3) further research agendas in higher education as defined in the reviews.

A data-charting form was cooperative developed based on the data extraction limitations. The items were chosen according to the research questions. The data extraction process was conducted entirely by Reviewer 2, with a thorough revision of the first ten completed forms by Reviewer 1 to ensure the consistency in the extraction and the accuracy of the extracted data. Both reviewers were in constant contact with one another to discuss and settle any issues arising at this stage.

The raw data extracted from the reviews comprise the synthesized coding matrix, including themes, categories, and relevant excerpts from the included literature. To ensure transparency and facilitate replication, the data extraction forms and the detailed coding framework used in the analysis have been included as tables, figures and appendices to this publication.

Visualisation and Thematic Clusters

We made a visualization based on author keywords, applying VOSviewer. The resulting visualization with a threshold of three occurrences per keyword grouped the documents into thematic clusters. In addition, the themes of all publications were coded while we were extracting the raw data from the reviews. At the stage of the analysis, we distributed the reviews among the thematic codes that essentially coincided with those suggested by the VOSviewer, with some overlapping as most themes and subsequently clusters are rather complex and far-reaching. The outcome gave an overview of the prevailing themes and details of the research focus.

To triangulate the findings and identify predominant themes, we conducted a comparative analysis between the thematic groupings generated by VOSviewer (derived from author keywords) and the thematic clusters identified through our manual coding process.

Table 2

A Data-Charting Form

	Data to be extracted
1.	Title of review
2.	Author(s)
3.	Country/ Countries of affiliation(s)
4.	Journal Title
5.	Journal Ranking in Social Sciences (Education) if applicable (Scopus Q1-Q4)
6.	Journal Ranking in Subject Areas other than Social Sciences (Education) if no ranking in Social Sciences (Education) – Scopus Subject Area(s)
7.	Type of synthesis as defined by the author(s) in the title, abstract or methods
8.	Theme of the review (Problem)
9.	Timeframe of the review
10.	Population of the review if applicable
11.	Type of higher education institution
12.	Further research agenda
13.	Implications (identified as a sub-section; identified, but within various sections; not identified)
14.	Targeted stakeholders of the implications
15.	Synthesis frameworks and protocols if stated (PICO-PICOT, PCC, PRISMA)
16.	Applied guidelines and recommendations referred to in the reviews

RESULTS

Search and Selection Results

A systematic search was executed in the Scopus database on August 21st, 2025. The initial search string, incorporating the keywords "higher education", "artificial intelligence", "education for sustainable development", "competence", "digital competence", "digital literacy", "critical thinking", "blended learning", and "online learning" returned 5,562 records. These records were filtered according to the pre-defined inclusion criteria, limiting them to reviews published in English within the Social Sciences subject area from 2024 to the present. This process identified 961 potentially relevant reviews for title and abstract screening. After screening, 694 records were excluded, resulting in 267 publications for which full-text retrieval was initiated.

The 260 full-text reviews were thoroughly read by each reviewer. Another 35 reviews were eliminated in screening as irrelevant to higher education research and another 97 reviews were eliminated as their timeframes did not comply with the inclusion criteria (2010-2025) or the timeframe was not identified. The total of 128 reviews were finally selected for further analysis. The PRISMA flow-chart (Figure 1) depicts the whole identification and screening procedure.

Key Characteristics of Review Articles

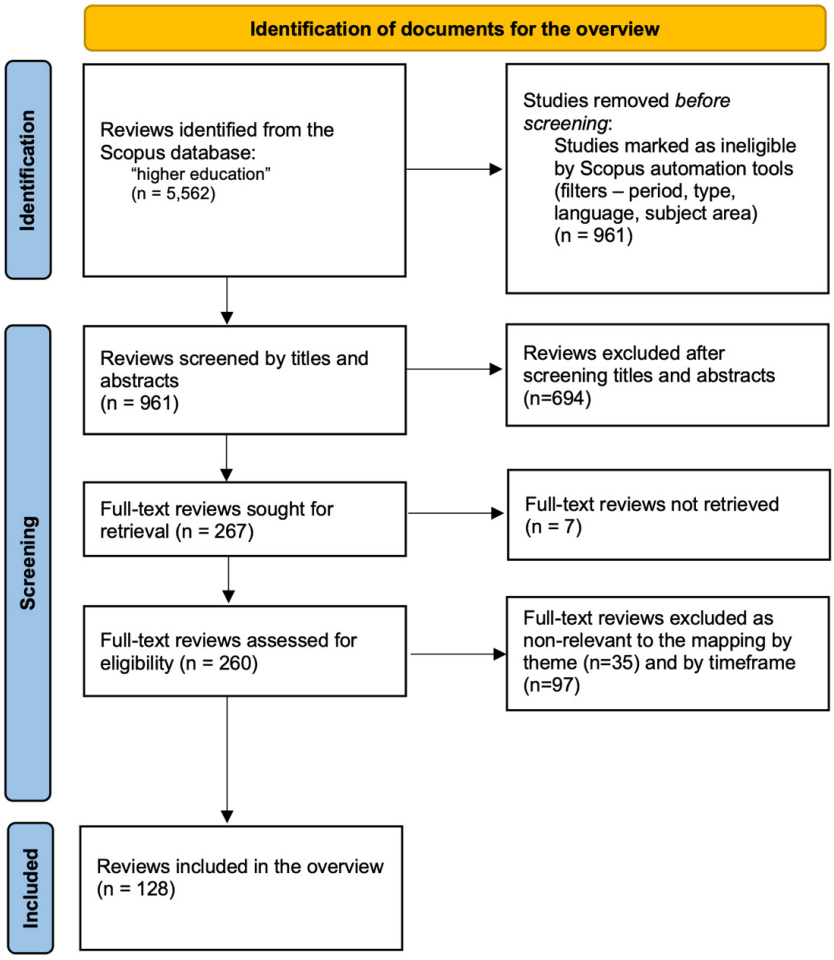
Demographics of the Sample

Eighty reviews out of the 128 reviews ultimately selected for the review were published in 2024, forty-eight came out in 2025. The most cited review in the sample is "A Systematic Review of Generative AI for Teaching and Learning Practice" (Ogunleye et al., 2024), with 61 citations in the Scopus database. Thirty-three reviews published in 2025 are not cited so far.

All 128 reviews are attributed to Social Sciences in compliance with the inclusion criteria. Simultaneously, the reviews are distributed among the following subject areas: Computer Sciences with 24 documents, Energy, Environmental Science, and Psychology 15 reviews each; Arts & Humanities

Figure 1

PRISMA Flow-Chart: Selection of Reviews



with 12 publications; Health Profession with 8 documents; 6 publications in Nursing; Decision Sciences and "Business, Management and Accounting" four reviews each; Engineering, Medicine, and Neuroscience with three reviews each. Other areas accounted for seven reviews.

The leading journals embrace Frontiers in Education (17 reviews), Cogent Education (13 reviews), Sustainability Switzerland (11 reviews), Education Sciences (6 reviews), Educational Research Review (4 reviews), Discover Education (3 reviews), Interactive Technology and Smart Education (3 reviews), International Journal of Learning Teaching and Educational Research (3 reviews), Journal of Language and education (3 reviews), Nurse Education Today (3 reviews), Sage Open (3 reviews), and Social Sciences and Humanities (3 reviews). The remaining 47 journals brought out fewer than three reviews. Of the 128 reviews in the dataset, 96 (75%) were published in journals ranked within the Scopus Social Sciences (Education) category. The quartile distribution of these is as follows: Q1 (23.6%), Q2 (36.7%), Q3 (7.8%), and Q4 (7.0%). The remaining journals, while not specifically categorized under Education, predominantly fall within other Social Sciences domains, most notably Social Sciences (miscellaneous) and Social Sciences (Geography, Planning and Development).

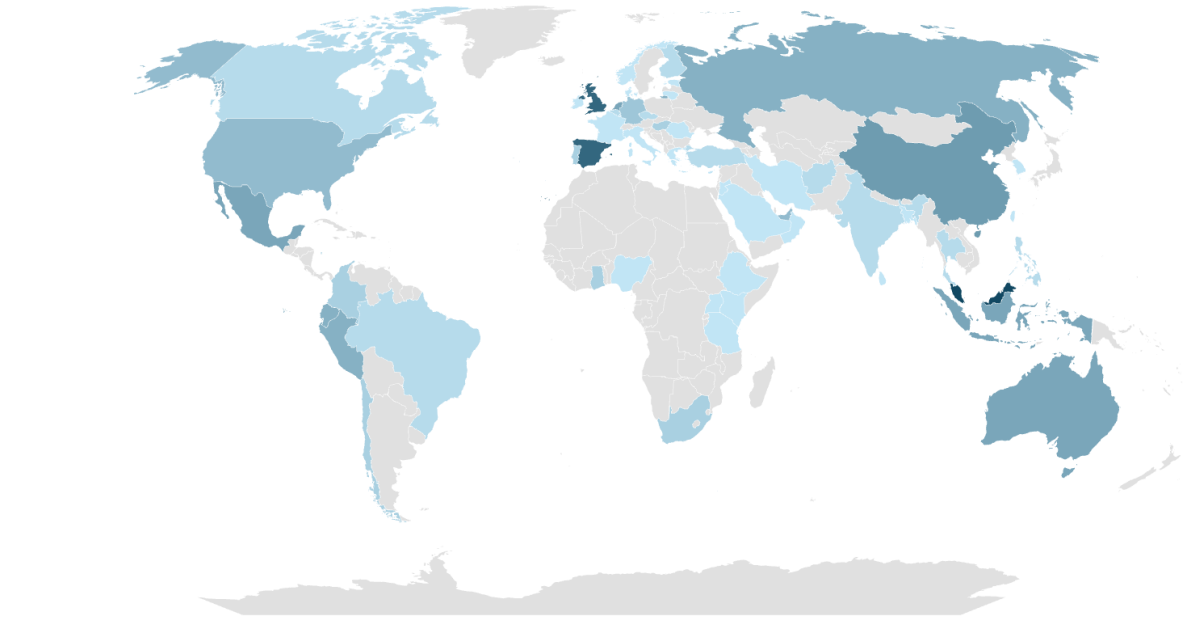
The most prolific authors in the sample were Bervell, B. (Mireku & Bervell, 2024; Mireku et al., 2024a; Mireku et al., 2024b), Mireku, D.O. (Mireku & Bervell, 2024; Mireku et al., 2024a; Mireku et al., 2024b), Raitskaya, L. (Raitskaya & Tikhonova, 2024; Raitskaya & Tikhonova, 2025; Tikhonova & Raitskaya, 2024), and Tikhonova, E. (Raitskaya & Tikhonova, 2024; Raitskaya & Tikhonova, 2025; Tikhonova & Raitskaya, 2024), with three reviews each. Six authors contributed two publications each: Alias, B.S., Barreiro-Collazo, A., Dzamesi, P.D., Glasserman-Morales, L.D., Oo, T.Z., and Tarake, T.G. The remaining researchers authored a single review.

The leading country by affiliations in the review is Malaysia (16 affiliations). Spain and the United Kingdom follow with 13 affiliations. China has 8 affiliations. Australia, Indonesia, Mexico, and Netherlands account for seven affiliations each. They are followed by Ecuador, Peru, and Russia, with six affiliations each. The geographical breakdown is shown in Figure 2. The top three of universities by affiliations embrace Tecnológico de Monterrey and RUDN University (six affiliated authors each) and Universiti Sains Malaysia (five affiliated authors). Consequently, the most conspicuous results that the reviews were conducted throughout the world, with a less impressive representation of Africa and Asia. International collaborations, involving researchers from two or three countries, accounted for 30 reviews (23.4%) in the sample.

Data pertaining to the methodological classification of the reviews were extracted and categorized. The distribution,

Figure 2

A Worldwide Breakdown of Review Authors' Affiliations



Note. The legend includes the density of publications per country, with a maximum of 16 (the darkest shade) to a minimum of 1 (the lightest shade). the map was made up in the microsoft excel by the authors

detailed in Figure 3, was as follows: systematic reviews (n=70, 55%), bibliometric reviews (n=15, 12%), scoping reviews (n=12, 9%), other review types (n=21, 16%), and reviews of an unidentified type (n=10, 8%).

The field's diverse and mixed methodological approaches were evident in the variety of review types identified. Alongside the dominant methodologies, the sample contained several less common types, as illustrated by the following examples: integrative (Amavasi & Zimmerman, 2024), exploratory (Barua & Lockee, 2024), narrative (Buele & Llerena-Aguirre, 2025), and realist (van der Wee et al., 2024) reviews, meta-ethnographic (Nieminen et al., 2024), pragmatic scoping (Marano et al., 2024), systematic scoping (Tikhonova & Raitskaya, 2024) among others (see Appendix 2 for full citations).

The reviews included in this scoping review demonstrated a strong adherence to established methodological standards, as evidenced by their consistent citation of authoritative guides and protocols (Table 3). The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, particularly the seminal work by Moher et al. (2009), were the most frequently referenced framework, underscoring a prevailing commitment to transparency and rigor in systematic reviewing. For scoping reviews, the foundational framework by Arksey & O'Malley (2005) and its subsequent updates were commonly employed. Furthermore, authors utilized a diverse toolkit of specialized methodologies to suit their research questions, drawing on handbooks for meta-analysis (e.g., Schwarzer et al., 2015), bibliometric analyses (e.g., van Eck & Waltman, 2010; Donthu et al., 2021), and qualitative synthesis approaches like meta-ethnography (Noblit & Hare, 1988) and narrative synthesis (Popay et al., 2006). This comprehensive referencing reflects a mature and methodologically conscientious field that strategically selects and applies a wide spectrum of review typologies to synthesize higher education research.

Characteristics of the Reviews by Included Primary Publication

The analysis of the 128 reviews reveals a highly skewed distribution in the number of primary publications they synthesize, with a small number of large-scale reviews accounting for a substantial portion of the total evidence base (Appendix 4).

The data is characterized by a clear concentration, where a minority of reviews are responsible for synthesizing the majority of the primary literature. Specifically, just 11 reviews (8.6% of the sample) incorporate over 100 primary studies each, and together they account for 7,259 publications, or 43.9% of the total. This trend is further emphasized by the three largest reviews in the dataset, which each encompass over 500 primary studies and collectively contribute 3,990 publications (24.1% of the total).

In contrast, the typical review in this sample is far more limited in scope. The vast majority - 72.7% of the reviews (n=93) - synthesized fewer than 50 primary studies. This indicates that while the field is being consolidated through numerous focused, smaller-scale reviews, the overall evidence base is heavily influenced by a few exceptionally comprehensive studies that integrate knowledge from a thousand or more primary sources each.

Figure 3

Breakdown of the Reviews by Type

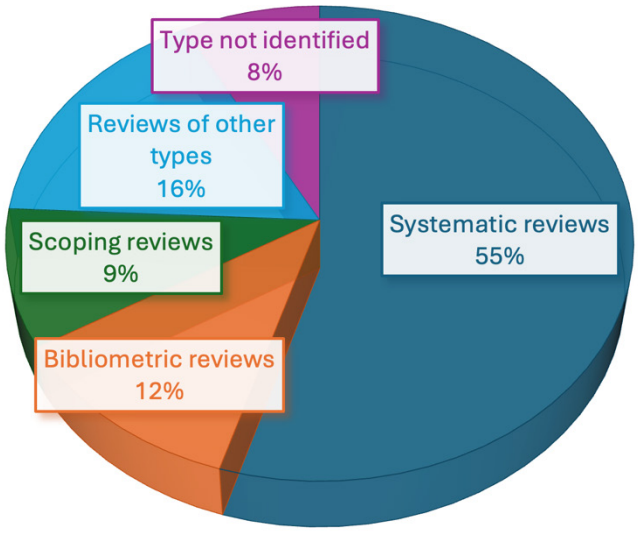


Table 3

References to Guides & Recommendations on Synthesis and Review Methodology, Frameworks, Protocols in the Reviews

Guides & Recommendations on Synthesis and Review Methodology, Frameworks, Protocols, etc.	References in the Reviews	
Systematic Reviews & recommendations on PRISMA	Abusaada & Elshater, 2022 Alexander, 2020 Bearman et al., 2012 Borrego et al., 2014 Briner & David, 2012 García-Peñalvo, 2017* Gough et al., 2017 Haddaway et al., 2022 Higgins & Green, 2011 Kitchenham & Charters, 2007 Kitchenham, 2004 Knobloch et al., 2011 Kraus et al., 2020 Marshall & Wallace, 2019 Moher et al., 2009 Moher et al., 2010 Moher et al., 2014 Moher et al., 2015	Moreno et al., 2018 Newman & Gough, 2020 Okoli, 2015 Page et al., 2016 Page et al., 2021 Papaioannou et al., 2016 Peters et al., 2020a Petticrew & Roberts, 2008 Pussegoda et al., 2017 Sánchez-Meca, 2022 Sarkis et al., 2021 Selçuk, 2019 Serrano et al., 2022* Sohrabi et al., 2021 Stansfield et al., 2016 Transfield et al., 2003 Urrútia et al., 2010* Xiao & Watson, 2019
Systematic Mapping Studies	Petersen et al., 2008	Petersen et al., 2015
Narrative synthesis in systematic reviews	Popay et al., 2006	Turnbull et al., 2022
Scoping Reviews	Arksey & O'Malley, 2005 Bradbury-Jones et al., 2022 Landa et l., 2011	Pollock et al., 2022 Tricco et al., 2018
Choice between Systematic and Scoping reviews	Munn et al., 2018	
Bibliometric Review	Aria & Cuccurullo, 2017 van Eck & Waltman, 2010 Belinchón Romero, 2008* Dávila et al., 2009*	Donthu et al., 2021 Gregorio-Chaviano, 2021* Joshi, 2014
Mapping Studies	Budgen et al., 2008	Novak, 1990
Literature Reviews	Fink, 2019	Templier & Pare, 2015
Meta-ethnography	France et al., 2019 Noblit & Hare, 1988	Noblit, 2019
Meta-analysis	Schwarzer et al., 2015	
Integrative Reviews	Toracco, 2005	Whittemore & Knafl, 2005
Realist Synthesis	Wong et al., 2013	

Populations of the Primary Publications

The analysis of the populations within the scoping review of 128 articles reveals a distinct concentration on specific stakeholder groups within the higher education landscape (Article 4). The field is overwhelmingly dominated by a focus on students, who constitute the central unit of analysis. This is evidenced by the fact that a significant majority of the reviews explicitly target various student cohorts. For instance, this encompasses general student populations, as well as more specific groups such as the medical students examined by Fengye et al. (2025), the student nurses in Amavasi & Zimmerman (2024), the STEM students studied by Bustamante-Mona et al. (2025), and students with disabilities, who are the focus of reviews like Nieminen et al. (2024) and Solis-Garcia et al. (2025).

Beyond the student body, a significant secondary focus is placed on educators and faculty, with numerous reviews examining the roles, practices, and development of teachers, lecturers, and HE academics. A smaller, yet notable, segment of the literature adopts a broader institutional or multi-stakeholder perspective. For example, Castillo-Martinez et al. (2024) analyzes the perspectives of "HE stakeholders," while Tikhonova & Raitskaya (2024) and Kaymakcioglu & Thomas (2024) focus on researchers and academics, respectively. Finally, a portion of the reviews, such as Barua & Lockee (2024), did not specify a particular population, in-

stead concentrating on theoretical or methodological trends within the literature itself. In summary, the intellectual focus of this corpus is firmly centered on the student experience, while also acknowledging the critical roles of academic staff and institutional frameworks in the ecosystem of higher education.

Higher Education Institutions as a Focus in the Primary Publications

The analysis of the institutional contexts within the scoping review reveals a strong predominance of generalist higher education institutions (HEIs) as the primary setting for research (Appendix 4). The vast majority of the reviews are focused on "HEI" as a broad category, indicating that the findings are intended to be applicable across universities and colleges without a specific professional or technical orientation. This general focus underscores a field concerned with universal themes in higher education. Alongside this dominant trend, a distinct and significant subset of reviews concentrates on specialized institutions. This is particularly evident in the health sciences, where a notable number of reviews, such as those by Amavasi & Zimmerman (2024) and Burton et al. (2024), are explicitly situated within nurse education institutions. Similarly, other reviews narrow their scope to specific academic units, including engineering faculties, medical universities, and STEM departments, as seen in works like Shahjahan & Seinn (2025) and Fengye et al. (2025). A small number of reviews also highlight institutions with a unique mission, such as those focusing on "green campuses" or entrepreneurship. In conclusion, while the literature is largely anchored in the context of the comprehensive university, a substantial and important thread of research is dedicated to understanding the unique dynamics and challenges within specialized professional and disciplinary educational environments.

Settings of the Primary Studies

An analysis of the geographical scope of the 128 reviews reveals a distinctly international character in the body of literature. The overwhelming majority of the reviews, comprising 99 articles or 77.3% of the sample, synthesized primary studies from an international setting. This indicates the field's strong emphasis on cross-border research and its pursuit of findings with global applicability.

Alongside this dominant global perspective, a notable secondary trend is the presence of regional studies, which account for 11 reviews (8.6%). These works concentrate on specific geographical or economic areas, such as developing countries or particular continents. Furthermore, a significant portion of the reviews, 17 in total (13.3%), are anchored in a national context, delving deeply into the higher education systems and policies of single countries.

A small number of the international reviews (1.6%) are supplemented with clarifying notes, such as "global, mainly Asian," indicating that while the scope is worldwide, the underlying evidence base may have a distinct geographical concentration. In summary, the field is overwhelmingly international in its outlook, yet maintains important, more focused lines of inquiry at both the regional and national levels.

Prevailing Themes

The co-occurrence analysis of author keywords from the 128 included reviews was conducted applying the VOSviewer software, based on full counting and minimum threshold set to three occurrences per keyword. The resulting visualisation (Figure 4) reveals nine initial groupings[3], automatically generated via VOSviewer's clustering algorithm based on keyword proximity and frequency.

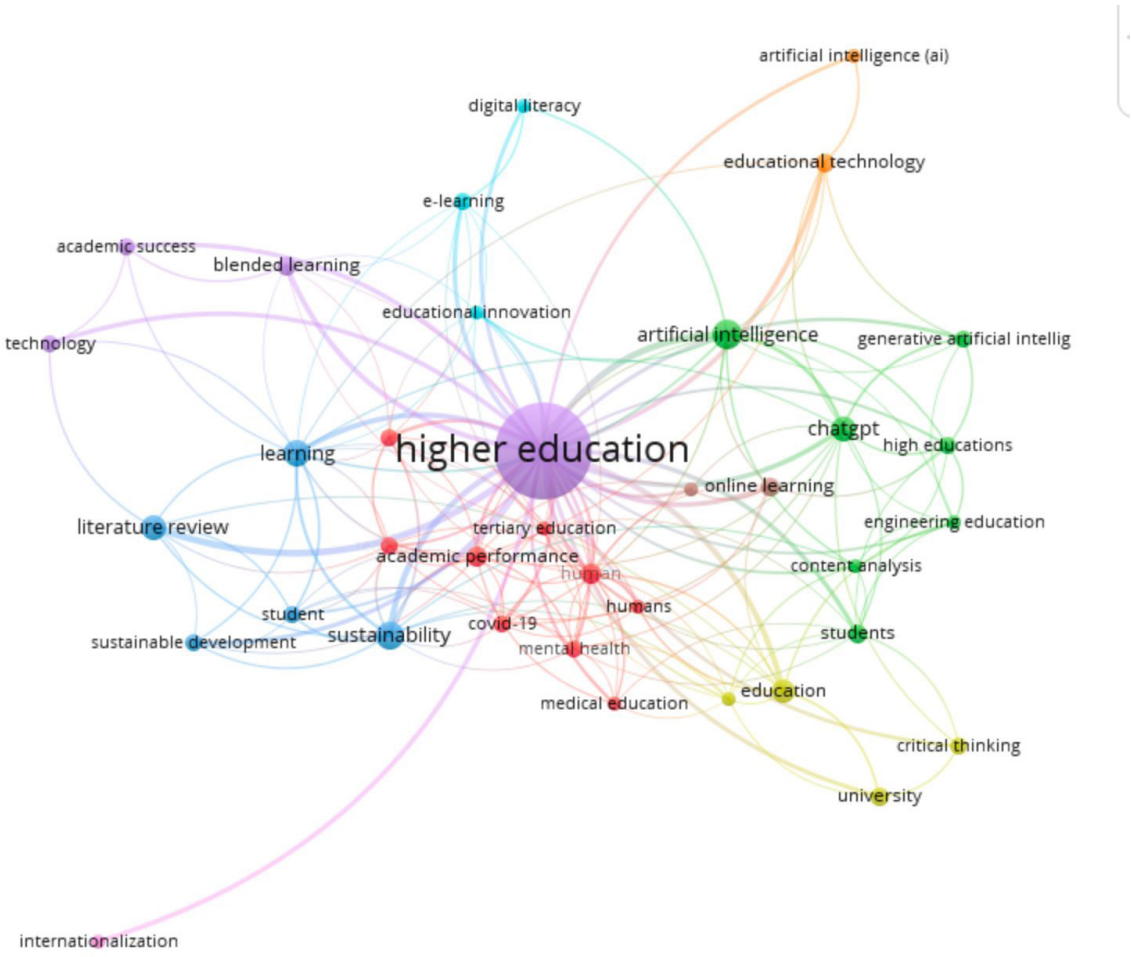
We coded all publications based on the clusters we extracted from the raw data (Appendix 1). The manually extracted clusters (codes) essentially coincided with groupings indicated by VOSviewer (Table 4). We categorised the reviews into eight clusters, or thematic codes (Table 5). The themes of the reviews partially overlapped, with a few entering more than one group. The biggest thematic group "*Digital literacy and educational innovation*" (Code 2) entails 40 reviews. The theme is wide in scope and scattered. Several reviews dwell upon digital competence, including the competence among higher education teachers (Karimi & Khawaja, 2025; Trujillo-Juárez et al., 2025), evaluation of digital competence (López-Nuñez et al., 2024), and a digital literacy gap in Sub-Saharan Africa universities (Ndibalema, 2025).

This cluster covers mobile-assisted language learning in teaching English in higher education (Álvarez-Martinez et al., 2025); teachers' behaviours and practices in various settings, including strategies fostering creativity of students (Brauer et al., 2024), lecturers' organizational commitment (Chen et al., 2024), and implementation of the Teachers Square concept suggested by Monica Vesely in 2001 as non-judgmental, evaluative process to enhance teaching (Gudoniene et al., 2025); challenge-based learning (Galdames-Calderón et al., 2024); use of technology-enhanced learning applications (Estaiba et al., 2025), self-regulated learning in the context of modern technologies (Junaštíkova, 2024), immersive learning platforms (Cabrera-Duffaut et al., 2024), virtual, augmented, and mixed reality (Balalee, 2025).

[3] *VOSviewer groupings based on the author keywords*: education, health and social challenges; artificial intelligence and transformation of educational practices; education, literature systemization and synthesis, and sustainable development; cognitive competencies and university education; academic success and blended learning; digital literacy and educational innovation; artificial intelligence in educational technologies; online learning and student engagement; and internationalization of higher education.

Figure 4

VOSviewer Visualization of Keyword Co-Occurrence and Thematic Groupings



Note. Circle size indicates keyword frequency; spatial distance reflects co-occurrence strength; colours represent cluster groupings by VOSviewer's modularity-based algorithm.

Table 4

Thematic Clusters (Codes) and VOSviewer Thematic Groupings

Code Number	Reviewers' Thematic Cluster (Code)	VOSviewer Thematic Groupings
1	Artificial intelligence in higher education (AI)	Artificial intelligence and transformation of educational practices Artificial intelligence in educational technologies
2	Digital literacy and educational innovation (DL)	Digital literacy and educational innovation
3	Education, health and social challenges (SC)	Education, health and social challenges
4	Cognitive competencies and university education (CC)	Cognitive competencies and university education
5	Online and blended learning in view of student engagement (OLBL)	Academic success and blended learning Online learning and student engagement
6	Education for sustainable development (ESD)	Education, literature systematization and synthesis, and sustainable development
7	Internationalization and transformation of higher education (INT)	Internationalization of higher education
8	Education: literature systematization and synthesis (SYN)	Education, literature systematization and synthesis, and sustainable development

Table 5

Thematic Distribution of Reviews

Thematic Cluster (Code)	Number of Reviews	Included Reviews (References)
1	24	Abdallah et al., 2025; Adauto Medina et al., 2024; Alotaibi, 2025; Andrade-Girón et al., 2025; Bayly-Castaneda et al., 2024; Buele & Llerena-Aguirre, 2025; Castillo-Martinez et al., 2024; Chashmyazdan et al., 2024; Chugh et al., 2025; Cui & Alias, 2024; Fernandez-Batanero et ak., 2024; Isiaku et al., 2024; Kalim et al., 2025; Klimova & Chen, 2024; Kovari, 2025; Lopez-Chila et al., 2024; Ma, 2025; Ogunleye et al., 2024; Peláez-Sánchez et al., 2024a; Raitskaya & Tikhonova, 2024; Raitskaya & Tikhonova, 2025; Sahar & Munawaroh, 2025; Schei et al., 2024; Tillmanns et al., 2025
2	41	Ahmad & Khurizan, 2024; Álvarez-Martinez et al., 2025; Balalee, 2025; Barua & Lockee, 2024; Brauer et al., 2024; Buele & Llerena-Aguirre, 2025; Cabrera-Duffaut et al., 2024; Cadiz, 2024; Castillo et al., 2024; Chen et al., 2024; Din Eak & Annamalai, 2024; Eltaiba et al., 2025; Galdames-Calderón et al., 2024; Harmon et al., 2024; Henry et al., 2024; Hidayat et al., 2024; Karimi & Khawaja, 2025; Liang et al., 2025; Lim & Lee, 2024; Liu et al., 2025; López-Nuñez et al., 2024; Lou & Zhou, 2024; Mashingaidze & Mayayise, 2025; Ndibalema, 2025; Olivares-De la fuente et al., 2025; Ortega-Ruiperez & Correa-Gorospe, 2024; Oulamine et al., 2025; Pallaris et al., 2024; Parambil et al., 2024; Peláez-Sánchez et al., 2024b; Renfors, 2024; Roy et al., 2025; Saez-Zevallos & Montalvo-Apolín, 2025; Sergeeva et al., 2024; Shahjahan & Seinn, 2025; Singun, 2025; Tang et al., 2024; Trujillo-Juárez et al., 2025; Vuoriainen et al., 2024; Zhao & Selvaratnam, 2024; Fernandez-Batanero et al., 2024
3	25	Amavasi & Zimmerman, 2024; Bannigan et al., 2025; Bustamante-Mona et al., 2025; Coleman et al., 2025; Dukes III et al., 2024; Edvardsen Tonheim et al., 2024; El Aatik et al., 2024; Fengye et al., 2025; Junaštíkova, 2024; Kalocsányiová et al., 2024; Kaymakcioglu & Thomas, 2024; Lim & Lee, 2024; Mireku et al., 2024a; Mireku et al., 2024b; Mursalzade et al., 2025; Ncube & Ngulube, 2024; Nieminen et al., 2024; Punch et al., 2025; Rahajeng et al., 2024; Rosales-Ricardo & Caceres-Manzano, 2024; Solis-Garcia et al., 2024; Solis-Garcia et al., 2025; Stamou et al., 2024; Wang & Ishak, 2025; Tikhonova & Raitskaya, 2024
4	7	Gomez et al., 2025; Marano et al., 2024; Mare & Mutezo, 2025; Mohammed & Ozdamli, 2024; Raitskaya & Tikhonova, 2025; Setiamurti & Kurniawati, 2024; Wang & Abdullah, 2024
5	15	Alonso et al., 2025; Alvarado, 2025; Barikzai et al., 2024; Benson et aL., 2024; Burton et al., 2024; Goncalves et al., 2024; Gudoniene et al., 2025; Ishmuradova et al., 2024; Lou & Zhou, 2024; Marano et al., 2024; Mare & Mutezo, 2025; Masalimova et al., 2024; Oulamine et al., 2025; Tareke et al., 2025; Valencia Quecano et al., 2024
6	12	Basheer et al., 2024; Bonilla-Jurado et al., 2024; Ghazian & Lortie, 2024; Liu et al., 2025; Ncube & Ngulube, 2024; ParedesCanencio et al., 2024; Rosario & Raimundo, 2024; Roy et al., 2025; Subki, 2025; van der Wee et al., 2024; Veres et al., 2025; You et al., 2024
7	14	Esteban, 2025; Ferreira Santos, 2024; Frez-Pulgar et al., 2025; Jaxin et al., 2024; Kaymakcioglu & Thomas, 2024; Marques et al., 2024; Mireku & Bervell, 2024; Sukjairungwattana et al., 2024; Tang et al., 2025; Tareke et al., 2024; Teng & Cosier, 2024; Tikhonova & Raitskaya, 2024; Vinueza-Morales et al., 2025; You et al., 2024
8	6	Banarjee et al., 2024; Heintalu et al., 2025; Mireku et al., 2024a; Nalweyiso et al., 2025; Thiedig & Wegner, 2024; Tikhonova & Raitskaya, 2024

Some focus is made on gamification and game-based learning (Galdames-Calderón et al., 2024; Hidayat et al., 2024; Henry et al., 2024).

A wide spread of mobile phones resulted in pervasive learning, in which students are placed in a real-world setting with smart phones and other wireless devices (Lim & Lee, 2024). The thematic cluster also spreads to barriers affecting e-learning (Oulamine et al., 2025), and barriers to digital transformation (Singun, 2025). In view of Education 4.0, the reviews synthesize education-industry collaboration (Vuoriainen et al., 2024), Internet of Things (Fernandez-Batanero et al., 2024) and the connections between AI and Education 4.0 (Peláez-Sánchez et al., 2024a).

As higher education is going through great transformation, causing great change in educational practices and learning technologies, the thematic cluster "*Artificial intelligence in higher education*" (Code 1) includes reviews ranging from general issues of Artificial Intelligence complex impact on higher education with all benefits and challenges (Abdallah et al., 2025; Buele & Llerena-Aguirre, 2025; Castillo-Martinez et al., 2024; Cui & Alias, 2024; Isiaku et al., 2024; Lopez-Chila et al., 2024; Ma, 2025; Ogunleye et al., 2024; Peláez-Sánchez et al., 2024a; Sahar & Munawaroh, 2025; Tillmanns et al., 2025) to diverse aspects of appliances of generative artificial intelligence, including cybersecurity (Parambil et al., 2024), AI-powered collaborative learning (Kovari, 2025), AI in academic work (Buele & Llerena-Aguirre, 2025), generative artificial intelligence in academic writing (Adauto Medi-

na et al., 2024; Raitskaya & Tikhonova, 2024), AI in fostering intercultural competence (ParedesCanencio et al., 2024), and critical thinking (Raitskaya & Tikhonova, 2025), and AI in learning management systems (Alotaibi, 2025).

The thematic cluster (Code 3) "*Education, health and social challenges*" entails aspects of education regarding the social function of university, health-related issues, medicine and nurse education (Amavasi & Zimmerman, 2024; Edvardsen Tonheim et al., 2024; Fengye et al., 2025), well-being features of higher education (Bannigan et al., 2025), inclusive education (Bustamante-Mona et al., 2025; Dukes III et al., 2024; Nieminen et al., 2024; Punch et al., 2025; Rahajeng et al., 2024; Solis-Garcia et al., 2024), students' migrant, minority, gender, displaced and refugee backgrounds in higher education (Coleman et al., 2025; Kaymakcioglu & Thomas, 2024; Kalocsányiová et al., 2024; Stamou et al., 2024). The thematic cluster also focuses on ethical issues of academic activities, including plagiarism (Mireku et al., 2024a, examination malpractice behaviours (Mireku et al., 2024b), ethical imperatives of data privacy (Ncube & Ngulube, 2024), and ethical aspects of research (Tikhonova & Raitskaya, 2024). The cluster (Code 3) totals 25 reviews.

The thematic cluster "*Cognitive competencies and university education*" (Code 4) works out at six reviews. As cognitive competence as other meta-competences factor in self-regulated learning and academic success of students, this theme attracts researchers' attention. Critical thinking as higher order thinking skill gets most focus (Gomez et al., 2025; Raitskaya & Tikhonova, 2025). Cognitive competence is also approached through shared metacognition in communities of inquiry in online learning (Mare & Mutezo, 2025). In some research, cognitive competence is considered within soft skills (Gomez et al., 2025; Mohammed & Ozdamli, 2024). Critical thinking is studied in the context of artificial intelligence impact (Raitskaya & Tikhonova, 2025) and through Mathematics (Wang & Abdullah, 2024). One more direction of study is creativity that is regarded as a metacognitive process (Setiamurti & Kurniawati, 2024).

The next thematic cluster titled "*Online and blended learning in view of student engagement*" (Code 5) has been popular for most of the 21st century, with a spike during the COVID-19 Pandemic (Kumar & Pande, 2021). Though, the timeframe of this synthesis includes reviews published in 2024-2025, the timeline of the included reviews is limited to 2010-2025. Thus, the Pandemic practices were reflected on in several reviews (Burton et al., 2024; Gudoniene et al., 2025; Lou & Zhou, 2024; Oulamine et al., 2025). Online learning and e-learning is the topic of a few reviews (Mare & Mutezo, 2025; Masalimova et al., 2024; Barikzai et al., 2024; Burton et al., 2024), with more reviews of blended learning (Alonso et al., 2025; Benson et aL., 2024; Ishmuradova et al., 2024; Lou & Zhou, 2024). This thematic cluster also covers hybrid learning (Gudoniene et al., 2025) and remote proctoring (Marano et al., 2024).

Sustainable Development Goals (SDGs) accepted in 2015 included Goal 4 - Quality Education. The focus on the topic reached its peak after 2015 but the theme is still presented in educational research. The thematic cluster "*Education for sustainable development*" (Code 6) totals 12 reviews. They dwell upon assessment of sustainability in higher education (Basheer et al., 2024), benefit of education for sustainable development at universities (Bonilla-Jurado et al., 2024; Veres et al., 2025), in incorporating the UN Sustainable Development Goals (SDGs) into Environmental and Natural Science Courses (Ghazian & Lortie, 2024), contribution of students' entrepreneurship competence to Sustainable Development (Liu et al., 2025; Rosario & Raimundo, 2024), carbon footprint of higher education institutions (ParedesCanencio et al., 2024) and green campus management (Subki, 2025).

Another thematic cluster titled "*Internationalization and transformation of higher education*" (Code 7) is rather wide and entails various aspects of transformations of higher education, including impact of internationalization issues. The cluster consists of 14 reviews. Some researchers align digital transformation with internationalization (Ferreira Santos, 2024). Aspects of student mobility still forms an integral part of internationalization of higher education (Esteban, 2025). As internationalization leads to a global educational dimension, issues of global competence (Jaxin et al., 2024; Teng & Cosier, 2024) and regional or national differences (Sukjairungwattana et al., 2024; Tang et al., 2025; Tareke et al., 2024) arise. Higher education change at large highlights academic identities (Marques et al., 2024).

Distinguished by its meta-research focus, the thematic cluster "*Education: literature systematization and synthesis*" (Code 8) encompasses methodological and literature or review aspects of educational inquiry. The six reviews comprising this cluster examine a range of foundational issues, such as conceptual frameworks for goal orientation (Heintalu et al., 2025), methodological inconsistencies in reporting STEM workforce skills (Banarjee et al., 2024), and the application of evidence in both teaching practice (Nalweyiso et al., 2025) and institutional decision-making (Thiedig & Wegner, 2024). Additional reviews explore the culture of research

(Tikhonova & Raitskaya, 2024) and trends in higher education leadership development (You et al., 2024).

Gaps and Priorities for Further Research

Of the 128 reviews analysed, 115 included recommendations for further research, which were primarily located in the conclusion (mainly) or discussion (rarely) sections. We catalogued the specific wordings of these agendas (Appendix 3) and subsequently categorized the recommendations into six overarching themes.

Technology Integration & Emerging Tools

This theme encompasses research on the implementation, effectiveness, and ethical implications of new technologies like AI, VR/AR, and digital platforms in education. The sub-theme of Long-term & Longitudinal Impact focuses on assessing the long-term effects on learning, critical thinking, career readiness, and skill retention, as seen in the work of Abdallah et al., 2025; Alotaibi, 2025; Balalee, 2025; Cabrera-Duffaut et al., 2024; Eltaiba et al., 2025; Jaxin et al., 2024; Liu et al., 2025; Nalweyiso et al., 2025; Oulamine et al., 2025; Pallaris et al., 2024; Punch et al., 2025; Raitskaya & Tikhonova, 2025; Vinueza-Morales et al., 2025; and Wang & Ishak, 2025. Research on AI & Generative AI, such as that by Girón et al., 2025; Chugh et al., 2025; Cui & Alias, 2024; Isiaku et al., 2024; Kovari, 2025; Ma, 2025; Ogunleye et al., 2024; Tillmanns et al., 2025; and Trujillo-Juárez et al., 2025, seeks to explore discipline-specific applications, develop ethical frameworks and guidelines, evaluate effectiveness compared to other tools, and investigate impacts on critical thinking and student dependency.

The sub-theme of Immersive Technologies (VR, AR, MR) is concerned with determining long-term applications and effectiveness across different subject domains like STEM, humanities, and health, as investigated by Balalee, 2025 and Cabrera-Duffaut et al., 2024. Studies on Digital Platforms & Tools, including those by Lim & Lee, 2024; López-Nuñez et al., 2024; and Olivares-De la fuente et al., 2025, investigate the use of specific tools like Twitter and YouTube, pervasive tools, and the impact of digital competence. Finally, the critical area of Cybersecurity & Data Privacy involves research aimed at developing benchmark datasets for cybersecurity in online education and exploring the efficacy of privacy-preserving techniques, as highlighted in the works of Ncube & Ngulube, 2024 and Parambil et al., 2024.

Pedagogy, Curriculum & Skill Development

This theme focuses on teaching methods, curriculum design, and the development of specific competencies in students and educators. A significant area of inquiry involves Teaching Methodologies & Frameworks, which investigates the effectiveness of specific pedagogical approaches like challenge-based learning (CBL), team-based learning (TBL), gamification, and translanguaging, as examined by Benson et al., 2024; Burton et al., 2024; Galdames-Calderón et al., 2024; Henry et al., 2024; Renfors, 2024; Sergeeva et al., 2024; and Tang et al., 2024. Closely related is the sub-theme of Skill Development, which focuses on fostering essential competencies in learners such as critical thinking, creativity, self-regulated learning, entrepreneurial competence, and digital literacy, a priority in the research of Brauer et al., 2024; Heintalu et al., 2025; Karimi & Khawaja, 2025; Liu et al., 2025; Lou & Zhou, 2024; Ndibalema, 2025; Peláez-Sánchez et al., 2024; and Wang & Abdullah, 2024.

Furthermore, the theme encompasses Curriculum Integration, exploring the systematic embedding of cross-cutting priorities like sustainability (SDGs), sustainable entrepreneurship, and evidence-based practice into curricula, as seen in the work of Bonilla-Jurado et al., 2024; Ghazian & Lortie, 2024; Nalweyiso et al., 2025; and Rosario & Raimundo, 2024. Finally, recognizing the central role of the educator, research on Faculty Development & Academic Identity examines the formation of academic identities, the enhancement of digital competencies among teachers, and the overall well-being of faculty, addressed by Harmon et al., 2024; López-Nuñez et al., 2024; and Marques et al., 2024.

Equity, Inclusion & Diverse Contexts

This theme highlights the critical need for educational innovations to be inclusive, accessible, and effective across diverse populations, cultures, abilities, and geographic regions. A primary focus is on Inclusive Education & Accessibility, which involves investigating robust support mechanisms for students with disabilities (including non-visible disabilities) and promoting inclusive pedagogical methods and peer support programs, as researched by Bustamante-Mona et al., 2025; Dukes III et al., 2024; Punch et al., 2025; Rahajeng et al., 2024; and Solis-Garcia et al., 2025. Further refining this focus, the sub-theme of Gender & Demographic Studies examines the complex relationship between technology adoption and factors like gender, age, and economic situation, with particular attention to underrepresented regions, as seen in the work of Bannigan et al., 2025; Bustamante-Mona et al., 2025; Coleman et al., 2025; and Kalim et al., 2025.

To counter a Western-centric bias, the theme emphasizes Cross-Cultural & Global Perspectives, calling for research conducted in diverse cultural, regional, and transnational contexts, including the Global South and non-Anglophone countries, exemplified by studies from Alonso et al., 2025; Chen et al., 2024; Kaymakcioglu & Thomas, 2024; Álvarez-Martinez et al., 2025; Setiamurti & Kurniawati, 2024; Shahjahan & Seinn, 2025; Sukjairungwattana et al., 2024; Tang et al., 2025; and Vuoriainen et al., 2024. Finally, ensuring that no cluster is overlooked, research on Support for Specific Populations concentrates on the unique needs of refugee-background students and the factors influencing their success throughout the entire higher education journey, a key area of investigation for Kalocsányiová et al., 2024.

Sustainability & Institutional Management

This theme addresses the environmental, social, and governance dimensions of educational institutions, focusing on their long-term viability and impact. A core area of investigation is Green Campus & Sustainable Development, which delves into the behavioral, cultural, and policy-related dimensions of green campus management and works to as-

sess the carbon footprint of Higher Education Institutions (HEIs), as explored by Basheer et al., 2024; Paredes-Canencio et al., 2024; Subki, 2025; Tareke et al., 2024; and Veres et al., 2025. The operational effectiveness of these institutions falls under Quality Assurance & Governance, which involves research on promoting quality assurance, understanding the impact of legislative frameworks on digital transformation, and enhancing the use of evidence in institutional decision-making, a key focus for Mireku & Bervell, 2024; Singun, 2025; and Thiedig & Wegner, 2024. Finally, bridging theory with practice, the theme explores Living Labs & Interdisciplinary Collaboration, examining how Living Labs function as hybrid learning spaces that merge education with real-world application and assessing the impact of interdisciplinary education on achieving tangible sustainability outcomes, as studied by van der Wee et al., 2024 and Veres et al., 2025.

Assessment, Ethics & Academic Integrity

This theme centers on the critical challenges of evaluating learning effectively, navigating the ethical implications of new educational tools, and preserving foundational academic standards. A key area of development is in Assessment Methods & Feedback, which involves the creation and evaluation of innovative automated assessment tools, such as AI for grading, alongside investigations into the effectiveness of feedback across diverse learning styles and explorations of how assessment practices themselves shape student identities, as examined by Bui & Barrot, 2024; Din Eak & Annamalai, 2024; Lu et al., 2024; Makarova et al., 2024; and Nieminen et al., 2024. In response to technological advancements, the theme critically addresses Ethics & Academic Integrity, focusing on studying the long-term effects of Generative AI on academic honesty, developing robust ethical guidelines and policies for AI use in educational settings, and investigating related issues such as plagiarism detection and technostress among students and educators, a priority in the research of Bayly-Castaneda et al., 2024; Adauto Medina et al., 2024; Mireku et al., 2024b; and Tillmanns et al., 2025.

Research Gaps & Methodological Approaches

This theme critically identifies limitations within current research practices and advocates for more comprehensive, rigorous, and diverse methodological strategies in future scholarly inquiry. A primary recommendation involves Broadening Research Scope, which entails utilizing multiple literature databases, incorporating multilingual sources to mitigate Anglophone bias, expanding inclusion criteria regarding time periods and publication types, and considering a wider range of stakeholder perspectives, as suggested by Ahmad & Khurizan, 2024; Esteban, 2025; Ferreira Santos, 2024; Gudoniene et al., 2025; Mashingaidze & Mayayise, 2025; Ortega-Ruiperez & Correa-Gorospe, 2024; Raitskaya & Tikhonova, 2024; Sahar & Munawaroh, 2025; Stamou et al., 2024; and Tikhonova & Raitskaya, 2024.

To enhance the depth and validity of findings, the theme calls for the adoption of Rigorous & Diverse Methodologies, specifically promoting the use of mixed-methods approaches, longitudinal studies, in-depth case studies, and experimental designs to build a more robust and reliable evidence base, a approach exemplified by Andrade-Girón et al., 2025; Karimi & Khawaja, 2025; Marques et al., 2024; Masalimova et al., 2024; and Tareke et al., 2025. Finally, to adequately address the complex nature of contemporary educational challenges, the theme underscores the necessity of Interdisciplinary Collaboration, encouraging active partnership between traditionally siloed fields such as education, computer science, ethics, and psychology, as highlighted in the works of Frez0Pulgar et al., 2025; Isiaku et al., 2024; Ma, 2025; Ogunleye et al., 2024; Parambil et al., 2024; and Vinueza-Morales et al., 2025.

To integrate the coded themes from our analysis and the research agendas from the reviews, we analyzed their relationship, resulting in the following consolidated list (Table 6). The distribution displayed the interrelation of the themes and complexity of educational research.

Implications of the Reviews Included in the Scoping Review

An analysis of the results of the coding for implications, where 2 denotes a dedicated implications section, 1 indicates implications embedded within the Discussion or Conclusion, and 0 signifies no stated implications, reveals a significant gap in explicit reporting. Only a minority of studies feature implications clearly stated in a separate section (coded as 2[4]), while a larger portion embed them within other sections (coded as 1[5]). However, nearly half of the reviewed literature is coded as 0, failing to state any implications at all. This prevalent

[4] *Implications extracted from the reviews* with Code 2 (Implications in a dedicated section): Alonso et al., 2025; Amavasi & Zimmerman, 2024; Barikzai et al., 2024; Bonilla-Jurado et al., 2024; Brauer et al., 2024; Buele & Llerena-Aguirre, 2025; Chen et al., 2024; Chugh et al., 2025; Coleman et al., 2025; Cui & Alias, 2024; Frez0Pulgar et al., 2025; Ghazian & Lortie, 2024; Harmon et al., 2024; Isiaku et al., 2024; Kalim et al., 2025; Karimi & Khawaja, 2025; Klimova & Chen, 2024; Ma, 2025; Mare & Mutezo, 2025; Masalimova et al., 2024; Mireku & Bervell, 2024; Mireku et al., 2024a; Mireku et al., 2024b; Nalweyiso et al., 2025; Ndibalema, 2025; Nieminen et al., 2024; Ogunleye et al., 2024; Oulamine et al., 2025; Rahajeng et al., 2024; Raitskaya & Tikhonova, 2025; Roy et al., 2025; Sahar & Munawaroh, 2025; Schei et al., 2024; Thiedig & Wegner, 2024.

[5] *Implications extracted from the reviews* with Code 1 (Implications within Discussion/Conclusion): Alotaibi, 2025; Bannigan et al., 2025; Basheer et al., 2024; Burton et al., 2024; Cabrera-Duffaut et al., 2024; Din Eak & Annamalai, 2024; El Aatik et al., 2024; Eltaiba et al., 2025;

Table 6

Consolidated List of Prevailing Research Themes and Themes Further Studies in Higher Education

Number of the theme	Themes for Further Research	Related Coded Clusters
1	Technology Integration & Emerging Tools	Code 1: Artificial Intelligence in Higher Education (partly)
		Code 2: Digital Literacy and Educational Innovation (partly)
2	Pedagogy, Curriculum & Skill Development	Code 4: Cognitive Competencies and University Education (partly)
3	Equity, Inclusion & Diverse Contexts	Code 3: Education, Health and Social Challenges (partly)
4	Sustainability & Institutional Management	Code 6: Education for Sustainable Development (partly)
		Code 7: Internationalisation and Transformation of Higher Education (partly)
5	Assessment, Ethics & Academic Integrity	Code 3: Education, Health and Social Challenges (partly)
		Code 5: Online and Blended learning in View of Student Engagement (partly)
6	Research Gaps & Methodological Approaches	Code 8: Education: Literature Systematization and Synthesis (partly)
7	Online and Blended learning in View of Student Engagement	Code 5: Online and Blended learning in View of Student Engagement (completely). The theme aligns with broader "Technology Integration" and "Pedagogy" themes
8	Education, Health and Social Challenges	Code 3: Education, Health and Social Challenges (completely). The theme aligns with the "Equity, Inclusion & Diverse Contexts" and "Ethics"
9	Cognitive Competencies and University Education	Code 4: Cognitive Competencies and University Education (completely). The theme aligns with "Pedagogy, Curriculum & Skill Development"
10	Internationalisation and Transformation of Higher Education	Code 7: Internationalisation and Transformation of Higher Education (completely). The theme aligns with "Sustainability & Institutional Management"
11	Education for Sustainable Development	Code 6: Education for Sustainable Development (completely), being a subset of "Sustainability & Institutional Management"
12	Education: Literature Systematisation and Synthesis	Code 8: Education: Literature Systematization and Synthesis (completely), being a subset of "Research Gaps & Methodological Approaches"

absence of a dedicated implications section results in vague conclusions and leaves the evidence base for practical application seeming doubtful and underdeveloped. For future research to provide more explicit and actionable guidance, the inclusion of a distinct implications section is strongly recommended to clarify the translational value and real-world impact of the findings.

DISCUSSION

This scoping review of reviews reveals a dynamic and rapidly evolving field of higher education research, characterized by a maturation in methodology, a complex and interconnected thematic landscape, and a distinct duality in the structure of its evidence synthesis (Figure 3; Table 3). A central finding is the field's methodological conscientiousness. The widespread application of established protocols like PRISMA and Arksey & O'Malley's framework, coupled with a sophisticated diversity of review typologies (from bibliometric to meta-ethnographic) signals a move beyond simple literature summaries towards rigorous, transparent, and nuanced forms of evidence aggregation. This methodological maturity strengthens the credibility of the field's collective findings and provides a robust foundation for addressing its complex research questions.

Galdames-Calderón et al., 2024; Jaxin et al., 2024; Kaymakcioglu & Thomas, 2024; Kovari, 2025; Liang et al., 2025; Liu et al., 2025; Marano et al., 2024; Mashingaidze & Mayayise, 2025; Mohammed & Ozdamli, 2024; Mursalzade et al., 2025; Ortega-Ruiperez & Correa-Gorospe, 2024; Parambil et al., 2024; ParedesCanencio et al., 2024; Peláez-Sánchez et al., 2024; Pelaez-Sanchez et al., 2024; Punch et al., 2025; Renfors, 2024; Rosario & Raimundo, 2024; Singun, 2025; Tang et al., 2024; Tareke et al., 2025; Teng & Cosier, 2024; Quecano et al., 2024; van der Wee et al., 2024; Veres et al., 2025.

The thematic architecture of the field reflects this complexity, dominated by the pervasive force of digital integration. The "wide and scattered" nature of the "Digital literacy and educational innovation" cluster shows its influence from pedagogy to institutional strategy. This broad transformation is now being defined by the rapid rise of "Artificial intelligence" as a major, distinct sub-field, as evidenced by a cluster of reviews with overlapping scopes and objectives (Abdallah et al., 2025; Buele & Llerena-Aguirre, 2025; Castillo-Martinez et al., 2024; Ogunleye et al., 2024). The breakneck pace of technological change has led to a compressed synthesis cycle, where reviews covering periods as short as a year quickly follow one another. The significant focus on AI in academic writing, noted in syntheses like those by Adauto Medina et al. (2024) and Raitskaya & Tikhonova (2024) despite our review's exclusion criteria, underscores its status as a rapidly maturing area of inquiry. This technological focus, however, exists in a necessary balance with strong clusters around social challenges, equity, and sustainable development, illustrating a field deeply engaged with its ethical responsibilities.

This interconnectedness is further clarified by the structured mapping of themes for further research and corresponding clusters/ codes (Table 6), which demonstrates that key issues like digital literacy (Cluster/ Code 2) or ethics (Cluster/Code 3) are not siloed but are integral components across technological, pedagogical, and social dimensions. For instance, the theme of "Online and Blended learning" (Theme 7) is a direct instantiation of a specific code but also contributes to broader discussions on "Technology Integration" (Theme 1) and "Pedagogy" (Theme 2). This structure supports an interdisciplinary approach, suggesting that the most significant advances may occur at the intersection of these categories. Furthermore, the inclusion of meta-level themes like "Research Gaps & Methodological Approaches" (Theme 6) indicates a self-reflective field that is systematically critiquing its own development.

Underpinning this thematic and methodological landscape is a dual structure of evidence synthesis. The field is populated by a large number of focused, small-scale reviews (nearly three-quarters synthesizing fewer than 50 studies) that provide detailed charts of niche topics. Conversely, the overarching evidence base is disproportionately shaped by a small number of monumental works (just 11 studies account for over 40% of the total primary publications analyzed), which provide broad maps of the territory. This duality presents a central challenge: integrating these different levels of analysis to form a coherent narrative.

Based on the analysis of the included reviews, the breakdown of how implications are presented in the reviews reveals a significant gap in explicit reporting: a minority of studies (approximately 30%) feature implications stated in a dedicated section, while a larger portion (approximately 25%) embed implications within the Discussion or Conclusion sections. However, nearly half of the reviewed literature fails to state any practical or research implications at all. This absence of a dedicated implications section often results in vague conclusions and leaves the evidence base for practical application seeming doubtful and underdeveloped.

Finally, a tension exists between the field's aspirations and its contextual grounding. The predominantly international scope of the reviews and their overwhelming focus on the student experience aim for global applicability. However, this evidence is often grounded in "generalist" HEI contexts, raising questions about its transferability to specialized professional schools. While the significant representation of countries like Malaysia, Spain, and the UK suggests a shifting geographical centre of gravity beyond Anglo-American dominance, the under-representation of regions like Africa and Asia points to persistent gaps in the global knowledge ecosystem. To end it up, the trajectory of higher education research will be shaped by its ability to integrate its dualistic evidence base, navigate the interplay between technological capability and ethical commitment, and broaden its geographical and institutional scope to build a truly inclusive and applicable body of knowledge.

CONCLUSION

The findings of our systematic scoping review of reviews of higher education show a field dominated by rigorous, protocol-driven methodologies; 76% of the reviews were systematic, bibliometric, or scoping in nature. While this demonstrates a broad commitment to evidence-based frameworks, a minority of studies utilized narrative or other qualitative methodologies.

The analysis identified eight prevalent thematic clusters in higher education research: (1) AI in higher education; (2) digital literacy and innovation; (3) education, health, and social change; (4) cognitive competencies; (5) student engagement in online/blended learning; (6) education for sustainable development; (7) internationalisation and transformation; and (8) literature systematisation and synthesis. Our review synthesized the research agendas proposed across the reviewed literature: (a) technology integration & emerging tools; (b) pedagogy, curriculum & skills development; (c) equity, inclusion & diverse contexts; (d) sustainability & institutional management; (e) assessment, ethics & academic integrity; (f) research gaps & methodological approaches.

Implications for Researchers

The review outlined the prevailing themes in research on higher education that entail (1) research on AI appliances in higher education and transformations which AI may lead to; (2) digital and AI literacy and competencies essential for facing innovations in higher education and society; (3) so-

cial function of universities, issues of medicine and nurse education, health-related aspects of higher education and inclusive education; (4) metacognition, with cognitive and creative competencies as the frontrunners for self-regulated life-long learning and knowledge society; (5) online, blended, hybrid and e-learning; virtual, augmented and mixed reality in higher education; (6) education for sustainable development; (7) transformation of higher education and internationalization, global issues of higher education; (8) epistemological, methodological ans. evidence-based aspects of educational research. For future research to provide more explicit and actionable guidance, the inclusion of a distinct implications section is strongly recommended to clarify the translational value and real-world impact of the findings.

Limitations and Further Research

The valuable insights from this review of higher education research themes must be considered alongside its methodological constraints. These include the potential omission of relevant reviews due to the search being limited to one database. The restriction to English-language publications may have excluded relevant insights from regional and national reviews, potentially limiting the geographical and contextual diversity of the synthesized evidence. To address these limitations and shed further light on the field's evolution, a subsequent study could employ an overview of reviews methodology. This would involve a longer time span, searches in multiple databases, and the inclusion of literature in other languages.

DECLARATION OF COMPETING INTEREST

None declared.

AUTHORS' CONTRIBUTIONS

Elena Tikhonova: conceptualization; data curation; formal analysis; investigation; methodology; resources; software; validation; visualization; writing – original draft; writing – review & editing.

Lilia Raitskaya: conceptualization; data curation; formal analysis; investigation; methodology; resources; software; validation; visualization; writing – original draft; writing – review & editing.

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APPENDIX 1

Coding Review Themes

Review reference	Theme	Code
Abdallah et al., 2025	ChatGPT applications in higher education	1
Adauto Medina et al., 2024	ChatGPT in university academic writing	1
Ahmad & Khurizan, 2024	Data Envelopment Analysis	2
Alonso et al., 2025	Blended learning in higher education for the development of intrinsic motivation	5
Alotaibi, 2025	AI and LMS Integration in higher education	1
Alvarodo, 2025	Design thinking as a teaching methodology	8
Álvarez Martinez et al., 2025	Mobile-assisted language learning (MALL) for improving English language teaching and learning in higher education	2
Amavasi & Zimmerman, 2024	Infection prevention and control continuous education and training in pre-registration nursing programmes	3
Andrade-Girón et al., 2025	Generative artificial intelligence in higher education learning	1
Balalee, 2025	Virtual reality, augmented reality, and mixed reality in higher education	2
Banarjee et al., 2024	Inconsistencies in the inclusion of subjects in research reports on STEM workforce skills in theUK	8
Bannigan et al., 2025	Whole-university approaches to embedding well-being in the curriculum	3
Barikzai et al., 2024	E-learning adoption in emerging economies	5
Barua & Lockee, 2024	Strategies to incorporate flexibility in higher education course designs	2
Basheer et al., 2024	Sustainability Assessment Practices in Higher Education	6
Bayly-Castaneda et al., 2024	Crafting personalized learning paths with AI for lifelong learning	1
Benson et aL., 2024	Quality assurance interventions in blended learning design	5
Bonilla-Jurado et al., 2024	Benefits of Education for Sustainable Development at Universities	6
Brauer et al., 2024	Creativity-Fostering Teacher Behaviors in Higher Education	2
Buele & Llerena-Aguirre, 2025	Transformations in academic work and faculty perceptions of artificial intelligence in higher education	1, 2
Burton et al., 2024	Online team-based learning approaches in health professional education	5
Bustamante-Mona et al., 2025	Inclusive Pedagogical Models in STEM	3
Cabrera-Duffaut et al., 2024	Immersive learning platforms in higher education	2
Cadiz, 2024	Technology integration in Phillippine higher education	2
Castillo et al., 2024	AI Impact on Immersive Learning in Higher Education	2
Castillo-Martinez et al., 2024	AI in Higher Education	1
Chashmyazdan et al., 2024	Challenges of Universities and Higher Education Institutions in the Knowledge-Based Economy	1
Chen et al., 2024	Factors Influencing Lecturers' Organizational Commitment in Higher Education	2
Chugh et al., 2025	Generative Artificial Intelligence as a Learning Assistant in ICT Education	1

Review reference	Theme	Code
Coleman et al., 2025	The career prospects of migrant, female academics from minority ethnic backgrounds in the UK's higher education sector	3
Cui & Alias, 2024	Opportunities and challenges in higher education arising from AI	1
Din Eak & Annamalai, 2024	The impact of screencast feedback on student learning outcomes	2
Dukes III et al., 2024	Disability-focus aspects of higher education	3
Edvardsen Tonheim et al., 2024	Online group work in higher education within health sciences	3
El Aatik et al., 2024	Students Psychological Needs at the Level of Higher Education Institutions in Morocco	3
Eltaiba et al., 2025	Technology-enhanced learning applications in higher education in Middle East and North Africa	2
Esteban, 2025	Language use in study Abroad, student mobility	7
Fengye et al., 2025	Research interest in medical students: an international and Chinese perspective	3
Fernandez-Batanero et al., 2024	Adoption of the Internet of Things in higher education	1, 2
Ferreira Santos, 2024	Internationalisation in the digital transformation of higher education	7
Frez-Pulgar et al., 2025	Institutionalization of Bioethics in Higher Education Institutions	7
Galdames-Calderón et al., 2024	Challenge-Based Learning and Teaching Practices in Higher Education	2
Ghazian & Lortie, 2024	Incorporating the UN Sustainable Development Goals (SDGs) into Environmental and Natural Science Courses	6
Gomez et al., 2025	Factors for the Development of Critical Thinking in Higher Education	4
Goncalves et al., 2024	Undergraduate Student Retention Activities	5
Gudoniene et al., 2025	Hybrid Teaching and Learning in Higher Education	5
Harmon et al., 2024	Interdisciplinary reflection by higher education academics using teaching squares	2
Heintalu et al., 2025	The conceptualisation of goal setting and goal orientation in higher education	8
Henry et al., 2024	Pre-Perception of Gamification and Game-Based Learning in Higher Education Students	2
Hidayat et al., 2024	Online game-based learning in mathematics education among Generation Z	2
Ishmuradova et al., 2024	Blended learning in higher education	5
Isiaku et al., 2024	Leveraging ChatGPT for teaching, learning and evaluation	1
Jaxin et al., 2024	Global competence in higher education	7
Junaštíkova, 2024	Self-regulation of learning in the context of modern technology	2
Kalim et al., 2025	Barriers to AI adoption for women in higher education	1
Kalocsányiová et al., 2024	Facilitating displaced and refugee-background students' access and participation in European higher education	3
Karimi & Khawaja, 2025	Digital Competence among Higher Education Teachers	2
Kaymakcioglu & Thomas, 2024	Gender inequalities and academic leadership by countries	3,7
Klimova & Chen, 2024	Impact of AI on Enhancing Students' Intercultural Communication Competence at the University Level	1
Kovari, 2025	AI-powered collaborative learning in higher education	1

Review reference	Theme	Code
Liang et al., 2025	Enhancing EFL Writing Through Online Peer Feedback	2
Lim & Lee, 2024	Utilising Pervasive Tools in Higher Education	2, 3
Liu et al., 2025	Student Entrepreneurship Competence and Its Contribution to Sustainable Development	2, 6
Lopez-Chila et al., 2024	Artificial Intelligence in Higher Education	1
López-Nuñez et al., 2024	Digital Competence Evaluation in Higher Education	2
Lou & Zhou, 2024	Effectiveness of self-regulated learning strategies in higher education blended learning	2, 5
Ma, 2025	ChatGPT in higher education	1
Marano et al., 2024	Student experience of remote proctoring	5
Mare & Mutezo, 2025	Community of inquiry, shared metacognition, and student engagement in online learning	4, 5
Marques et al., 2024	Academic identities and higher education change	7
Masalimova et al., 2024	Trends in online learning in higher education in the BRICS countries	5
Mashingaidze & Mayayise, 2025	Relevance in information systems curriculum	2
Mireku & Bervell, 2024	Quality assurance in higher education (QAiHE) within subSaharan Africa	7
Mireku et al., 2024a	Plagiarism in Higher Education within Sub-Saharan Africa	3, 8
Mireku et al., 2024b	Examination malpractice behaviours in Higher Education in sub-Saharan Africa	3
Mohammed & Ozdamli, 2024	Soft Skills in Information Technology Education	4
Marano et al., 2024	Student experience of remote proctoring	5
Mursalzade et al., 2025	Factors Associated with Psychological Flexibility in Higher Education Students	3
Nalweyiso et al., 2025	Educational interventions for teaching and learning evidence-based practice knowledge, skills, attitudes, and behaviours	8
Ncube & Ngulube, 2024	Ethical Imperatives of Data Privacy in Sustainable Educational Data Analytics in Postgraduate Programmes	3, 6
Ndibalema, 2025	Digital literacy gaps in promoting 21st century skills among students in higher education institutions in Sub-Saharan Africa	2
Nieminen et al., 2024	Assessment experiences of students with disabilities in higher education	3
Ogunleye et al., 2024	Generative AI for Teaching and Learning Practice	1
Olivares-De la fuente et al., 2025	Twitter and YouTube as digital tools in higher education	2
Ortega-Ruiperez & Correa-Gorospe, 2024	Peer assessment to promote self-regulated learning with technology in higher education	2
Oulamine et al., 2025	Barriers Affecting e-Learning in Higher Education	2, 5
Pallaris et al., 2024	Mapping the landscape of Makerspaces in higher education	2
Parambil et al., 2024	Integrating AI-based and conventional cybersecurity measures into online higher education settings	1
ParedesCanencio et al., 2024	Carbon footprint of higher education institutions	6
Peláez-Sánchez et al., 2024a	The impact of large language models on higher education: exploring the connection between AI and Education 4.0	1
Pelaez-Sanchez et al., 2024b	Digital competencies in higher education for Industry 5.0	2

Review reference	Theme	Code
Punch et al., 2025	Experiences and challenges of students with disability in Australian universities	3
Rahajeng et al., 2024	Strategies among Students with Disabilities in Indonesia	3
Raitskaya & Tikhonova, 2024	Appliances of Generative AI-Powered Language Tools in Academic Writing	1
Raitskaya & Tikhonova, 2025	Enhancing Critical Thinking Skills in ChatGPT-Human Interaction	1, 4
Renfors, 2024	Education for the circular economy in higher education	2
Rosales-Ricardo & Caceres-Manzano, 2024	Effects of Physical Exercise on Academic Performance in University Students	3
Rosario & Raimundo, 2024	Sustainable Entrepreneurship Education	6
Roy et al., 2025	Metaverse-based education for sustainable development and improving the performance	2, 6
Saez-Zevallos & Montalvo-Apolín, 2025	Strategies for learning English in higher education	2
Sahar & Munawaroh, 2025	Artificial intelligence in higher education	1
Schei et al., 2024	Perceptions and Use of AI Chatbots among Students in Higher Education	1
Sergeeva et al., 2024	Gamified learning in higher education	2
Setiamurti & Kurniawati, 2024	Fostering Creativity in Higher Education Institution	4
Shahjahan & Seinn, 2025	'Decolonizing' engineering education	2
Singun, 2025	Unveiling the barriers to digital transformation in higher education institutions	2
Solis-Garcia et al., 2024	Mental Health of University Students with Disabilities	3
Solis-Garcia et al., 2025	Inclusion of students with disabilities in the European Higher Education Area (EHEA)	3
Stamou et al., 2024	Counseling for non-traditional students in formal higher education	3
Subki, 2025	Green Campus Management Sustainability	6
Sukjairungwattana et al., 2024	Higher Education Internationalization in Asia	7
Tang et al., 2024	Translanguaging strategies in the English writing classroom in higher education	2
Tang et al., 2025	Languages and the Internationalization of Higher Education in China	7
Tareke et al., 2024	Ethiopian Public Higher Education	7
Tareke et al., 2025	Students' academic success in higher education in the digital era	5
Teng & Cosier, 2024	Influences of cultural capital and internationalization on global competence in higher education	7
Thiedig & Wegner, 2024	Evidence use in higher education decision-making and policy	8
Tikhonova & Raitskaya, 2024	Culture of Research	3, 7, 8
Tillmanns et al., 2025	GenAI in Higher Education	1
Trujillo-Juárez et al., 2025	Teacher digital competence in higher education	2
Valencia Quecano et al., 2024	Dropout in postgraduate programs	5
van der Wee et al., 2024	Teaching and learning in sustainability-oriented Living Labs within higher education	6
Veres et al., 2025	Sustainable Universities	6
Vinueza-Morales et al., 2025	Teaching programming in higher education	7

Review reference	Theme	Code
Vuoriainen et al., 2024	Successful higher education-industry collaboration in engineering education	2
Wang & Abdullah, 2024	Enhancing Students' Critical Thinking Through Mathematics in Higher Education	4
Wang & Ishak, 2025	Social-Emotional Learning among College Students	3
You et al., 2024	Global research trends on higher education leadership development	7, 8
Zhao & Selvaratnam, 2024	Reform of vocational education in China	2

APPENDIX 2

Types of reviews and application of Frameworks & Protocols

Review Reference	Type of the review as stated in the title or in the text	PICO(T)-PPC & PRISMA PAGER
Abdallah et al., 2025	systematic	PRISMA
Adauto Medina et al., 2024	bibliometric	PRISMA
Ahmad & Khurizan, 2024	systematic & bibliometric	-
Alonso et al., 2025	systematic	PRISMA
Alotaibi, 2025	not identified	PRISMA
Alvado, 2025	systematic	PRISMA
Álvarez-Martinez et al., 2025	systematic	PRISMA
Amavasi & Zimmerman, 2024	not identified in the title, integrative	PRISMA
Andrade-Girón et al., 2025	not identified in the title, systematic	PRISMA
Balalee, 2025	systematic	PRISMA, PICO
Banarjee et al., 2024	systematic	PRISMA
Bannigan et al., 2025	scoping	PCC, PRISMA
Barikzai et al., 2024	scoping	PRISMA
Barua & Lockee, 2024	exploratory literature review	-
Basheer et al., 2024	comprehensive and bibliometric review	PRISMA
Bayly-Castaneda et al., 2024	systematic	PRISMA
Benson et aL., 2024	systematic	PRISMA
Bonilla-Jurado et al., 2024	not identified in the title	PRISMA
Brauer et al., 2024	systematic	-
Buele & Llerena-Aguirre, 2025	not identified in the title, narrative	-
Burton et al., 2024	systematic	PICO, PRISMA
Bustamante-Mona et al., 2025	not identified in the title, systematic mapping	-
Cabrera-Duffaut et al., 2024	systematic	PRISMA
Cadiz, 2024	bibliometric	-
Castillo et al., 20244	bibliometric	-
Castillo-Martinez et al., 2024	systematic	PRISMA
Chashmyazdan et al., 2024	literature review	-
Chen et al., 2024	systematic	PRISMA
Chugh et al., 2025	literature review, systematic narrative literature review	-
Coleman et al., 2025	integrative	PRISMA
Cui & Alias, 2024	systematic	PRISMA
Din Eak & Annamalai, 2024	systematic	-
Dukes III et al., 2024	not identified in the title, systematic	PRISMA
Edvardsen Tonheim et al., 2024	scoping	PRISMA
El Aatik et al., 2024	systematic	PRISMA, PICO
Eltaiba et al., 2025	systematic	PRISMA

Review Reference	Type of the review as stated in the title or in the text	PICO(T)-PPC & PRISMA PAGER
Esteban, 2025	bibliometric	PRISMA
Fengye et al., 2025	bibliometric	-
Fernandez-Batanero et al., 2024	not identified in the title	PICO, PRISMA
Ferreira Santos, 2024	scoping	PRISMA
Frez-Pulgar et al., 2025	systematic mapping	PICO
Galdames-Calderón et al., 2024	systematic	PRISMA, PICO
Ghazian & Lortie, 2024		-
Gomez et al., 2025	not identified in the title, systematic narrative review	-
Goncalves et al., 2024	not identified in the title	-
Gudoniene et al., 2025	systematic	PRISMA
Harmon et al., 2024	scoping	PRISMA, PAGER, PCC
Heintalu et al., 2025	systematic	PRISMA
Henry et al., 2024	systematic mapping study	-
Hidayat et al., 2024	systematic	PRISMA
Ishmuradova et al., 2024	bibliometric	-
Isiaku et al., 2024	not identified in the title, comprehensive literature review	PRISMA
Jaxin et al., 2024	systematic	PRISMA
Junaštíkova, 2024	review of empirical studies	-
Kalim et al., 2025	systematic	PRISMA
Kalocsányiová et al., 2024	multilingual systematic review	PRISMA
Karimi & Khawaja, 2025	systematic	PRISMA
Kaymakcioglu & Thomas, 2024	systematic	PRISMA
Klimova & Chen, 2024	not identified in the title, systematic	PRISMA
Kovari, 2025	systematic	PRISMA
Liang et al., 2025	systematic	PRISMA
Lim & Lee, 2024	systematic	-
Liu et al., 2025	systematic	PRISMA
Lopez-Chila et al., 2024	bibliometric	-
López-Nuñez et al., 2024	systematic	PRISMA
Lou & Zhou, 2024	systematic	PRISMA
Ma, 2025	systematic	PRISMA
Marano et al., 2024	pragmatic scoping	PRISMA
Mare & Mutezo, 2025	systematic	PRISMA
Marques et al., 2024	not identified in the title, systematic	PRISMA
Masalimova et al., 2024	bibliometric	PRISMA
Mashingaidze & Mayayise, 2025	systematic	PRISMA
Mireku & Bervell, 2024	systematic	PRISMA
Mireku et al., 2024a	systematic	PRISMA
Mireku et al., 2024b	systematic	PRISMA

Review Reference	Type of the review as stated in the title or in the text	PICO(T)-PPC & PRISMA PAGER
Mohammed & Ozdamli, 2024	systematic	PRISMA
Mursalzade et al., 2025	systematic	PRISMA
Nalweyiso et al., 2025	systematic	PRISMA, PICOT
Ncube & Ngulube, 2024	systematic	PRISMA, PICO
Ndibalema, 2025	systematic	not specified as 'PRISMA', though a PRISMA flowchart included
Nieminen et al., 2024	meta-ethnographic review	-
Ogunleye et al., 2024	systematic	PRISMA
Olivares-De la fuente et al., 2025	systematic	-
Ortega-Ruiperez & Correa-Gorospe, 2024	systematic	PRISMA
Oulamine et al., 2025	systematic	PRISMA
Pallaris et al., 2024	systematic concept mapping	-
Parambil et al., 2024	not identified in the title	-
ParedesCanencio et al., 2024	systematic	PRISMA
Peláez-Sánchez et al., 2024	not identified in the title, systematic	-
Pelaez-Sanchez et al., 2024	not identified in the title, systematic	PRISMA
Punch et al., 2025	scoping	PRISMA
Rahajeng et al., 2024	not identified in the title	PRISMA
Raitskaya & Tikhonova, 2024	scoping	PRISMA, PPC
Raitskaya & Tikhonova, 2025	scoping	PRISMA, PPC
Renfors, 2024	overview of the current state	-
Rosales-Ricardo & Caceres-Manzano, 2024	systematic	PRISMA
Rosario & Raimundo, 2024	bibliometric systematic	-
Roy et al., 2025	not identified in the title	PRISMA
Saez-Zevallos & Montalvo-Apolín, 2025	mapping	PRISMA
Sahar & Munawaroh, 2025	bibliometric	PRISMA
Schei et al., 2024	scoping	PRISMA
Sergeeva et al., 2024	bibliometric	-
Setiamurti & Kurniawati, 2024	systematic	PRISMA
Shahjahan & Seinn, 2025	integrative review	-
Singun, 2025	systematic	PRISMA
Solis-Garcia et al., 2024	systematic	PRISMA
Solis-Garcia et al., 2025	systematic	PRISMA
Stamou et al., 2024	scoping	PRISMA
Subki, 2025	bibliometric	-
Sukjairungwattana et al., 2024	systematic	PRISMA
Tang et al., 2024	systematic	PRISMA
Tang et al., 2025	not identified in the title	PRISMA
Tareke et al., 2024	not identified in the title	-

Review Reference	Type of the review as stated in the title or in the text	PICO(T)-PPC & PRISMA PAGER
Tareke et al., 2025	systematic	PRISMA
Teng & Cosier, 2024	systematic	PRISMA
Thiedig & Wegner, 2024	scoping	PRISMA
Tikhonova & Raitskaya, 2024	systematic scoping	PPC, PRISMA
Tillmanns et al., 2025	systematic	PRISMA
Trujillo-Juárez et al., 2025	systematic	PRISMA, PICO
Valencia Quecano et al., 2024	scoping	PRISMA
van der Wee et al., 2024	not identified in the title, realist review	PRISMA
Veres et al., 2025	bibliometric	PRISMA
Vinueza-Morales et al., 2025	bibliometric	-
Vuoriainen et al., 2024	systematic	PRISMA
Wang & Abdullah, 2024	systematic	PRISMA
Wang & Ishak, 2025	systematic	-
You et al., 2024	bibliometric	PRISMA
Zhao & Selvaratnam, 2024	systematic	PRISMA

APPENDIX 3

Extracted Data on Further Research from the Reviews

Review Reference	Further Research as Stated in the Review
Abdallah et al., 2025	Future research should include longitudinal studies to assess long-term impacts on learning and critical thinking. Greater focus is also needed on underrepresented regions, emotional well-being, and discipline-specific applications. Robust, transparent frameworks are essential to ensure responsible use that prioritizes academic integrity and inclusivity
Adauto Medina et al., 2024	Future research should focus on systematic literature reviews that delve into key areas such as the impact of ChatGPT on the development of specific academic writing skills, risks related to academic integrity and ethics, and its role in educational assessment
Ahmad & Khurizan, 2024	Bibliometric investigations. future researchers might consider evaluating works that were not included in the current analysis. could benefit from creating new techniques and utilizing new keywords to incorporate additional relevant publications for more comprehensive metadata analysis
Alonso et al., 2025	It would be convenient to analyze BL interventions in countries where these problems exist
Alotaibi, 2025	Future research should focus on quantifying the long-term sustainability impacts of AI–LMS integration and developing implementation frameworks that balance technological advancement with sustainable development objectives
Alvado, 2025	As a recommendation, it is essential to continue promoting the research and implementation of the DT in university education. This involves developing training programs for educators, promoting interdisciplinary collaboration between faculties and departments, and fostering pedagogical innovation based on this methodological approach. In addition, it is suggested to continuously evaluate the impact of design thinking on students' learning and development in order to adjust and improve its application in the university environment
Álvarez-Martinez et al., 2025	Future research endeavors should dedicate attention to assessing the viability of MALL to acquire new languages, while also exploring any potential variations in its efficacy across different languages
Amavasi & Zimmerman, 2024	This integrated review also found opportunities for future research addressing newly graduated nurses' IPC core competency throughout their induction or probation period to comprehend the challenges and strategies needed during the transition phase. An interventional control study of a group of newly graduated nurses on IPC core competency and their reflective learning during the early stages of their nursing career is recommended to monitor how nurses adapt and adopt IPC standards
Andrade-Girón et al., 2025	This research highlights the need for further study and future analysis to address variations in results based on different prompts or words used with ChatGPT and the potential impact on student satisfaction and effectiveness. Likewise, it opens opportunities for future exploration and improvement in designing and implementing AI-assisted learning systems, ensuring their optimal use and addressing concerns and difficulties that students may face. Therefore, it is recommended that experimental research be carried out with more rigorous criteria in the selection of the sample and in the application of measurement instruments to guarantee the validity and reliability of the results obtained in the research
Balalee, 2025	Future research can be conducted to determine the long-term applications of VR, AR, and MR in education. This type o research will help elucidate the immense impact of technology on education in the long run... more research is needed to determine how VR, AR, and MR applications are impacting traditional classroom settings in the digital domain. Research in VR, AR, and MR must explore applications across subject domains such as science, technology, engineering, and mathematics, as well as the humanities and health. Continuous research will be needed to stay up to date with new developments in VR, AR, and MR...
Banarjee et al., 2024	Not identified
Bannigan et al., 2025	It is alsowhole-university approach is one that considers all actors within HE. This is something that future research could explore. important to address the role of educators both in delivering well- being content but also in relation to the well-being of HE staff themselves. For educators to effectively impart well-being knowledge on students, they must be able to take care of their own well-being first (Querstret, 2019). It may also be worth considering the roles of other staff members and actors within the HE ecosystem
Barikzai et al., 2024	Future research should focus on exploring adaptive strategies to address these growing challenges, assessing the long-term impact of e-learning on academic outcomes, and examining the effectiveness of specific interventions in overcoming infrastructure-related barriers in various emerging contexts

Review Reference	Further Research as Stated in the Review
Barua & Lockee, 2024	Future research in this area can look more closely into the optimal degree of flexibility across the dimensions of flexible learning and develop a better understanding of how much choice is beneficial without causing confusion for learners and instructors. Further research is also needed to investigate the constraints of flexible course design and delivery including but not limited to access, connectivity, institutional policies, legal regulations, and the logistical and administrative barriers that can hinder the design and implementation of flexible courses in higher education
Basheer et al., 2024	Increasing research on student acceptance of the sustainability initiatives and possible changes that can be implemented to speed up the process
Bayly-Castaneda et al., 2024	Future lines of research are proposed among which are the determination of the factors that influence the effectiveness of personalization of learning as well as the ethical implications of this development to ensure equity and non-discrimination in access to these solutions in order to promote the democratization of learning
Benson et aL., 2024	Future research could focus on multi-faceted interventions that combine these approaches to upskill academics and lift the quality of BL across higher education institutions
Bonilla-Jurado et al., 2024	Future research should explore the effectiveness of ESD in diverse populations, including adolescents and older adults, to understand its applicability and benefits in a broader context. ... it is essential to continue to investigate methodological variations and demographic factors that may influence educational outcomes, as well as the impacts of different educational protocols and participant characteristics on observed effects. In addition, it is crucial to increase research on ESD implementation in the Global South, identifying strategies to overcome economic and infrastructural constraints and adapting successful approaches from the Global North to local contexts
Brauer et al., 2024	We thus encourage future researchers to zoom in on the interplay of our proposed themes to study how teachers apply different creativity-fostering behaviors interactively. The meta-creativity model could provide the structure for such a comprehensive measurement tool. We hope to spark researchers' ideas about studying and applying transdisciplinary approaches to fostering creativity within domain-specific interdependencies
Buele & Llerena-Aguirre, 2025	Future reviews should consider broader inclusion criteria and adopt dynamic frameworks that respond to the evolving nature of AI in education
Burton et al., 2024	Further research is required to better understand how online Team Based Learning approaches, now adopted as mainstream, impact knowledge, learning processes, academic outcomes, and the perceived experiences of students in health professional courses
Bustamante-Mona et al., 2025	Building on this conceptual mapping, future studies are encouraged to empirically assess how emotional intelligence, resilience, and motivation influence learning outcomes in various STEM environments. More research is needed on the best practices for training educators in inclusive pedagogical methods, particularly those that incorporate socio-emotional learning and gender-sensitive approaches. Investigating the long-term effects of inclusive STEM education on career choices and workforce participation would provide valuable insights into the effectiveness of these models
Cabrera-Duffaut et al., 2024	Expansion of Applications in Diverse Disciplines: More research is needed to explore the use of VR beyond health sciences, opening potential for its application in areas such as the exact and social sciences, arts, and humanities. Long-Term Studies: More longitudinal studies that assess the effects of implementing VR in higher education over time would be beneficial, allowing a better understanding of its long-termimpact and effectiveness. Impact Assessment on Digital Competence: Investigating how the implementation of VR affects the digital competence of students and educators could provide valuable insights for the development of training programs and technological adaptation in educational institutions
Cadiz, 2024	Not identified
Castillo et al., 20244	Future research should be directed towards a deeper understanding of the effectiveness of these environments in developing specific skills such as teamwork, leadership, communication, as well as creating strategies that promote inclusive accessibility. This will not only maximize the value of AI and metaversesin higher education, but will ensure that their impact contributes equitably to theadvancement of learning in an increasingly digitalized world
Castillo-Martinez et al., 2024	Not identified
Chashmyazdan et al., 2024	Not identified
Chen et al., 2024	future research could explore lecturers' organizational commitment in specific cultural or regional contexts to provide more specific insights.

Review Reference	Further Research as Stated in the Review
Chugh et al., 2025	The use of GenAI to evaluate programming code efficiency as a potential study; future research could explore leveraging generative AI (GenAI) to deliver interactive, conversational feedback that emulates the guidance typically provided by human teaching assistants
Coleman et al., 2025	Care is needed to ensure that such studies provide insight into the various ways in which such barriers impact women from different contexts, together with the efficacy of alternative strategies in addressing these
Cui & Alias, 2024	Future research should focus on developing and establishing guidelines for the ethical and effective use of AI technology
Din Eak & Annamalai, 2024	Research should focus on factors like student engagement, the effectiveness of feedback across different learning styles and the impact of digital literacy on the feedback process
Dukes III et al., 2024	Scholars interested in intervention or service delivery might conduct longitudinal studies to examine the evolution of service programs, following faculty, staff and students over time to determine access, effectiveness, and development of activities, programs, and policies intended to benefit students with disabilities. Furthermore, scholars might examine intended and unintended consequences of activities, programs, and policies for the general university population on students with disabilities
Edvardsen Tonheim et al., 2024	Further research is needed to investigate the different facilitators and barriers in more detail including the educators' perspective
El Aatik et al., 2024	Comparative research with international institutions would further help identify which interventions are most effective in this context
Eltaiba et al., 2025	Suggestion for future studies may include areas such as: expanding or narrowing down geographical scope to provide insights into how TEL can be customized to address diverse regional or individual-specific countries barriers. Future research could investigate TEL's impact in secondary and basic education settings, conduct longitudinal studies and multi-faceted impact studies
Esteban, 2025	Future research should broaden its inclusion criteria by extending the time period, considering the addition of more keywords relevant to the focus of the study, and utilizing additional databases to capture a more comprehensive dataset. Future studies may also consider the inclusion of other manuscripts, such as articles conference proceedings and books, to gain more valuable insights about the field
Fengye et al., 2025	Future research will focus on three main areas: optimizing AI teaching systems to guide research, developing interactive learning modules based on clinical problems; establishing cross-regional medical education and research collaboration platforms to regenerate high-quality resources via cloud-based teaching research communities; and designing dynamic evaluation systems to accurately track the effectiveness of research interest cultivation
Fernandez-Batanero et ak., 2024	Among the future lines of research, it is intended to continue investigating how the so-called emerging technologies, including the IoTs, Blockchain or Big Data, can transform higher education institutions
Ferreira Santos, 2024	Not specified
Frez0Pulgar et al., 2025	A systematic and collaborative approach to future research could significantly improve the implementation and impact of bioethics in higher education
Galdames-Calderón et al., 2024	Subsequent studies should focus on elaborating and detailing the specific techniques that can facilitate the successful application of these identified practices. By providing a more detailed understanding of these methods, future research can contribute significantly to the refinement of CBL pedagogy, thereby enhancing the learning experiences and outcomes of students engaged in this innovative educational approach
Ghazian & Lortie, 2024	Future research should focus on evaluating the long-term impact of embedding the SDGs in course curricula. Longitudinal studies could assess how student engagement with SDGs translates into sustainable practices in their personal and professional lives post-graduation. Furthermore, emerging digital tools and platforms for teaching, such as virtual reality and artificial intelligence, could enhance experiential learning in sustainability. Future research could examine how these tools can be leveraged to simulate real-world challenges and promote active problem-solving related to the SDGs
Gomez et al., 2025	Less attention paid to physiological factors...a niche for future research is identified here
Goncalves et al., 2024	Further research is needed to understand contextual issues. It would be interesting to replicate the study in different contexts and perform meta-analysis and meta-synthesis to better understand the effects. The researchers also verified complementary keywords and used a method to mitigate other possible limitations
Gudoniene et al., 2025	Not identified
Harmon et al., 2024	Further research is also required on the experiences and perceptions of reflection for this cohort of HE academics

Review Reference	Further Research as Stated in the Review
Heintalu et al., 2025	Future studies could test and use the proposed IGSO (integrated goal setting and orientation) theory to interpret students' goal setting and goal-pursuit processes, and to develop interventions and predict and test their mechanisms.
Henry et al., 2024	With the trend of moving to playful and experiential learning in education in a post pandemic era, gamification bears significant influence in shaping the future of education
Hidayat et al., 2024	Not identified
Ishmuradova et al., 2024	Not identified
Isiaku et al., 2024	It encourages interdisciplinary collaboration among researchers from various elds, such as education, computer science and ethics, to holistically explore the implications of ChatGPT adoption and foster innovation
Jaxin et al., 2024	Future research should address these limitations by conducting longitudinal studies and considering larger sample sizes for experimental participants
Junaštíkova, 2024	Not identified
Kalim et al., 2025	Future research needs to examine the relationship between women's AI adoption and their age and economic situation, as literature is very limited in this regard in Asia. Future studies and reviews can also include published reports of AI adoption among women in Asia from government and non-government organizations to integrate their views and remarks to get more in depth insights about the women's situation in the Asian context
Kalocsányiová et al., 2024	Future e orts should establish the impact of the discussed measures and recommendations for HE enrolment and study completion, while continuing to consider the voices, perceptions and input of refugee-background students and other stakeholders. There is also a need for more robust research into support mechanisms in later stages of the HE study cycle. Most research to date has failed to look beyond welcome and preparatory programmes, even though many of the disadvantages refugee-background students face are likely to persist throughout their HE journey
Karimi & Khawaja, 2025	Future studies should adopt mixed methods approaches and explore longitudinal interventions to examine how sustained training programmes influence digital skill development over time
Kaymakcioglu & Thomas, 2024	It is recommended that future research shift its focus towards examining the implementation of such strategies, exploring success stories, and understanding the characteristics of resistance and failures in achieving objectives. Additionally, future research could broaden its scope by including more LMICs from Sub-Saharan Africa.
Klimova & Chen, 2024	One important direction for future research is the exploration of the long-term impact of AI on ICC. Exploring how AI can be integrated into broader educational frameworks to support holistic cultural education
Kovari, 2025	Future research should investigate how AI can better foster deeper collaboration in diverse groups where challenges may be at odds with equitable participation. Future research should address how AI can ensure cohesion in the group, equal participation from the members, and effective collaboration collectively in order to realize its full potential in higher education institutions. Symbolic AI and hybrid systems, which merge approaches based on reasoning, therefore have immense potential for further development along this direction. For that reason, future research should be directed into probing these underrepresented AI methodologies so that application of AI technologies in education will be holistic. However, with a more expanded notion of AI for educators and research scholars, the true potential of AI to augment collaborative learning and ameliorate educational outcomes may be seen
Liang et al., 2025	Future studies should explore diverse OPF configurations, investigate long-term effects on EFL writing development, and examine the integration of emerging technologies like AI and VR in multicultural learning environments
Lim & Lee, 2024	Future research might, for example, develop a pervasive tool for students in higher education and investigate students' acceptance and intention to use it in the learning process. In addition, future research can consider investigating students' use of pervasive tools at the primary school level. Studies relating to the population at the primary school level were excluded from this study
Liu et al., 2025	Future studies should adopt more longitudinal research methods to track the development process of college students' entrepreneurial competence and combine experimental research with follow-up surveys to more closely analyze the long-term impact of different educational interventions. Future research should further combine multi-variate data, longitudinal analysis, mixed-method research, and a comparative analysis of different education systems to enhance the comprehensive understanding of the development path of students' entrepreneurial competence and to promote more targeted policy optimization and education reform practices

Review Reference	Further Research as Stated in the Review
Lopez-Chila et al., 2024	In future research, the authors proposed to undertake an in-depth bibliographic analysis in order to explore the results of the research and methodologies used to measure the specific impact of AI in higher education and to consider the influence of global events and international collaborations
López-Nuñez et al., 2024	On the one hand is the international comparison of the digital competences of teachers in higher education institutions with the same instrument, being able to make correlations according to different characteristics. On the other hand, is the generation of practical and training experiences for trainee teachers on digital competences by trying to establish practical tasks to demonstrate the competences obtained
Lou & Zhou, 2024	Future research could enhance understanding of individual and contextual factors influencing self-regulated learning strategy application through longitudinal studies (Green et al., 2022), as well as case studies and interviews
Ma, 2025	Research should focus on exploring interdisciplinary collaboration to address the multifaceted challenges posed by ChatGPT … This includes addressing its inherent deficiencies, mitigating the ethical implications, and harnessing potential of ChatGPT to revolutionize teaching and learning practice. Research in this realm should carry out more empirical experiments that based on effective research methods, in an effort to examine student learning outcomes and offer insights into measures to enhance the integration of AI into higher education
Marano et al., 2024	Some further research on these variables could be helpful for education providers when implementing remote proctoring (e.g. privacy laws and proctoring)
Mare & Mutezo, 2025	It is recommended that future studies focus on the impact of social regulation within the community of inquiry to enhance student engagement. More studies on social regulation and how it links with self- and co-regulation are required
Marques et al., 2024	First, we recommend longitudinal and comparative studies to help understand better how academic identities develop over time and vary across different spatial dimensions. Second, we think that studies that explore the links between identity differences and responses to managerialist university contexts (e.g. considering differences in disciplinary group traditions, generational perspectives, and career stages) would be useful. There is a need, too, for further research into academic identity and higher education change from an intersectional perspective, exploring specific local, regional and cultural factors, including gender, ethnicity, and religion. Finally, given that most of the studies we included used qualitative methodology, the generation of studies using mixed method designs might further enrich investigations in this field
Masalimova et al., 2024	Future bibliometric studies should focus on conducting detailed analyses of the areas that have shown significant relevance for online learning post pandemic… Additionally, content analysis may provide a more detailed understanding of scientific discourse by exploring topics and contexts in bibliometric studies. Moreover, conducting future analyses and comparisons would be beneficial in exploring the differences between countries with different social and educational contexts…Longitudinal studies could also help understand the development of online learning trends
Mashingaidze & Mayayise, 2025	Future research can also consider the perspectives of stakeholders other than industry and students
Mireku & Bervell, 2024	Experts in the field of quality assurance promotion should increase their efforts in searching and publishing on the subject and make recommendations for growing the educational institutions in the sub-region…Many more researches need to be conducted to predict possible challenges that may, in the future, disturb the systems for achieving quality assurance in higher education
Mireku et al., 2024a	We suggest that future studies look into these aspects of the phenomenon in higher education in SSA in order to fill this gap and inform policy and practice
Mireku et al., 2024b	Educational institutions should embrace more research to uncover how advanced technologies, such as CCTV cameras, biometrics, and online assessment practices, could be used to supervise examinations…It is suggested that future studies could also delve into how the use of artificial intelligence is promoting academic dishonesty among students and faculty
Mohammed & Ozdamli, 2024	Researchers should develop instructional designs that align with the results identified for sustainable education
Mursalzade et al., 2025	Future research and interventions aimed at enhancing psychological flexibility may thus serve as strategic levers for sustainable development in educational contexts
Nalweyiso et al., 2025	Future researchers may focus on conducting quality research with an emphasis on the long-term educational effects on students. Future research on teaching EBP to undergraduate healthcare students in developing countries need to concentrate on studying the impact of EBP education on long-term EBP knowledge, skills, attitudes, and behaviours utilising rigorous techniques and assessment tools

Review Reference	Further Research as Stated in the Review
Ncube & Ngulube, 2024	Future research could delve deeper into the efficacy of specific techniques within the context of student privacy and data sustainability. Longitudinal studies could track the impact of a particular technique (e.g., learning analytics dashboards, social network analysis) on student learning over time, examining both academic outcomes and potential privacy concerns. Additionally, comparative studies could explore the relative effectiveness of different techniques for achieving specific learning objectives within different postgraduate programmes, while also considering their long-term data management requirements and impact on student trust
Ndibalema, 2025	Future research should investigate long-term trends and evaluate the effectiveness of digital literacy initiatives across varied educational contexts
Nieminen et al., 2024	We call for future research and practice that focuses on examining how assessment shapes student identities, and how it may create 'othered' student identities
Ogunleye et al., 2024	Future research should be focused on interdisciplinary studies to develop guidelines for GenAI usage in HE. Experimental comparisons of advanced GenAI toolslike Gemini and the performance of AI content detectors in plagiarism systems will be explored. Comparative studies should be conducted to assess the effectiveness of GenAI tools in educational settings, accurately
Olivares-De la fuente et al., 2025	A potential future line of research would be to incorporate qualitative studies that explore in depth the experiences of students and teachers with the use of Twitter and YouTube as educational tools, allowing for a more enriching and contextualized analysis
Ortega-Ruiperez & Correa-Gorospe, 2024	It is therefore recommended that future literature reviews be conducted with a more open search
Oulamine et al., 2025	Longitudinal studies would be advantageous for observing evolutions and changes in attitudes over time, thus providing more robust data and more precise recommendations for the future of e-learning in higher education...Future studies would benefit from using interdisciplinary approaches and mixed methodologies to understand these resistances better, taking into account the diversity of actors and contexts
Pallaris et al., 2024	More future research is needed in the areas of the advancement of making culture in academic Makerspaces to enhance active and wide students and teaching personnel participation; Makerspace's academic effects through design learning experiences by using Makerspaces in study programs curriculum in the form of making co-curricular assignments and group projects; and Academic Makerspaces effectiveness on student's professional career prospect through longitudinal studies
Parambil et al., 2024	Future research directions include developing benchmark datasets specific to cybersecurity in online education, promoting interdisciplinary collaboration, and exploring emerging technologies such as GNNs and blockchain
ParedesCanencio et al., 2024	Future studies could focus on assessing the carbon footprint of specific emission sources and the specific scope of HEIs, reporting the factors that may make it difficult to compare the results of their study with results from other studies, so that consistent comparisons can be made between different institutions around the world, and inspire more institutions to report their carbon footprints while establishing a global standard. The results of upcoming carbon footprint studies may further provide the information to develop such a standard
Peláez-Sánchez et al., 2024	Future research should focus on exploring how advanced technologies can facilitate the development of specific competencies such as emotional, collaborative, complex problem-solving skills, and critical thinking
Pelaez-Sanchez et al., 2024	Future research aiming for a more global scope should include studies in various languages
Punch et al., 2025	Further research should explore the long-term influence of these recommendations on student retention and success, investigate the effectiveness of specific assistive technologies, and examine the benefits of peer support programmes. Additionally, studies must address the barriers faced by students with disabilities in disclosing their disabilities and accessing support services, providing further insights for improving university policies and practices
Rahajeng et al., 2024	Students with mental and intellectual disabilities may not exhibit overt or visible signs of disability, which could contribute to their under-recognition and marginalization in research on SwD in Indonesia. Consequently, the findings of this review might not fully capture the experiences and challenges faced by students with mental and intellectual disabilities. This gap underscores a significant area for future research
Raitskaya & Tikhonova, 2024	Further and regular (at least yearly) reviews are essential for the field that is evolving fast New knowledge is added monthly with an unclear though impressive perspective of the GenAI appliances in the long run

Review Reference	Further Research as Stated in the Review
Raitskaya & Tikhonova, 2025	Future research should address these gaps in several directions. First, longitudinal studies are needed to investigate the enduring effects of GenAI-supported instruction on critical thinking across diverse educational contexts and learner populations. Second, there is a clear need to develop more robust theoretical models that explicitly connect the dimensions of critical thinking, as defined in Bloom's taxonomy, with the specific learning mechanisms that are activated through the use of generative AI. Third, further work should focus on evaluating how different forms of instructional support, including scaffolded AI use and targeted AI literacy training, influence students' cognitive outcomes and their ability to engage with AI critically and productively
Renfors, 2024	Further studies with a focus on these matters are suggested because more research is needed to explore the connection between competencies and teaching and learning approaches, as well as a moreanalytical approach to critically examine the effectiveness of using these specific approaches to improve their use
Rosales-Ricardo & Caceres-Manzano, 2024	Not identified
Rosario & Raimundo, 2024	Research might focus on the effectiveness of interdisciplinary curricula and teaching methods and investigate methodologies for assessing the impact of sustainable entrepreneurship education in broader geographical areas
Roy et al., 2025	Future research should empirically test the framework in different settings while solving these practical problems for its inclusive and sustainable implementation in education.
Saez-Zevallos & Montalvo-Apolín, 2025	In light of the critical role of English proficiency in higher education, it is recommended to conduct new research on the construct using SMS and systematic reviews. Additionally, evaluations of the design and implementation of strategies aimed at enhancing the competence in writing and publishing scientific articles in English are suggested…In light of the critical role of English proficiency in higher education, it is recommended to conduct new research on the construct using SMS and systematic reviews
Sahar & Munawaroh, 2025	Future research should incorporate multiple databases to provide a more comprehensive perspective on AI adoption in higher education. Future studies should include multilingual sources to capture a more diverse global understanding of AI's impact on higher education. Future research should complement these methods with qualitative approaches, such as case studies, surveys, or interviews, to explore faculty perceptions, institutional challenges, and student experiences with AI. Future studies should consider a broader range of academic and institutional sources to gain deeper insights into AI applications in education.
Schei et al., 2024	We also have limited knowledge about which disciplines, countries, and research methods are prevalent in this field of research. Gaining such knowledge holds critical value not only for policymakers, educational institutions, educators, and students but also for guiding future research
Sergeeva et al., 2024	Future research has to find the impact of instructors' competence and how they decide to use a gamified learning style as they will determine the effectiveness of this style
Setiamurti & Kurniawati, 2024	Researchers are encouraged to investigate and incorporate studies from a broader range of cultural and regional contexts to achieve a comprehensive and nuanced understanding of fostering creativity in HE worldwide
Shahjahan & Seinn, 2025	Future efforts should prioritize exploring how DEE is understood in diverse geographical and transnational contexts to include voices from historically neglected regions. Addressing these gaps will be crucial in ensuring that DEE is both inclusive and globally relevant, and in broadening the conversation beyond the current limitations of the field
Singun, 2025	Future research will aim to confirm the findings of this review through studies conducted in HEIs. To advance this research, it would be beneficial to consider how specific legislative frameworks, and the governance structures of public sector entities influence barriers to DT
Solis-Garcia et al., 2024	Not identified
Solis-Garcia et al., 2025	Future research should support current findings and implement necessary actions to improve inclusion
Stamou et al., 2024	Future studies could focus on answering review-related questions by examining more databases and broadening their focus to incorporate different types of publications, such as book chapters, dissertations, and conference proceedings
Subki, 2025	Future research should address key gaps identified in the current literature. Specifically, there is a need for deeper investigation of the behavioral, cultural, and policy-related dimensions of green campus management. Comparative studies across regions and time periods could provide valuable, context-specific insights, while integrating qualitative approaches with bibliometric methods may offer a more comprehensive understanding of sustainability practices.

Review Reference	Further Research as Stated in the Review
Sukjairungwattana et al., 2024	Future research should further explore how to strike a balance between internationalization and local culture to promote more inclusive and sustainable educational development. Additionally, the research should focus on the unique challenges and opportunities faced by di□erent countries and regions in the internationalization process, in order to provide more targeted recommendations and solutions for policymakers and educators
Tang et al., 2024	It is also hoped that future research will explore and help students' English writing, such as whether there are effective translanguaging teaching methods provided for teachers to help students learn English writing, how students use translanguaging strategies in their writing process, whether translanguaging helps students improve English writing proficiency, and what are the attitudes of students towards translanguaging
Tang et al., 2025	To address these gaps, future research should incorporate institutional case studies that analyse internal language policy documents and their alignment—or misalignment—with national directives. Ethnographic or interview-based research involving international students, faculty members, and university administrators could provide rich insight into how language policies are interpreted, negotiated, and resisted in everyday academic life. Additionally, studies comparing Chinese institutions with those in other non-Anglophone contexts would illuminate how different systems manage the balance between English dominance and national language promotion. Finally, longitudinal research tracking the implementation and outcomes of bilingual or multilingual policies over time could offer deeper understanding of their long-term implications for equity, identity, and international engagement
Tareke et al., 2024	Further investigations need to be conducted on the higher education system in the country to focus on integrating technology and innovation in higher education, as well as to what extent those emerging initiatives are working and contributing to the alignment of public university missions with sustainable development
Tareke et al., 2025	Further investigations are needed using diverse methodologies and theoretical frameworks to more deeply examine the dynamic between technology, education, and academic success. Researchers need to balance the broader theoretical frameworks with variable-specific frameworks and bridge the "generational gaps" through theoretical development or reevaluating the foundational academic success theories in the digital context
Teng & Cosier, 2024	Not identified
Thiedig & Wegner, 2024	Studies would benefit from making more explicit whether they intend to study the extent of evidence use, qualitative aspects of evidence use, or its influence/impact, and how this is defined and measured…A more systematic and comparative investigation of sources of evidence would enable it to derive conclusions about how the choice of sources might impact evidence use, and whether this is determined by the (un)availability of evidence, or rather by the explicit comparison and assessment of different sources…More deliberate and independent comparative studies including a larger number of organisations (or organisational units) are needed to prevent bias resulting from the selection of good practice examples as empirical cases. In doing so, the specific organisational characteristics of HERI, and their effects on the use context, should be reflected and, ideally, varied in a systematic manner. Country-specific factors, such as the regulatory environment or incentive and funding structures, should be noted, and their implications for the generalisability of the findings discussed. At the same time, the high number of local or national studies currently leaves potential for international comparative analyses and collaboration unused
Tikhonova & Raitskaya, 2024	A review of publications dated back to the 1990s and later may add to the general understanding of the field. Although the Scopus database is comparatively comprehensive, other bases may broaden today's views of the problem field
Tillmanns et al., 2025	While the need for ethical guidelines is widely recognised, there is limited research on the long-term effects of GenAI integration on student learning outcomes and faculty performance. Furthermore, the potential negative consequences of GenAI, such as technostress and over-reliance on AI tools, remain underexplored, particularly in the context of higher education. Future research should address these gaps, focusing on the development of scalable, adaptable policy frameworks and effective training models that can be implemented across diverse educational settings
Trujillo-Juárez et al., 2025	Future research should investigate the potential of integrating learning analytics and AI-driven personalization into micro-course design. Such technologies can adapt content in real time based on individual teacher needs, engagement patterns, and performance, thereby enhancing the relevance and effectiveness of professional development
Valencia Quecano et al., 2024	Regarding future research directions and academic work opportunities, this research suggests several areas of focus that could further enrich the understanding of dropout at the postgraduate level. It becomes evident that there is a need for longitudinal research that analyzes student life throughout their entire academic journey, which would allow the identification of changes in the intensity with which variables influence dropout over time

Review Reference	Further Research as Stated in the Review
van der Wee et al., 2024	Further research could enrich and deepen the ndings of the current work by empirically examining when, how and why certain characteristics of Living Labs, as identified in this study, could support transformative teaching and learning toward sustainability and empower higher education students to nd pathways toward a sustainable future…Hence, future studies should empirically examine characteristics of and experiences with education in Living Labs by focusing on the interplay between the Living Lab as a hybrid learning space, the approaches for teaching and learning used therein, the practices that foster collaboration and co-learning with societal stakeholders and the policies and structures of the higher education institute in which the Living Lab is embedded
Veres et al., 2025	We aim to focus our research efforts on refining sustainability indicators, exploring the role of digital platforms in fostering collaboration and examining the long- term impacts of interdisciplinary education on sustainability outcomes
Vinueza-Morales et al., 2025	Longitudinal studies on programming education outcomes: more research is needed to understand how different teaching methodologies influence students' career progression and long-term skills development. future research should explore how integrating programming with other fields (e.g., cognitive science, psychology, and educational technology) can enhance learning outcomes. Future studies can address the challenges and research gaps outlined in this discussion and contribute to the development of more inclusive, e□ective, and technologically enhanced programming education models. These insights will be invaluable for educators, curriculum designers, and policymakers seeking to optimize programming instruction for the next generation of learners
Vuoriainen et al., 2024	Further research can help by examining individual factors and combinations of factors. Since we did not limit our study to just one or two continents or countries, future research could further explore global variations in collaboration and potentially apply the proposed framework within different contexts
Wang & Abdullah, 2024	This study is expected to provide researchers and educators worldwide with a broad horizon and a clear reference point for further research on the develop-ment of students' CT, especially in China. ..further investigation into enhancing students' CT through intervention strategies is warranted
Wang & Ishak, 2025	Future research could further explore the longitudinal effects of SEL interventions to assess long-term outcomes, such as students' career readiness and psychological well-being. Studies should also investigate how SEL frameworks can be tailored to specific cultural contexts, ensuring the development of inclusive, adaptable SEL programmes that resonate across diverse student populations
You et al., 2024	Not identified
Zhao & Selvaratnam, 2024	Our research will help to provide future scholars with basic and more comprehensive theoretical references, to provide a theoretical overview of relevant studies on reform in this field, and to contribute to the reform and development of vocational education in China

APPENDIX 4

Raw Data on the Journal Rankings, Numbers, Populations and Settings of Primary Research

Review Reference	Journal	Scopus ranking in Social Sciences (Education)	Scopus subject areas if not included in Social Sciences (Education)	Number of primary research	Populations of primary research	Type of HEI if applicable	Setting of primary research
Abdallah et al., 2025	Social Sciences & Humanities Open	NA	Social Sciences (miscellaneous)	39	NA	HEI	international
Medina et al., 2024	International Journal of Learning, Teaching and Educational Research	Q2	NA	50	NA	HEI	international
Ahmad & Khurizan, 2024	Sage Open	NA	General Social Sciences	75	NA	HEI	international
Alonso et al., 2025	Cogent Education	Q2	NA	15	Students	HEI	international
Alotaibi, 2025	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development	60	NA	HEI	international
Alvado, 2025	Frontiers in Education	Q2	NA	28	Students, Teachers	HEI	international
Martinez et al., 2025	Knowledge Management & E-Learning	Q2	NA	51	Students, teachers	HEI	international
Amavasi & Zimmerman, 2024	Nurse Education Today	Q1	NA	15	Student nurses	Nurse education institution	international
Andrade-Girón et al., 2025	Iberoamerican Journal of Science Measurement and Communication	NA	Social Sciences (miscellaneous)	28	Students	HEI	global, mainly Asian
Balalee, 2025	Discover Education	Q4	NA	22	Students	HEI	international
Banarjee et al., 2024	Cogent Education	Q2	NA	19	NA	HEI	national
Bannigan et al., 2025	Frontiers in Education	Q2	NA	72	Students	HEI	international
Barikzai et al., 2024	Cogent Education	Q2	NA	84	NA	University in an emerging economy	international
Barua & Lockee, 2024	Discover Education	Q4	NA	Not identified	Not identified	HEI	international

Review Reference	Journal	Scopus ranking in Social Sciences (Education)	Scopus subject areas if not included in Social Sciences (Education)	Number of primary research	Populations of primary research	Type of HEI if applicable	Setting of primary research
Basheer et al., 2024	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development	83	Not identified	HEI	international
Bayly-Castaneda et al., 2024	Frontiers in Education	Q2	NA	78	Students, graduates	HEI	international
Benson et aL., 2024	Australasian Journal of Educational Technology	Q1	NA	15	NA	HEI	international
Bonilla-Jurado et al., 2024	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development	50	Students	HEI	international
Brauer et al., 2024	Review of Educational Research	Q1	NA	58	Teachers	HEI	international
Buele & Llerena-Aguirre, 2025	Frontiers in Education	Q2	NA	9	Teachers, faculty members	HEI	international
Burton et al., 2024	Nurse Education Today	Q1	NA	14	Tertiary health profession related students, Tertiary health		
course teachers/ professors/faculty	Nurse education institution	international					
Bustamante-Mona et al., 2025	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development	51	STEM students	STEM departments of universities	international
Cabrera-Duffaut et al., 2024	Frontiers in Education	Q2	NA	27	Students	HEI	international
Cadiz, 2024	Jurnal Ilmiah Ilmu Terapan Universitas Jambi	Q3	NA	61	NA	HEI	national
Castillo et al., 20244	International Journal of Learning, Teaching and Educational Research	Q2	NA	42	Students	HEI	international
Castillo-Martinez et al., 2024	Frontiers in Education	Q2	NA	85	HE stakeholders	HEI	international
Chashmyazdan et al., 2024	Journal of						

Review Reference	Journal	Scopus ranking in Social Sciences (Education)	Scopus subject areas if not included in Social Sciences (Education)	Number of primary research	Populations of primary research	Type of HEI if applicable	Setting of primary research
Higher Education Policy							
And							
Leadership Studies	Q3	NA	48	Not identified	HEI	international	
Chen et al., 2024	Journal of Curriculum and Teaching	Q3	NA	30	Lecturers	HEI	international
Chugh et al., 2025	Computer Applications in Engineering Education	Q1	NA	26	NA	HEI	international
Coleman et al., 2025	Educational Review	Q1	NA	14	migrant, female academics from		
minority ethnic backgrounds	HEI	national					
Cui & Alias, 2024	Journal of Infrastructure, Policy and Development	NA	Social Sciences (miscellaneous)	16	NA	HEI	international
Din Eak & Annamalai, 2024	Asian Association of Open Universities Journal	Q1	NA	25	Students	HEI	International
Dukes III et al., 2024	Disabilities	NA	Social Sciences (miscellaneous)	1,479	Students	HEI	International
Edvardsen Tonheim et al., 2024	Medical education online	Q1	NA	39	Students, Teachers	HEI	international
El Aatik et al., 2024	The Open Public Health Journal	NA	Social Sciences (Health)	11	Students	HEI	national
Eltaiba et al., 2025	Global Transitions	NA	Social Sciences (Health)	85	Students	HEI	regional
Esteban, 2025	Cogent Education	Q2	NA	149	Students	HEI	international
Fengye et al., 2025	Cogent Education	Q2	NA	553	Medical students	Medical Inoversity	national, international
Fernandez-Batanero et ak., 2024	Interactive Technology and Smart						
Education	Q1	NA	11	NA	HEI	international	
Ferreira Santos, 2024	Higher Education Quarterly	Q1	NA	45	NA	HEI	international

Review Reference	Journal	Scopus ranking in Social Sciences (Education)	Scopus subject areas if not included in Social Sciences (Education)	Number of primary research	Populations of primary research	Type of HEI if applicable	Setting of primary research
Frez-Pulgar et al., 2025	Journal of Bioethical Inquiry	NA	Arts & Humanities (Philosophy); Socail Sciences (Health)	444	NA	HEI	international
Galdames-Calderón et al., 2024	Education Sciences	Q1	NA	20	NA	HEI	international
Ghazian & Lortie, 2024	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development)	940	NA	HEI	international
Gomez et al., 2025	Journal of Intelligence	Q1	NA	83	NA	HEI	international
Goncalves et al., 2024	SAGE Open	NA	General Social Sciences	125	Students	HEI	international
Gudoniene et al., 2025	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development)	27	HEI teachers	HEI	international
Harmon et al., 2024	Nurse Education Today	Q1	NA	13	HE academics	HEI	international
Heintalu et al., 2025	Educational Research Review	Q1	NA	198 and 48	NA	HEI	international
Henry et al., 2024	Simulation & Gaming	NA	General Social Sciences	46	Students	HEI	international
Hidayat et al., 2024	International Electronic Journal of Mathematics Education	Q4	NA	20	Gen Z students of mathematics	HEI	international
Ishmuradova et al., 2024	Contemporary Educational Technology	Q1	NA	107	NA	HEI	international
Isiaku et al., 2024	Quality Education for All	Q4	NA	29	NA	HEI	international
Jaxin et al., 2024	Frontiers in Education	Q2	NA	24	Not identified	HEI	international
Junaštíkova, 2024	Interactive Technology and Smart						
Education	Q1	NA	36	Students	HEI	international	
Kalim et al., 2025	Smart Learning Environments	Q1	NA	17	Female students	HEI	regional

Review Reference	Journal	Scopus ranking in Social Sciences (Education)	Scopus subject areas if not included in Social Sciences (Education)	Number of primary research	Populations of primary research	Type of HEI if applicable	Setting of primary research
Kalocsányiová et al., 2024	Educational Review	Q1	NA	44	Students	HEI	regional
Karimi & Khawaja, 2025	International Journal of Learning, Teaching and Educational Research	Q2	NA	22	HEI teachers	HEI	international
Kaymakcioglu & Thomas, 2024	Social Sciences & Humanities Open	NA	Social Sciences (miscellaneous)	37	Researchers	HEI	national
Klimova & Chen, 2024	Language Teaching Research Quarterly	Q3	NA	11	Students	HEI	international
Kovari, 2025	Social Sciences & Humanities Open	NA	Social Sciences (miscellaneous)	27	NA	HEI	international
Liang et al., 2025	Journal of Curriculum and Teaching	Q3	NA	24	Students	HEI	international
Lim & Lee, 2024	Journal of Educators Online	Q3	NA	30	NA	HEI	international
Liu et al., 2025	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development)	11	Students	HEI	national
Lopez-Chila et al., 2024	Education Sciences	Q1	NA	870	NA	HEI	international
López-Nuñez et al., 2024	Education Sciences	Q1	NA	47	Students, teachers	HEI	international
Lou & Zhou, 2024	Journal of Computer Assisted Learning	Q1	NA	15	NA	HEI	international
Ma, 2025	Computera and Education: Artificial Intelligence	Q1	NA	67	NA	HEI	international
Marano et al., 2024	Higher Education Quarterly	Q1	NA	21	Students	HEI	international
Mare & Mutezo, 2025	Interactive Laerning Environments	Q1	NA	21	Students	HEI	international
Marques et al., 2024	Educational Research	Q2	NA	44	Academics	HEI	international
Masalimova et al., 2024	Frontiers in Education	Q2	NA	971	NA	HEI	regional

Review Reference	Journal	Scopus ranking in Social Sciences (Education)	Scopus subject areas if not included in Social Sciences (Education)	Number of primary research	Populations of primary research	Type of HEI if applicable	Setting of primary research
Mashingaidze & Mayayise, 2025	Cogent Education	Q2	NA	45	NA	HEI	international
Mireku & Bervell, 2024	Higher Education	Q1	NA	143	NA	HEI	regional
Mireku et al., 2024a	Research Ethics	Q1	NA	171	NA	HEI	regional
Mireku et al., 2024b	International Journal of Educational Development	Q1	NA	96	NA	HEI	regional
Mohammed & Ozdamli, 2024	Behavioral Sciences	NA	Social Sciences (Development)	69	IT students	HEI	international
Mursalzade et al., 2025	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development)	31	Students	HEI	international
Nalweyiso et al., 2025	Cogent Education	Q2	NA	8	Undergraduate healthcare students	HEI	regional, developing countries
Ncube & Ngulube, 2024	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development)	14	Postgraduate students	HEI	international
Ndibalema, 2025	Cogent Education	Q2	NA	14	Students	HEI	regional
Nieminen et al., 2024	Educational Research Review	Q1	NA	42	Students with disabilities	HEI	international
Ogunleye et al., 2024	Education Sciences	Q1	NA	355	NA	HEI	international
Olivares-De la fuente et al., 2025	Frontiers in Education	Q2	NA	27	NA	HEI	international
Ortega-Ruiperez & Correa-Gorospe, 2024	Frontiers in Education	Q2	NA	15	Students	HEI	international
Oulamine et al., 2025	Educational Process. International Journal	Q1	NA	77	NA	HEI	international
Pallaris et al., 2024	Interactive Technology and Smart						
Education	Q1	NA	183	NA	HEI	international	
Parambil et al., 2024	Computers and Education: Artificial Intelligene	Q1	NA	92	NA	HEI	international

Review Reference	Journal	Scopus ranking in Social Sciences (Education)	Scopus subject areas if not included in Social Sciences (Education)	Number of primary research	Populations of primary research	Type of HEI if applicable	Setting of primary research
Paredes Canencio et al., 2024	Environment, Development and Sustainability	NA	Social Sciences (Geography, Planning and Development)	50	NA	HEI	international
Peláez-Sánchez et al., 2024	Frontiers in Education	Q2	NA	182	NA	HEI	international
Pelaez-Sanchez et al., 2024	Frontiers in Education	Q2	NA	46	NA	HEI	international
Punch et al., 2025	International Journal of Inclusive Education	Q1	NA	17	NA	HEI	national
Rahajeng et al., 2024	Disabilities	NA	Social Sciences (miscellaneous)	17	Students with disabilities	HEI	national
Raitskaya & Tikhonova, 2024	Journal of Language and Education	Q2	NA	44	NA	HEI	international
Raitskaya & Tihkonova, 2025	Journal of Language and Education	Q2	NA	30	Students	HEI	international
Renfors, 2024	International Jurnal of Sustainability in Higher Education	Q1	NA	22	NA	HEI	international
Rosales-Ricardo & Caceres-Manzano, 2024	Health Professions Education	Q4	NA	11	Students	HEI	international
Rosario & Raimundo, 2024	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development)	61	NA	Entrepreneurship HEI	international
Roy et al., 2025	Sustainable Futures	NA	Social Sciences (Sociology and Political Science)	105	NA	HEI	international
Saez-Zevallos & Montalvo-Apolín, 2025	Frontiers in Education	Q2	NA	143	NA	HEI	international
Sahar & Munawaroh, 2025	Discover Sustainability	NA	Social Sciences (Geography, Planning and Development)	275	NA	HEI	international
Schei et al., 2024	Education Sciences	Q1	NA	24	Students	HEI	international
Sergeeva et al., 2024	Contemporary Educational Technology	Q1	NA	67	NA	HEI	international
Setiamurti & Kurniawati, 2024	Open Education Studies	Q3	NA	28	NA	HEI	international

Review Reference	Journal	Scopus ranking in Social Sciences (Education)	Scopus subject areas if not included in Social Sciences (Education)	Number of primary research	Populations of primary research	Type of HEI if applicable	Setting of primary research
Shahjahan & Seinn, 2025	Cogent Education	Q2	NA	47	NA	Engineering Faculties	international
Singun, 2025	Discover Education	Q4	NA	20	NA	HEI	international
Solis-Garcia et al., 2024	Behavioral Sciences	NA	Social Sciences (Development)	16	Students with disabilities	HEI	international
Solis-Garcia et al., 2025	Cogent Education	Q2	NA	31	Students with disabilities	HEI	regional
Stamou et al., 2024	Frontiers in Education	Q2	NA	25	Non-traditional students	HEI	international
Subki, 2025	International Journal of Sustainable Development and						
Planning	NA	Social Sciences (Geography, Planning and Development)	364	NA	Green campus	international	
Sukjairungwattana et al., 2024	Frontiers in Education	Q2	NA	13	NA	HEI	regional
Tang et al., 2024	Aila Review	NA	Social Sciences (Linguistics and Language)	23	NA	HEI	international
Tang et al., 2025	Forum for Linguistic Studies	Q4	NA	34	NA	HEI	national
Tareke et al., 2024	Education Sciences	Q1	NA	40	NA	HEI	national
Tareke et al., 2025	International Journal of Educational Research Open	Q1	NA	21	Students	HEI	international
Teng & Cosier, 2024	Frontiers in Education	Q2	NA	26	Students	HEI	international
Thiedig & Wegner, 2024	London Review of Education	Q2	NA	77	NA	HEI	international
Tikhonova & Raitskaya, 2024	Journal of Language and Education	Q2	NA	56	Researchers, academics, PhD students, students, HE teachers	HEI	international
Tillmanns et al., 2025	Trends in Higher Education	NA	NA	93	NA	HEI	international
Trujillo-Juárez et al., 2025	Discover Education	Q4	NA	18	HE teachers	HEI	international

Review Reference	Journal	Scopus ranking in Social Sciences (Education)	Scopus subject areas if not included in Social Sciences (Education)	Number of primary research	Populations of primary research	Type of HEI if applicable	Setting of primary research
Quecano et al., 2024	Cogent Education	Q2	NA	40	Dropped out postgraduate students	HEI	international
van der Wee et al., 2024	International Journal of Educational Development	Q1	NA	35	Students	HEI	international
Veres et al., 2025	Sustainability Switzerland	NA	Energy; Computer Science; Environmental Science; Social Sciences (Geography, Planning and Development)	286	NA	HEI	international
Vinueza-Morales et al., 2025	Frontiers in Education	Q2	NA	1,697	NA	HEI	international
Vuoriainen et al., 2024	European Journal of Engineering Education	Q1	NA	36	NA	HEI Engineering Faculty	international
Wang & Abdullah, 2024	SAGE Open	NA	General Social Sciences	15	Students	HEI	international
Wang & Ishak, 2025	International Journal of Learning, Teaching and Educational Research	Q2	NA	26	Students	HEI	international
You et al., 2024	Discover Sustainability	NA	Social Sciences (Geography, Planning and Development)	2,447	NA	HEI	international
Zhao & Selvaratnam, 2024	Cogent Education	Q2	NA	61	NA	HEI	national