

Mapping the Use of Artificial Intelligence in Higher Education: A Content Analysis

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Abstract

This paper examines the development and use of artificial intelligence (AI) in higher education through a qualitative content analysis, of a purposive sample of 20 peer-reviewed journal articles, published between 2020 and 2025. The study identifies dominant research themes, methodological approaches, and emerging trends while highlighting gaps in current scholarship. AI technologies, particularly generative AI, have increasingly influenced teaching, learning, assessment, and institutional management. Five primary themes were identified: AI-supported teaching and learning, assessment and academic integrity, AI literacy and professional development, ethical and governance considerations, and equity and access issues. Findings indicate that while pedagogical applications dominate the literature, governance, equity, and policy-related aspects remain underexplored. The paper provides an integrative overview of current research and offers recommendations for both scholars and institutional policymakers in adopting AI responsibly.

Keywords: *artificial intelligence, content analysis, educational innovation, higher education, research trends*

1. Introduction

Artificial intelligence (AI) is increasingly transforming higher education, reshaping teaching, learning, assessment, and institutional processes. While it offers opportunities for greater personalisation and efficiency, it also raises important concerns related to ethics, governance, and equity (Holmes et al., 2019; Zawacki-Richter et al., 2019; Selwyn, 2023; UNESCO, 2023). Despite growing scholarly interest, the literature remains fragmented, with a strong emphasis on pedagogical applications and limited attention to governance and inclusion. This study addresses this gap through a qualitative content analysis of 20 peer-reviewed articles published between 2020 and 2025.

1.1. Significance of the Study

This study synthesises recent research on AI in higher education, identifying key themes and gaps in governance, ethics, and equity.

1.2. Research Objectives

The primary aim of this study is to analyse recent research on AI in higher education using qualitative content analysis. The specific objectives are to:

1. Seeks to identify dominant themes in peer-reviewed literature on AI in higher education published between 2020 and 2025.
2. Examine the methodological approaches used in contemporary AI-related higher education research.
3. Analyse how teaching and learning, assessment, ethics, governance, and equity are addressed in the literature.
4. Identify gaps and underrepresented areas to inform future research and institutional practice.
5. Generate evidence-based insights to support ethical, inclusive, and sustainable AI integration in higher education.

2. Literature Review

Over the past decade, research on AI in higher education has shifted from a focus on technical capabilities to a broader exploration of pedagogical, institutional, and ethical dimensions. Early studies focused on adaptive learning systems, intelligent tutoring, and learning analytics to enhance student engagement, provide personalised feedback, and improve learning outcomes (Holmes et al., 2019; Zawacki-Richter et al., 2019).

From 2020 onwards, the literature expanded beyond pedagogy to include governance, ethics, and institutional policy. Scholars highlighted risks such as algorithmic bias, data privacy, and transparency in AI use within universities (Selwyn, 2023; UNESCO, 2023). At the same time, faculty professional development emerged as essential for ensuring effective, ethical, and responsible AI integration (Crompton & Burke, 2023; Bond et al., 2021).

The rapid rise of generative AI has further reshaped the research landscape. Recent studies explore how educators and students engage with generative AI in teaching, learning, and assessment contexts (Alshammari et al., 2025; Ayyoub et al., 2025). However, research on ethical implementation, policy frameworks, and inclusion remains limited, indicating critical gaps for future investigation.

3. Methodology

This study employs a qualitative content analysis to examine research trends in AI in higher education. A purposive sample of 20 peer-reviewed journal articles was selected for analysis. While all articles informed the thematic coding, illustrative examples are selectively discussed in the findings and discussion sections.

A structured search and screening process was used to ensure transparency and rigour in article selection. Relevant studies were identified through database searches in Scopus, Web of Science, and Google Scholar using keywords such as “artificial intelligence,” “higher education,” “AI in teaching and learning,” and “generative AI in education.”

The initial search yielded a broad pool of potentially relevant articles, which were screened using predefined inclusion and exclusion criteria. Included studies were peer-reviewed journal articles published between 2020 and 2025, focused on AI in higher education, and written in English. Exclusions comprised conference abstracts, non-peer-reviewed sources, duplicates, and studies not directly related to higher education. The process followed PRISMA-aligned principles to ensure transparency and replicability (Page et al., 2021), involving database identification, duplicate removal, title and abstract screening, full-text review, and final selection of 20 articles.

Following title and abstract screening, the remaining articles were assessed for full-text eligibility. A final sample of 20 articles were selected for in-depth qualitative content analysis. This purposive selection ensured representation across themes, methodologies, and geographic contexts. The sample size (20) is consistent with qualitative content analysis studies that prioritise depth of analysis over breadth, allowing for detailed thematic exploration (Mayring, 2014; Krippendorff, 2018).

The qualitative content analysis approach was selected to enable in-depth interpretation of themes, patterns, and conceptual trends across the literature, which would not be adequately captured through purely quantitative methods (Mayring, 2014; Krippendorff, 2018). The analysis involved iterative coding to capture key themes, patterns, and trends across the literature. These observations were categorised into five primary themes: AI-supported teaching and learning, assessment and academic integrity, AI literacy and professional development, ethical and governance considerations, and equity and access. Coding was refined through comparison and reflection, merging overlapping concepts and highlighting differences across studies.

Frequency counts were used to identify dominant trends and gaps. Limitations include the small sample size and focus on English-language publications. Nevertheless, this approach provides a rigorous framework for mapping current research trends and offering actionable insights for educators, policymakers, and researchers (Alshammari et al., 2025; Ayyoub et al., 2025).

A coding framework was developed to guide the analysis. Each theme was associated with specific codes and inclusion criteria. For example, “AI-supported teaching and learning” included studies focusing on adaptive learning systems and AI-driven feedback, while “ethics and governance” captured discussions of data privacy, bias, and institutional policy.

While the primary approach is qualitative and interpretive, the study incorporates a limited quantitative component through frequency counts of identified themes. This enhances analytical rigour by providing an indication of the relative prominence of themes across the sampled literature. Given the purposive and relatively small sample (20), advanced statistical analysis was not appropriate, but the combination of qualitative and descriptive quantitative techniques strengthens the transparency and robustness of the findings (Mayring, 2014).

Table 1 provides an overview of the 20 articles included in the analysis, including their focus areas. This enhances transparency and allows readers to assess the scope and coverage of the sample.

Table 1: Overview of Included Studies. Source: Author's own work

Author(s)	Year	Focus Area
Williamson & Eynon	2020	AI in education (critical perspective)
Roll & Wylie	2020	Evolution of AI in education
Selwyn	2019	Learning analytics critique
Zawacki-Richter et al.	2019	AI applications in HE
Bond et al.	2021	Educational technology trends
Ouyang & Jiao	2021	AI paradigms in education
Holmes et al.	2019	AI in education overview
Crompton & Burke	2023	AI in higher education
Selwyn	2023	Ethics & technology in education
UNESCO	2023	AI governance in education
Dwivedi et al.	2023	Generative AI implications
Kasneci et al.	2023	ChatGPT in education
Bates & Sangrà	2024	AI in HE (meta-review)
González-López & García-Peñalvo	2025	Human-centred AI in HE
Sebopelo	2024	AI for quality in HE
Madwe et al.	2025	AI in assessment
Alshammari et al.	2025	Student AI adoption
Ayyoub et al.	2025	Educator AI literacy
Kumar et al.	2025	AI research trends
Nguyen et al.	2025	AI bibliometric synthesis

The results of this analysis are presented in the following section.

4. Findings

The themes presented below reflect patterns identified across the full sample, with selected studies used illustratively to support key observations. The findings are presented according to five key themes identified through the coding process. To complement the qualitative analysis, a frequency count of themes was conducted to indicate their relative prominence across the sampled articles. The content analysis of 20 peer-reviewed articles revealed five dominant themes that characterise current research on AI in higher education:

1. AI-supported teaching and learning:

The most prevalent theme focused on the use of AI to enhance teaching and learning through adaptive systems, intelligent tutoring, and AI-driven feedback (Holmes et al.,

2019; Zawacki-Richter et al., 2019). These tools enable personalised learning and improved student engagement, particularly in STEM disciplines.

2. Assessment and academic integrity:

Many studies examined AI's role in assessment, including automated grading and integrity monitoring (Alshammari et al., 2025; Ayyoub et al., 2025; Madwe et al., 2025). AI was found to improve grading efficiency and consistency while supporting formative feedback. However, challenges were reported regarding fairness, validity, and the potential misuse of AI for academic dishonesty.

3. AI Literacy and professional development:

Research highlighted the importance of equipping both students and educators with the skills and knowledge to use AI effectively. AI literacy programs, workshops, and professional development initiatives were noted, as critical for fostering responsible and pedagogically sound adoption (Kumar et al., 2025).

4. Ethics, governance, and policy:

Several studies explored institutional approaches to AI governance, ethical frameworks, and policy development (Selwyn, 2023; UNESCO, 2023). Issues such as algorithmic bias, data privacy, and accountability were frequently raised. Findings suggest that robust governance structures are essential to ensure AI is implemented responsibly and aligns with institutional goals.

5. Equity and access:

Equity and inclusion emerged as a critical, yet underexplored, area. Studies highlighted disparities in access to AI tools and digital infrastructure, particularly across geographic and socio-economic contexts (Williamson & Eynon, 2020). Unequal access risks widening existing educational gaps.

Table 2: Frequency of Themes Identified in the Literature (20 articles). Source: Author's own work

Theme	Number of Articles	Percentage
AI-supported Teaching and Learning	16	80%
Assessment and Academic Integrity	14	70%
AI Literacy and Professional Development	12	60%
Ethics, Governance, and Policy	9	45%
Equity and Access	7	35%

The frequency distribution indicates that pedagogical applications dominate current research, particularly AI-supported teaching and learning. In contrast, governance, ethics, and equity-related themes are comparatively underrepresented, highlighting important gaps in the literature.

5. Discussion

This study provides a structured and integrative overview of how AI is currently conceptualised and applied in higher education research. By synthesising findings across multiple studies, it moves beyond individual analyses to identify broader patterns, trends, and gaps in the literature (Bond et al., 2021; Crompton & Burke, 2023).

These findings also highlight structural imbalances in the research landscape. The dominance of pedagogical applications suggests that AI is primarily being framed as a teaching tool, rather than a broader institutional or societal transformation.

Further analysis highlights several important patterns. Research remains dominated by quantitative approaches, with limited longitudinal studies examining long-term impacts. Additionally, most studies originate from North America and Europe, raising concerns about geographic bias and generalisability. The rapid emergence of generative AI has also shifted research focus toward issues of academic integrity, creativity, and assessment (Zawacki-Richter et al., 2019; Selwyn, 2023; UNESCO, 2023; Dwivedi et al., 2023).

Emerging research also highlights the importance of human-centred approaches and quality enhancement in AI adoption, particularly within diverse institutional contexts (González-López & García-Peñalvo, 2025; Sebopelo, 2024). Additionally, recent studies on assessment practices and bibliometric trends provide further insight into how AI is reshaping evaluation methods and research trajectories in higher education (Madwe et al., 2025; Nguyen et al., 2025).

A key contribution of this study is the development of a coherent thematic framework, that captures the multidimensional nature of AI in higher education. The findings highlight a clear imbalance in current research, with strong emphasis on pedagogical applications and comparatively limited attention to governance, ethics, and equity. Addressing these gaps is essential for ensuring responsible and sustainable AI adoption. While not all studies are discussed individually, the findings are based on patterns identified across the full dataset. These insights inform the conclusions and recommendations presented in the following section.

6. Conclusion

The findings emphasise that AI offers substantial potential to enhance learning outcomes, personalise instruction, and streamline administrative tasks. However, realising these benefits requires careful attention to institutional readiness, educator and student AI literacy, and the establishment of robust ethical and governance frameworks (Alshammari et al., 2025; Ayyoub et al., 2025). Without such measures, there is a risk that AI could unintentionally widen existing disparities or undermine academic integrity.

AI has significant potential to enhance teaching and learning, but its effective implementation requires careful attention to governance, ethics, and equity. Future research should prioritise longitudinal and context-sensitive approaches, while institutions should strengthen governance frameworks, invest in AI literacy, and promote equitable access to support responsible and inclusive adoption.

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