Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Generative Artificial Intelligence and the Transformation of Higher Education, A Systematic Review

Nasir Ahmad Ganaie

nasirahmadganaie@gmail.com

Indian Institute of Technology Guwahati

Bodrul Islam

Indian Institute of Technology Guwahati

Systematic Review

Keywords: Generative Artificial Intelligence, Higher Education, AI Literacy, ChatGPT, Educational Technology

Posted Date: August 11th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10636151/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Generative artificial intelligence (GenAI) has rapidly reshaped higher education by influencing pedagogical practice, student learning, assessment design, and institutional governance, yet the literature remains fragmented across these domains. This study systematically reviews recent scholarship on GenAI in higher education to synthesise current evidence on its implications for teaching, learning, assessment, and governance. The present study found that GenAI is widely discussed as both an instructional support tool and a disruptive force in higher education. In teaching, it supports content generation, feedback, and instructional design, but its effectiveness depends on educator preparedness and institutional guidance. In learning, outcomes vary according to students' agency, critical engagement, and the extent to which GenAI is used as a scaffold rather than a substitute for thinking. In assessment, the literature highlights growing pressure to redesign tasks toward authentic, process-based, and reflective forms of evaluation. Across all domains, governance, AI literacy, ethics, and policy coherence emerge as central institutional concerns. This study concludes that GenAI should be understood as a socio-technical and pedagogical challenge requiring integrated strategies that align teaching, learning, assessment, and governance in higher education.

1. Introduction

Generative artificial intelligence (GenAI) tools such as ChatGPT, GPT-4, Claude, Gemini, and DALL·E have revolutionised the education sector and driven excitement and anxiety amongst higher education practitioners around the world (Lindell & Modén, 2025). They are built with huge foundation models, which can take huge amounts of digital text and other facts, and generate answers that can emulate a human responding to the inputs they are fed. Currently, students/academic staff are able to use GenAI in web platforms, institutional platforms, and apply it in activities regarded as academic activities, which include writing essays, solving maths/linear algebra problems, writing codes, summarising reading material, creating teaching material, marking assignments, etc. (Barus et al., 2025). This technological change relates to an ongoing debate on 'digitalisation', 'learning analytics' and 'Artificial Intelligence in education' (AIEd) in Higher Education (HE), but unlike the previously mentioned change, it is generative and not based on rules or prediction (Alba et al., 2026). Typical curiosity of the simulated conversational partner and creative respondent or collaborator that GenAI systems can also yield, which can be applied to many courses and disciplines, and usually do not demand advanced technical skill of the end-user (Zahid et al., 2026). GenAI seems to be making its case; therefore, to move beyond being a tool for education into a general-purpose AI that may revolutionise the "how" of teaching or learning, the "how" of learning or judging learning, and the "how" of governing Universities.

Regarding the use of GenAI, there is an emerging rapid pace of its use at the university level, but evidence of the pedagogical and policy integration is disjointed and uneven, spanning across teaching, learning and assessment (Virmani et al., 2026). While there have been several systematic and scoping reviews that have begun to synthesise studies on GenAI, many of these have focused on one facet of this research area and have overlooked some important questions for the higher education community

(Cox, 2024). Recent systematic reviews on, for example, GenAI for teaching/learning practices, disciplinary trends and publication and citations in these areas, for instance, have not given adequate consideration to reconfiguration of assessment regimes and/or interaction between institutional-level policy/governance and classroom-level use of innovation, for example. Thus, in GenAI and assessment-related publications, there are myriad models of assessment, and they encompass a variety of learning variables, but with no attention to the changed teachers' and/or learners' approach to learning. In more general terms, the lack of awareness of the implications for HE pedagogy and evaluation because of AI (both generative and non-generative) is not easy to trace. They refer to the fact that the adoption of AI in STEM/computer sciences is further advanced than in the humanities and social sciences, and methodological problems with the studies (small, short time horizon and mostly single institution study). It is challenging, however, to translate their teaching, learning and assessment into conversational and creation capabilities of GenAI tools and translate to traditional AIEd applications.

While waiting for this change, the new empirical studies are calling attention to differential and at times conflicting impacts on GenAI use in the areas of HE. Research on students' learning approaches and agency can also be thrown into some confusion, as they may be inhibited or supported as regards Deep Learning based on how students interact with GenAI (Crompton, et al., 2026). While the studies of student agency/learning approaches reveal the potential of GenAI to create passive learning, it was also found that GenAI can facilitate engaging learning and critical learning (Zhang et al., 2026). Qualitative insights in social entrepreneurship education show that GenAI can spark new "dialogic spaces" in which co-creative learning, knowledge linking and theory-practice alignment can take place, but can also pose challenges in terms of careful design and human oversight (Wang et al., 2024). The shift from traditional to innovative and/or refocused assessment to AI-integrated assessment is a three-fold shift, but with certain conflicts in the way: institutional integrity policies, autonomous and responsible learning in an AI-rich learning environment (Debets et al., 2026). The AI governance in universities study indicates that most of the universities are currently in the traditional and centralised stage, emphasising risk control and risk mitigation measures, and a few universities have a more flexible and community-led approach for integrating GenAI (Tarhini et al., 2026).

It is important to note that this collection of studies points towards multiple dimensions of revolution in HE driven by GenAI, with limited studies focusing on multiple dimensions. Most systematic reviews of teaching and learning fail to report systematic findings around assessment, and most scoping reviews of assessment don't connect typologies of assessments and learning outcomes to the broader teaching and learning (Magzoub et al., 2025). Moreover, the existing reviews conclude with a (big picture) of trends over time, either with respect to publications or based on a review of the spatial distribution of research or a more generic idea of research spheres, but do not include a mapping framework to link to future research, practice and policy for the support of GenAI in teaching, learning and assessment (Crompton, et al., 2026). The outcomes of several of these studies are preliminary, as they largely investigate the adoption of many of the GenAI tools in mainstream higher education with interventions of short duration and limited measures of outcomes (Johnson, 2026). Many of the studies are qualitative/exploratory in nature, and there are few studies that are quasi-experimental, longitudinal or

mixed methods regarding long-term impact on learning outcomes, assessment performance and equity of access (Giannakos et al., 2025). However, little systematic research exists on the effects of the technology or on questions concerning the conditions of success/side effects of the GenAI with special regard to aspects where it could be particularly successful, for example, the provision of feedback, support for multilingual writing, personalised learning pathway, etc.

Literature is regionalised and institutionalised, too. There are fewer studies in institutions in emerging economies or in under-resourced HE institutions compared to many of the earlier empirical studies, and the policy analyses are in well-resourced universities in North America, Europe and East Asia (Supianto & Widyaningrum, 2026). This may introduce doubts regarding the risks and opportunities of GenAI in other settings, with different digital infrastructures, language ecologies and regulation, and with different groups of students and different demographics, which might affect the generalisability of the results. While equity and inclusion have been prominent topics of recent literature on AI literacy and GenAI literacy, there is less empirical research that explores how it is reflected in teaching and learning, and in assessment (Bilgiç & Sever, 2026). Moreover, institutional policy research is primarily descriptive of the types of AI governance policies or analyses of the policy documents, but not deep enough to involve the implementation of teaching, learning and evaluation (Yang et al., 2024). Therefore, little literature exists to capture the pedagogical impact of GenAI in the classroom, assessment impact, or institutional policies that may act as barriers or enablers for using GenAI. Similarly, focusing positively and responsibly on the future of GenAI and ensuring there is a shared vision of how higher education can help “connect the dots” between the everyday use today, how students learn and engage with GenAI, how assessment is evolving and adapting, and how governance frameworks and rules are evolving and “catching up” to GenAI can be challenging (Thompson, 2026).

Therefore, there is an urgent need to carry out a systematic review of GenAI in higher education with respect to its potential uses in teaching, learning, assessment and future directions in the literature. The overall purpose of this study is to develop a synthesis of the existing literature to grasp the current landscape of the application of GenAI in classroom learning within HEIs, in institutional assessment, and to provide suggestions and recommendations based on evidence for future research, policy and pedagogical designs (Verboom et al., 2025). This review can be beneficial in a number of ways: (a) to document the evidence of GenAI usage and integration in the broader literature of AI in Education; (b) to gather the evidence spanning the entire landscape of teaching, learning and assessment; (c) to identify methodological and conceptual gaps in the current evidence base; and (d) to synthesise implications for institutional governance, AI Literacy and ethics for responsible, equitable and safe use and implementation of GenAI.

2. Methods and Materials

This study synthesises empirical and conceptual studies on the application of GenAI in the context of teaching, learning, and assessment in HE. The methodology follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement. Given the exploratory nature of the

field, the review also aligns with the PRISMA Extension for Scoping Reviews. The studies were considered eligible if they were conducted in the context of higher or continuing education (including under- or post-graduate courses) and explicitly addressed the use of GenAI tools in teaching, learning, assessment, feedback, or other educational contexts. Empirical, systematic reviews, scoping reviews, conceptual, and theoretical articles were considered, provided they had a direct relevance to HE practice and governance. Only peer-reviewed journal articles and complete conference papers published in English since late 2022 onward were retained. Studies were omitted if they were limited to K-12 or informal learning settings; discussed non-generative AI applications (e.g., intelligent tutoring systems or predictive analytics dashboards); or were editorials, opinion pieces, or non-peer-reviewed commentary that did not systematically engage with data or existing literature. The literature search covered multidisciplinary databases including Scopus, Web of Science (WoS) and Google Scholar.

The iterative search process was adopted, with search terms refined through pilot searches to assess key articles. Search strings comprised into three concept blocks: (i) generative AI terminology ("generative artificial intelligence", "generative AI", "large language model", "ChatGPT" and "GPT-4"); (ii) pedagogical and assessment terminology ("teaching", "instruction", "learning", "student learning", "assessment", "examination", "feedback", and "grading"); and (iii) higher education terminology ("higher education", "university", "college", "tertiary education", and "postsecondary"). The search syntax was adapted to the requirements of each of the databases. Study selection followed the PRISMA 2020 multi-stage screening process. All retrieved literature was imported into a reference management software, and duplicate documents were excluded before the screening. To operationalise the three core components of the eligibility criteria, the higher-education context, the generative AI focus and the relevance to teaching and learning, assessment and governance, the titles and abstracts were then screened using a template. All these records were then subjected to full-text screening, and at this stage, the number of reasons to exclude the records was recorded, such as the case where AI was not used in a generative way, or it was not used in a higher education context or the case where there was insufficient detail in the method. The systematic search conducted across Scopus (n = 426), Web of Science (n = 297), and Google Scholar (n = 179) identified a total of 902 records (n = 902) relevant to the review. Following the identification stage, 152 duplicate records (n = 152) were removed, and the remaining records underwent systematic title and abstract screening. Subsequently, 140 full-text articles (n = 140) were assessed against the predefined eligibility criteria. Of these, 92 articles (n = 92) were excluded for the following reasons: studies not focusing on higher or continuing education (n = 23), studies addressing non-generative artificial intelligence (n = 21), studies lacking relevance to the review focus (n = 18), editorials, opinion pieces, or commentaries (n = 12), studies with insufficient methodological rigor (n = 10), and studies failing to meet other predefined eligibility criteria (n = 8). Ultimately, 48 studies (n = 48) met the inclusion criteria and were retained for the qualitative synthesis.

The study selection process is presented using a PRISMA 2020 flow diagram (see Fig. 1).

Data were extracted using a pre-designed data extraction template. The extracted information included author(s), publication year, country or region, production sources, disciplinary context, study design,

sampling strategy, and methods of data collection and analysis. Information on the GenAI tools examined (e.g., chatbots, code assistants, feedback systems, and multimodal generators) and their educational applications (teaching, learning, assessment, or institutional governance) was also extracted. In addition, key findings relating to teaching practices, learning outcomes, assessment, institutional support, ethics, equity, and AI literacy were recorded. The extracted data were organised and managed in Microsoft Excel and subsequently thematically coded according to domain, discipline, geographical region, and methodological characteristics. Due to the variations in study contexts, tools and outcomes, a narrative and themed approach to synthesising the data was undertaken; therefore, no meta-analysis was done. An initial descriptive analysis summarised the included studies according to publication year, geographical distribution, disciplinary focus, study design, and the type of generative AI tools examined. The studies were then grouped into four domains (teaching, learning, assessment, and governance) and analysed thematically to identify recurring patterns, challenges, and reported outcomes. The synthesis was also used to identify implications for future research, educational practice, and policy.

3. Results

Findings from this study show that studies on GenAI in HE have risen suddenly in the last few years; however, evidence of such studies is unevenly distributed across its scope, methodology, and disciplinary aspects (Papyshev, 2025). GenAI is invariably characterised as an 'enabling and disruptive' technology with implications for classroom practice, institutional policies, academic integrity, assessment design, policy dissemination and AI literacy (Usher, 2025). However, the literature analysed shows that the adoption of GenAI has outpaced the development of stable pedagogical and governance frameworks, resulting in continued experimentation, uncertainty, and diverse institutionalised responses (Gao et al., 2026). Drawing from these trends, we can define GenAI in HE as a socio-technical phenomenon that reshapes the relationships among students, teachers, learning tasks, and AI tools, while transforming institutional policies and governance practices. A descriptive reading of the literature reveals that most studies have been published since the public release of tools like ChatGPT, with a significant increase in publications from 2023 onwards (Gamlem et al., 2026). Many of these articles are preliminary and rely on perceptions, case studies and early institutional experiences rather than robust quantitative or longitudinal analyses. This pattern is typical of a new discipline, but it also indicates that many findings are tentative, subject-based and locally dependent. Consequently, positive findings can only be generalised to the field of higher education when the pedagogical design (and/or institutional support) remains unaltered in the study.

The literature can be divided into three interrelated areas: teaching and learning, assessment, and governance and policy. GenAI in teaching can be seen as a pedagogical assistant that supports lesson planning, creating content, providing feedback and designing learning activities. Learning-focused studies examine students' use of GenAI for the creation of content, clarification of concepts, coding and self-directed learning (Ceallaigh et al., 2025). Assessment-related studies specifically focus on academic integrity, redesigning evaluation tasks, feedback, and evaluating students' ability to responsibly use AI

tools. The noted literature identifies GenAI as both a productivity tool and a pedagogical catalyst in teaching. A number of studies have proposed that teachers can leverage GenAI to automate course preparation, create quizzes, generate examples, explanations, and summaries, and spend more time with their students. In these connectivist and dialogic approaches to teaching, GenAI functions as an interactive agent, which can assist in collaborative learning, connections of knowledge and linkage between theory and practice (Wessel et al., 2025). Rather than serving solely as a content generator, GenAI can act as a co-participant in the learning process, shifting the teacher role from being a content transmitter to an orchestrator, curator and guide (Zhang et al., 2026). However, the effectiveness of these tools depends on the specific disciplinary fit, teachers' AI competencies and the alignment of AI use with intended learning goals.

A major theme which has surfaced in the teaching literature is that teachers are at varying stages of readiness. In the midst of all the potential for transforming the teaching and learning experience through the workflows of products such as ChatGPT, there is also a lack of clarity in using such tools in education, the ethical considerations, and what should be considered "too much" for students to use (Wessel et al., 2025). Interestingly, in the field of institutional policy studies, there is a lot of freedom in universities where instructors can choose to use AI as it concerns course policies and acceptable use statements (Misawa et al., 2025). However, there is a cost to this flexibility: inconsistencies can stem from it, with different expectations of the students in different courses, even within a single institution. This means that educational uses of GenAI tools in teaching and learning involve more than just the capabilities of the tools; they also rely on the institutional supports available that work to improve the AI literacy of teachers, the policy that supports AI integration, and the curriculum that aligns with AI technologies.

The literature on the learning process seemed to be more nuanced and points to not necessarily the use of GenAI, but how students use it as they learn. Alumni's studies on student agency show that students' interactions with GenAI vary, sometimes employing it as a "fast tool", a "study buddy", a "reflection point" or a "scaffolding device" to help understand. Receptive, Resistive, Resourceful and Reflective SIMMER model, one influential student model, conceptualises student engagement with the same technology as being receptive, resistive, resourceful or reflective based on student intentionality and self-regulation on how the technology can be used to support or hinder their learning (Schrepel, 2026). What's remarkable about this finding is that it takes the conversation away from the question of whether students use AI and toward how they use AI, and how effectively they use AI to enhance or do away with thinking.

Institutional support and frequencies come into the picture in several studies that investigate learning outcomes and when/where to introduce AI, but instead of frequencies, it is part of broader use architectures (Chiu, 2024). Based on the evidence reviewed and the research into the use of GenAI by students, when GenAI is used to scaffold, not replace any cognitive task, there are likely to be more gains in capability (Liang & Bai, 2025). The same research also shows that for some of these learner profiles, this correlation can be done, with support from institutions, and for others, it cannot. It reinforces this insight on the important role of institutional mediation for the meaningful development of learning

through the use of GenAI (Mulyani et al., 2025). In the meantime, much is being discussed about shallow engagement and cognitive offloading. Some research has warned that the use of GenAI to generate seemingly polished outputs without the thoughtfulness it requires can lead to shallow learning processes, students' inability to independently solve problems and lower their capacity to assess the veracity, relevance and morality of GenAI-generated answers (Candel et al., 2026). Two things are special in this context, namely ground knowledge and its relation to the writing process in non-STEM or writing-intensive courses; the depth of learning may not only be about the ability to complete, but also about argumentation, interpretation and original synthesis. Therefore, AI usage, whether permitted or forbidden, is not that significant for the student agency literature, but how to use AI in reflective, purposeful, and critically aware ways that allow for the student's autonomy, and AI aids or supports the students' learning is emphasised repeatedly in the relevant literature.

Perhaps no portion of assessment literature has undergone as many transformations as that which most clearly has experienced the impact of GenAI concerning student assessments: written productions, written computer code, and answers (Colbran et al., 2026). One emerging pattern in the current research is the vulnerability of traditional assessment approaches, especially unsupervised writing or take-home tasks, and other 'product' assessment tasks in the context of GenAI (Llantuy et al., 2026). In response to this volatility, many institutions have had policies that respond to these issues, particularly as they relate to academic integrity, disclosure requirements, security of the data, and default denials of what can or cannot be done in a course unless the teacher has specified. There is an equally difficult-to-implement purely-prohibitive approach in the literature, because GenAI has become an integrated component of classroom, school, and college education and work experiences of learners.

Thus, this review argues for changing the assessment from an integrity policing approach. This includes more focus on real-world tasks, orally assessed products, reflected and practised tasks, verbally assessed processes, output performance, critical analysis/reworking of products generated using AI tools. The intent of these strategies is to have students' thinking, decision making, conceptualising or learning in the discipline be the focus of assessment (Oben et al., 2025). The important thing is, the impact of AI on the university should be directed toward assessing their learning, not their proficiency with the tools, particularly if their work with them demands little effort on the part of the student. This will not solve the misuse issue in the problem domain, but may shift the perception of the problem to a more congruent and transparent assessment of higher-order cognition.

In evaluating students' work, the ambivalence of the assessment literature is underlined in the research into AI-generated feedback and machine-assisted evaluation. On the other hand, there is a risk of relying on GenAI tools to deliver timely formative feedback in large classes, where the option of teacher feedback is time-consuming (Ellis et al., 2025). But research pitting AI evaluation against that of instructors and peers has led to doubt regarding reliability, pedagogical quality, and whether AI evaluative comments can capture the nuances, context, and disciplinary standards (Fleischmann, 2025). As a result, there is a positive outlook on the literature about the use of GenAI in contexts with a lot of feedback; however, it is advised to be cautious about GenAI in contexts where there is a need for

replacing human assessment, such as summative assessment contexts. In this aspect, there is evidence of AI having the potential to enhance the assessment process instead of taking over the entire process (Sharples, 2023).

Governance with regard to teaching, learning and assessment is a significant cross-cutting theme. The policy literature reveals that most universities take a more restrictive approach to the key issues of academic honesty, privacy and security, with the instructor having more flexibility as to how the classroom is integrated (Tisza et al., 2025). It appears that there are six main types of policy dimensions that are particularly relevant: academic integrity and responsible use, policy communication, data privacy and security, ethical considerations, policy development and evolution, and classroom or teacher implementation and discretion. Although such institutional arrangements allow for a rapid response to the evolving context, they also can lose coherence if there is a one-office approach to developing school policies, or if policies are not communicated to or utilised by students and faculty (Lee & Kang, 2025).

However, more than a statement is required when it comes to policies in order to get to effective institutional responses, according to the governance literature. The systematic analysis of the governance of GenAI in HE underscored a complex social, technical and socio-technical matrix, comprising several elements that are crucial for the sustainable integration of GenAI in HE, such as: role definition, AI literacy programs, ethical guidelines, data governance, transparency, risk management, and evaluation frameworks (Jauhiainen & Guerra, 2025). An important finding in this collection is that governance of GenAI is not solely a technical issue; it's a people-driven process, a continuous endeavour, and a combination of institutional and technological systems (Lee et al., 2025). This is particularly relevant as much of the most pressing concerns around GenAI lie at the intersection of human practices and technical capabilities, including bias, hallucination, misuse, inequitable access, overreliance and inconsistent policy interpretation.

One thing the results clearly indicate is that AI literacy and institutional support are crucial. In a couple of studies, the school providing guidance, structure and space for reflection seems to benefit the students and teachers educationally (Alduais et al., 2025). AI literacy here goes beyond just knowing but also will encompass an ability to critically think with AI-generated content and to understand its epistemological and ethical boundaries, while being able to use it effectively depending on the situation and the task (Dai & Chan, 2026). An assessment of academic achievement and responsible use of GenAI suggests that supports at the institutional level can have an influence on GenAI usage rates as well as the quality of learning that accompanies its use. As such, AI awareness is not an add-on to the HE's reaction to GenAI.

Lastly, there are some areas in the literature which are commonly missing. Evidence continues to be largely short-term, exploratory studies with rather few longitudinal studies, inter-institutional comparisons or sound estimates of the long-term learning outcomes. Furthermore, there is a high percentage of studies conducted in well-resourced institutions, and in some regions, it's unknown whether the results of research can be used in less-resourced institutions or institutions in other emerging economic areas. (Hamamra et al., 2026) Furthermore, whereas the number of studies that are

more in the spirit of ethics and policy is sometimes large, similarly the number that are more in the spirit of ethics and pedagogy is sometimes large, but fewer studies are simultaneously as much in the spirit of ethics and pedagogy as in the spirit of policy, and fewer studies are simultaneously as much in the spirit of ethics and policy as in the spirit of pedagogy. Therefore, while there are many messages on how to use GenAI in HE and the risks that come with it, there is still an unavailability of systematic guidance in using GenAI to align Teaching and Learning, Assessment and Governance in practice (Ferrer et al., 2025).

4. Discussion

This study highlights that GenAI has made a difference not only within the learning experience for students but also in pedagogical, epistemic and institutional perspectives of learning, teaching and assessment. Based on the research presented in this paper, it can be seen that regarding the academic environment, GenAI is an augmenting technology in the process of knowledge production, access, evaluation and delivery. This is most noticeable in literature, in which research goes beyond functional dimensions to include the roles played by students and educators, and factors adapted with the purposeful and efficient use of technology from students' perspectives in classroom decision-making within educational systems. In short, the benefits of GenAI in HE go beyond its use and capabilities to a more fundamental impact on the dynamics of the learning relationship and decisions about learning.

The main finding of the study is the pedagogy part of the educational contribution of GenAI. There are studies that show the value of feedback, giving personal support, relating to effective teaching, etc., but this does not simply happen. In contrast, they appear to be most relevant to planned, purposeful and intentional learning when engaging with GenAI with a clear learning goal and human evaluation and judgement. This result supports the overall argument that no innovation in education can be assessed merely by its productivity enhancement and/or convenience; pedagogical coherence will always be the final decision. Instead, it should be viewed not as a substitute for pedagogy, but as a means to reveal the merits and weaknesses of the pedagogical design.

The article also highlights the importance of reconsidering teachers' roles in AI-mediated learning environments. Education is like with GenAI: Teachers don't seem to be less important or complicated, but even more so, not replaced by AI. These words in the literature make the change of role of the teacher from the information transmitter to the designer, the mediator, a curator and the ethical guide self-evident. This can be even stronger if understood as an interactive agent that can further strengthen the dialogic learning process and therefore involve more actors in the knowledge-sharing process. Nonetheless, though, this blossoming ecosystem doesn't disregard the educator; it only sustains them, at least when AI content may not be deep, or accurate, or even unbiased.

To which something else in the literature is attached, since it is one aspect related to student agency, particularly understood as a change in museums. The findings suggest that the use of GenAI in education cannot simply be divided into a binary of "use" or "not use" and "accept" or "reject" GenAI.

More importantly, the use of GenAI by students in the learning process demonstrate the different frames of engagement with GenAI receptive, resistant, resourceful, and reflective and illustrate some of the limitations of GenAI as a tool for content generation (quick and easy) dependency, shallow completion; furthermore, note that there are great opportunities to selectively look at the GenAI solution with critical, iterative, and purposeful eyes deep learning with GenAI. Not only pedagogy and access control with AI, but it is also about AI practice, which provides autonomy, judgment, and intellectual responsibility.

Understanding of deep and surface engagement is relevant to curriculum and course design. If GenAI can scaffold learning while taking some of the cognitive labour, then universities should not only have a policy of acknowledging misconduct and/or detection but also an aim to reduce such potentially harmful interactions in learning and teaching. Literature suggests that educational activities should be redesigned so that learning is not evident until the student(s) are not only rewarded for best output, but for reflecting, taking in the process, critiquing, and using technology in such fields as these, where understanding, argumentation and originality play an important part in intellectual enrichment. In such instances, the AI generation of such material can endanger some of the HE institutions' core instructional values, critical thinking, decision making, autonomy, and self-directed learning in the field of expertise. The documents indicate that, in particular, the traditional types of assessment were becoming susceptible to automation, meaning that they were no longer great for measuring learners' learning. However, the age-old questions of purpose, what, and how are now in a new light, and questions of authenticity and intellectual contribution in a digitally mediated context of assessment come to the fore. The challenge can consequently not only be based on procedure, but also on concept. Are students of higher education required to perform power of output, or must they use new tools responsibly, have a grip over a content area or perform power of reasoning?

According to the literature, in this regard, assessment should be transitioned from assessment for product verification towards assessment for evidence of thinking. Others, such as stagers and papers, such as oral defence, reflective explanation and in-class performance/critique of text/research created by AI appear more important as they focus on reasoning and process as well as just completion. These practices are nothing new, but with the coming of GenAI, their significance is underscored as 'editability of text' is becoming the new 'best practice'. However, at the same time, AI can serve as a valuable instrument for formative assessment, when well managed and applied appropriately, for the provision of timely feedback and/or the opportunity for iterative revisions. The message there is that assessment reform is not only out of AI, but it is about using it, it is about distinguishing and getting hold of what kind of assessment shouldn't be used, what type of assessment is for the best, what kind of assessment is about and by AI, and how it can make assessment more transparent and informative. Important to note, however, is that institutional governance is a formative factor determining educational outcomes, which is another key takeaway from the study. The research addressed in this paper argues that Institutional policies and management, communication mechanisms and ethical issues are all factors that influence the uptake and use of GenAI in the classroom. In modern education, more and more universities nowadays seem to have a more rigid and centralised academic integrity policy as well as a privacy and security policy. Whilst also keeping a more lenient policy on the classroom application of AI. This is

needed in a constantly changing environment, but the same review suggests that overly rigid models of implementing policy can stifle pedagogical innovations, can leave room for different interpretations of policy at the Departmental level and that they are not flexible enough to account for varying applications and impacts of AI across the disciplines.

The studies reviewed on governance state that there is a need for adaptive, evidence-based and participative institutional frameworks. In terms of the institutional component of governance, there have been coordinated efforts revolving around both socio-technical aspects, including creating clear roles, opportunities for AI governance actors, increasing AI literacy, and codes of conduct and ethical frameworks, as well as the development of transparency practices and principles and data governance frameworks and mechanisms, and the implementation of data review processes. This is significant because it points to one of the ways in which the pedagogical impact and implications of GenAI can be built, and that this is not an add-on secondary activity on the governance side, but is integral to the experience of GenAI. If a governance framework is not in place to work in this way, then pedagogical innovation and responsible use of the tools may be hindered, and policies may be split up, communication and support may be difficult.

They also apply and strengthen the ideals that taking care of literacy in AI should be part and parcel of the teaching and learning process, and not merely just an add-on as a technical inclusion. Being a good and effective user of GenAI is often equated with users being able to: know the limits of GenAI-generated content, know when the AI is 'hallucinating' and when it is introducing a bias, judge the credibility of the content produced from the AI, and make context-specific decisions on how to use the AI. This literacy should be granted to all involved students and teachers. Based on UNESCO's framework of AI competency in education, there are more teacher-centred perspectives regarding AI in education that focus on the importance of valuing human-centred principles, ethical and pedagogical considerations and professional development rather than just fascination with AI technologies. The same goes for the students, who are now expected to be AI-critically literate, as an element of their digital and epistemic competencies.

Another key strand through the review is equity and inclusion. However, it has been mentioned in literature that 'accessibility is not the same as equity' and scalability and accessibility are often referred to. Concerns include the potential for AI systems to be biased due to the training data (e.g. language bias, cultural or epistemic bias), or that institutional policies might be discriminatory if it means that not every student has access to the AI systems, is confident using the systems or has the same level of fluency when using them. More specifically, the historically marginalised and multilingual students might encounter distinct, specific challenges when assessing student work and writing using AI systems because the dominant language and/or "desirable" norms of writing are not in the system. This means that any higher education policy on GenAI needs to be concerned with inclusion in the broadest sense beyond access to GenAI, but also with regard to design and assessment, as well as institutional support.

The study also suggests that, on a fundamental level, the issue with GenAI is a matter of the mission of HE. It is possible to divide the literature into two about equally balanced ways: In one camp, one has work that is concerned with efficiency and which is predominantly looking for instruments of support for automation, productivity and these. In the other camp, one has work that shares its major focus with that of humanism and criticality and which is also looking for instruments of support for judgment, dialogue and ethics and creating autonomous learners. AI at the heart of the fight here has the promise to save on time, but it has the potential to increase access, at the same time risking ideas about authorship and originality, expertise and intellectual labour. Hence, one possible image of 'technology' will be the one that can be decided upon based on the values of education that the institutions want to pass on and sustain. The review in this context is not just a challenge for the institutions of HE by an outside body, but it also makes HE Institutions reflect on the value of learning and its purpose.

Lastly, the evaluation contains a section that highlights areas of key gaps in evidence that should moderate any strong statements. The few printed documents available today are more exploratory and qualitative, with the majority being perception studies, local interventions and policy commentaries and are geared mainly towards the short term. Few data are available on continued use of GenAI and its impact on learning about the discipline, assessment, teacher practice and institutional culture. Similarly, comparative analyses of various institutions or between different regional contexts or resource conditions are poorly developed and do not help to understand the extent to which results achieved can be generalised. Many of the conclusions mentioned above are provisional and indicative because so many of the restrictions outlined above come into effect, and the field of interpretation is at an early stage.

GenAI should not only be perceived as a threat or problem in education, but also should be perceived as a tool for enhancing learning and teaching and can therefore be applied to achieve the same. An alternative reading is that it is an amplifier of the institutional setting, pedagogical value and user autonomy as stated in the literature. With well-formulated learning goals, well-designed assessments, teacher support, and adaptive governance, the use of GenAI can bring further opportunity to give feedback, experiment and learn. In a learning environment where these are less prevalent or even completely lacking, the same methodology and tools can result in increased superficial learning, dependency, inequality and confusion. Based on this review, however, it appears that the implementation of GenAI in education is not only a matter of the power of the AI models, but rather of the education systems in which they are implemented.

5. Implications and Recommendations

The conclusions from this study are crucial for HE institutions to have a positive and constructive response to the fast-growing GenAI. Overall, the literature showed the emphasis was not on debating the presence of GenAI in Universities but rather facilitating and encouraging GenAI in such a way that will be supportive of university-level academic rigour and promote innovation and creativity in teaching with GenAI. Nevertheless, within the studies included in this survey, the "either probe or ban" received

consideration continues to be a major element of the responses to challenges like academic integrity or privacy and risk management, but there is growing evidence that this response is inadequate for a technology that is so much a part of students' lives, working, not to mention studying. Hence, it is imperative that a cautious, flexible, and pedagogically purposeful approach be created in the institutions.

The first possible implication is that it's necessary to go beyond a blanket ban and adopt context-sensitive governance. Policy-level survey literature provides a more narrow, more centralised perspective in many of the institutions where there was the most baroque evidence (hallucinated text/misuse of data) of cheating. While making sense during this initial acclimatisation to the institution, this might make it harder for teachers to creatively use the potential applications of GenAI in their curricular areas and might lead to an inconsistent policy and practice landscape. The literature then suggests models of governance that make clear the rules in terms of (mis)uses of technology and some boundaries for the departments/professors to make explicit for their acceptable uses vis-à-vis disciplinary learning outcomes and assessment, and disciplinary norms of knowledge. It suggests that governance of AI at the institutional level should be principle-based, and governance at the local academic level should be flexible.

This is because it is clear that policy should be more pedagogically explicit, and it cannot be compliance-based. They seem to be created based on just one need or concern identified by the university that has arisen (e.g. academic dishonesty, data privacy), with limited investigation or learning experiences and needs in the discipline field. But research on student use profiles shows it isn't about how students use GenAI at all, e.g., their frequency in using GenAI—that affects students' learning; it's about how they use GenAI, e.g., using it, not as an alternative to, but as a way of thinking and rethinking. Thus, policy needs to regulate outputs, as well as create modes of engagement. Hence, AI policy needs to be adapted to the teaching and learning practice, and guidelines for acceptable use should be aligned with learning objectives that involve learning outcomes like critical reasoning, creativity, and self-regulation/ethical decisions to be made.

The greatest need is in the area of Assessment Design on the institutional level. However, the traditional conception of product (assignments) could be manipulated if a student could create a code, explanation, or text (with little effort) that can be "well-dressed". In parallel, any disruption in the application of this in the same piece of work can be an opportunity for us to revisit our practices around assessment that would include a student's process, thinking and understanding in disciplines. Evaluative tasks should be more authentic, process-based, staged, present, oral defence, reflective comments, comparison tasks if it's an AI-generated work, critique and enhance work created by AI, etc. They are not only examples of preventing misbehaviour, but rethinking assessment to be about appreciation of judgement; they are transparent, owned intellectually by the students. This is indeed an issue which is not only to be addressed, but also is an opportunity to rethink assessment.

The study further suggests that institutions need to focus on AI literacy as a core competency and not an additional competency. AI Literacy is not simply about prompt swings; it is also about what it is that

you should and should not prompt a model about, what to watch out for in AI hallucinations, and where pedagogically and ethically appropriate and inappropriate uses come into play when using AI. However, there are studies that also span the aspect of institutional support, which points to how capability gains can be realised with any kind of scaffolding and direction that can be offered by Universities for the benefit of their students, with different scaffolding and structures supporting the gains of different learners. This means it is highly unlikely that “blanket training” will have any beneficial effect. Instead, universities should strive for a tiered approach to AI literacy: in all courses and programmes, provide an introduction to AI for all students and staff; and, if AI is relevant to a particular course or discipline, offer a more in-depth course or more targeted resources to the students and staff of that course or programme. This needs to be embedded in curricula, and in professional development organisational set up and not as optional workshops.

Thus, it won’t cost the educators either. Among the instructions, the role of the teacher may change from the information source to the critical, guiding and managing party of GenAI as a curator, or a designer/moderator. This is not an abdication of responsibility by the educator, but it is also an added importance of pedagogical judgement. These two questions should be answered by the teachers: at which moments can AI help students to enhance the learning experiences, and how and when can the AI be used in a way that the students’ thinking will not be lost even if they use AI tools? Policymakers in Universities should be releasing guidance like policy documents for faculty with some examples of acceptable and unacceptable use of AI, toolkits to update assessments, and even communities of practice for faculty to exchange new best practices. When not delivered, it can lead to a vacuum in institutional policy and its implementation.

The results also describe the role of the stakeholders’ involvement and communication in policy legitimacy. The attitude towards information on AI in the institutions appears to be complex, with each institution witnessing multiple communication channels, e.g. via several offices and with disjunctions or confusion within parts of the university community. More participative, less frequently used approaches may be more suited to a fast-changing context to ensure that a policy remains relevant, since it is possible to gather information from those who are directly affected by the policy implementation, through community-based approaches. The role of students and staff in governance is important and highly significant since students and staff are the most impacted face of the influence of “AI Policy” in learning-teaching-assessment spaces. As a result, mechanisms of consultation, namely open feedback systems, faculty working groups, communicative meetings for students and in Universities for the policy review should be introduced. Compliance and trust in the policy can be reinforced through such spaces in that the policy isn’t simply ‘declared’ but rather has emerged out of a conversation.

GenAI can create possibilities, like rapid feedback, language support and affordable help, and it can create inequities, like when access isn’t equal, or there isn’t the digital literacy or institutional guidance needed. In those with the most resources, it is more likely that they have a specific support mechanism, enterprise secure applications, and custom pedagogical programmes, whilst in institutions with less resources, it is harder to achieve a stable policy, and in under-resourced institutions, it is even more

difficult to establish a stable policy. This means that suggestions to incorporate AI must be “capacity conscious”. Policy makers and institutional leaders should think about the opportunities for a “scalable” solution, such as the introduction of common guidance repositories, the introduction of open access literature, inter-institutional collaboration, targeted support for smaller institutions and support for teaching-focused institutions. In this case, equity also refers to access to information and ethical use of tools, as well as educationally meaningful use of tools.

Last, there is a call in the literature for a change in institutions from a ‘static’ (rulemaking) review to a ‘continuous’ review. To prevent policies from becoming outdated or unpalatable, they need to be flexible and be able to grow and change in response to GenAI tools and their implementation in practice and public perception. Therefore, cycles of review, monitoring and revision of the governance mechanisms have to be evidence-based. Over time, evidence relative to the challenges encountered in the implementation of the policy, as well as the difference in the grades (where applicable), the experience of the students and teachers, and the efficacy of specific assessment and/or literacy intervention should be collected to support the policy. Thus, the responsible governance of AI in HE is not just regulatory, but an ongoing process of learning and adaptation, and institutional self-correction.

6. Conclusion

The systematic review has identified that the introduction of the use of GenAI (GPT-3) in HE will not be an easy one to execute, but can be taken as a multi-layered process comprising variations in pedagogy and andragogy, assessment, as well as governance. Based on a scanned literature, all of them have found opportunities and challenges associated with education with GenAI, and that is what is needed: a more comprehensive and educational approach. This implies the impact of GenAI in higher education can’t be viewed simply in terms of the technologies themselves but through the lens of the context in which GenAI is being introduced, managed and integrated in education. A key learning from the study is the importance of quality integration of the educationally worthy nature of GenAI. The use of GenAI in the context of teaching can be used to support the design of teaching, preparation of feedback and creation of more dialogic and interactive learning environments. This evolution is not a natural process and cannot be accomplished in every context. Much of what has been discussed about “learning” in the literature also carries over into the discussions made here, such as the question of whether the learning task is authentic or the stance of the learner and whether the AI is used for assistance or replacement. Through assessment, it is identified that the traditional “product” approach of assessment needs to be expanded to encompass a greater need for rethought assessment, which would take the form of process, reasoning, reflection and authentic evidence of understanding and can be utilised in the redesigned assessment with GenAI.

It is also proven in the study that the question of governance is not an accessory to the pedagogical use within the scope of institutional policies concerning academic integrity, privacy, ethics and communication, as well as responsible use, the use of GenAI for teaching, learning and assessment becomes possible and legitimate. The literature, however, suggests there are still a number of

universities that are merely responding partially to this issue; limited aspects (e.g. pedagogical or technical facilities) are addressed whilst other aspects (e.g. technical facilities or support) are neglected. This fragmentation can impact institutional clarity, learning and teaching effectiveness, particularly when students or staff have conflicting programme/course expectations. One of the other big lessons to be learned is that AI literacy needs to be taken as a key institutional initiative. In all the studies examined, students/teachers require guidance on and about the use of GenAI, and a critical examination of the results to understand the limitations and ethical issues of GenAI and to inform their decisions to use it. AI Literacy, in this sense, is not necessarily just the proficiency of skills, but the ability to make informed decisions, reflect, and navigate ethically a rapidly evolving world of AI-powered school environments. This isn't about misbehaviour/compliance; it's about how the things they need to learn may change or be different from what we are currently doing: it's about curriculum/development, and investing in the challenge is what we call GenAI.

Overall, this study not only indicates that GenAI will be among us and able to attend our colleges in the future. A much better way is to create models that are balanced, to maintain academic integrity, human agency and pedagogic and professional practices. This entails a cohesive policy, curriculum, assessment, staff development, and student support, enabling institutions to engage with GenAI, not just in a defensive manner, but in ways that are educationally meaningful, socially inclusive, and ethically responsible.

Lastly, this study demonstrates the need for further investigation of it, not only in terms of short-term perception research, but also in isolated cases. Longitudinal, comparative and transdisciplinary studies are needed to develop a deeper understanding of the impact of GenAI across time on learning outcomes, how and where institutional policies influence the use of GenAI, and how performance assessment and governance can look and work differently in varying contexts of HE. But the current evidence tends to indicate that generative AI represents a paradigm shift in the education profile; hence, a rethinking of knowledge sharing, knowledge learning, knowledge assessment and knowledge management in the current learning landscape is warranted in the higher education institutional context.

Declarations

Author Contribution

N.A.G. wrote the main text and reviewed the manuscript and edited the manuscript. B.I. edited and reviewed the manuscript.

References

1. Alba, C., Mcilwain, C., & An, R. (2026). ChatGPT on campus: how top U.S. universities govern generative AI across higher education. *Policy Reviews in Higher Education*. https://doi.org/10.1080/23322969.2026.2622674

2. Alduais, A., Qadhi, S., Chaaban, Y., & Khraisheh, M. (2025). Utilising Generative AI Responsibly and Ethically for Research Purposes in Higher Education: A Policy Analysis. *Serials Review*, *51*(3–4), 120–170. https://doi.org/10.1080/00987913.2025.2581429
3. Barus, O. P., Hidayanto, A. N., Eitiveni, I., Phusavat, K., & Sudibjo, N. (2025). Identifying key components and stakeholders for generative AI governance in higher education: a systematic literature review. *Interactive Learning Environments*. Routledge. https://doi.org/10.1080/10494820.2025.2596058
4. Bilgiç, B., & Sever, D. (2026). Understanding ethical dimensions of AI in higher education: insights from faculty members and students. *International Journal of Educational Technology in Higher Education*, *23*(1), 35. https://doi.org/10.1186/s41239-026-00601-0
5. Carrión Candel, E., Lomba Pérez, A., Berd-Gómez, R., & González-Martín, A. M. (2026). Generative artificial intelligence in teacher education: perceptions, attitudes, and transformative digital resources. *Cogent Education*, *13*(1). https://doi.org/10.1080/2331186X.2026.2641323
6. Ceallaigh, T. J. Ó., O' Brien, E., Tømte, C., Kulaksız, T., & Connolly, C. (2025). Rethinking teacher education in an AI world: perceptions, readiness and institutional support for generative AI integration. *European Journal of Teacher Education*, *48*(5), 914–933. https://doi.org/10.1080/02619768.2025.2563696
7. Chiu, T. K. F. (2024). The impact of Generative AI (GenAI) on practices, policies and research direction in education: a case of ChatGPT and Midjourney. *Interactive Learning Environments*, *32*(10), 6187–6203. https://doi.org/10.1080/10494820.2023.2253861
8. Colbran, S., Jha, M., & Schiavone, C. (2026). Understanding student perspectives on generative AI chatbots: a human-centred mixed-methods study in higher education. *International Journal of Educational Technology in Higher Education*, *23*(1). https://doi.org/10.1186/s41239-026-00605-w
9. Cox, A. (2024). Algorithmic Literacy, AI Literacy and Responsible Generative AI Literacy. *Journal of Web Librarianship*, *18*(3), 93–110. https://doi.org/10.1080/19322909.2024.2395341
10. Crompton, H., Burke, D., Bozkurt, A., Nickel, C., Miao, F., Pegrum, M., Curry, J., Parsons, D., Edmett, A., Lindsey, L. A., Garcia, M. B., Chigona, A., Bonk, C. J., Bellas, F., Benali, M., Yongpradit, P., Palalas, A., de Bem Machado, A., Tinmaz, H., & Yu, S. (2026). A framework for generative AI policy and guidelines in K-12 education. *Journal of Research on Technology in Education*. https://doi.org/10.1080/15391523.2026.2661641
11. Crompton, H., Burke, D., Nickel, C., Bozkurt, A., Miao, F., Sharples, M., Greene, J. A., Parsons, D., Gill-Simmen, L., Edmett, A., Pegrum, M., de Waard, I., Bonk, C. J., Garcia, M. B., Curry, J. H., Lindsey, L. A., Yang, M., Marshall, S., Bali, M., & Yu, S. (2026). Governing generative AI in higher education: a global Delphi study on policy and practice. *International Journal of Educational Technology in Higher Education*, *23*(1). https://doi.org/10.1186/s41239-026-00602-z
12. Dai, W., & Chan, C. K. Y. (2026). Shaping responsible GenAI use in research through AI literacy-oriented guidelines: insights from post-graduate students. *International Journal of Educational Technology in Higher Education*, *23*(1). https://doi.org/10.1186/s41239-026-00609-6

13. Debets, T., Banihashem, S. K., Maillette de Buy Wenniger, G., Joosten-ten Brinke, D., Vos, T. E. J., & Camp, G. (2026). Responsible generative AI in higher education: Expert validation of a compact RAG for technical and pedagogical robustness. *Innovations in Education and Teaching International*. https://doi.org/10.1080/14703297.2026.2686372
14. Ellis, R., Han, F., & Cook, H. (2025). Qualitatively different teacher experiences of teaching with generative artificial intelligence. *International Journal of Educational Technology in Higher Education*, *22*(1). https://doi.org/10.1186/s41239-025-00532-2
15. Fernández-Ferrer, M., Lanzo, N. C., Maina, M. F., & Guàrdia, L. (2025). How does peer assessment support students' self-regulation? A case study in online education. *International Journal of Educational Technology in Higher Education*, *22*(1). https://doi.org/10.1186/s41239-025-00565-7
16. Fleischmann, K. (2025). The commodification of creativity: Integrating Generative Artificial Intelligence in higher education design curriculum. *Innovations in Education and Teaching International*, *62*(6), 1843–1857. https://doi.org/10.1080/14703297.2024.2427039
17. Gamlem, S. M., McGrane, J., Brandmo, C., Moltudal, S., Sun, S. Z., & Hopfenbeck, T. N. (2026). Exploring pre-service teachers' attitudes and experiences with generative AI: a mixed methods study in Norwegian teacher education. *Educational Psychology*, *46*(1), 27–51. https://doi.org/10.1080/01443410.2025.2528663
18. Gao, M., Zhang, H., Dong, Y., & Li, J. (2026). Embracing generative AI in education: an experiential study on pre-service teachers' acceptance and attitudes. *Educational Studies*, *52*(3), 344–363. https://doi.org/10.1080/03055698.2025.2483831
19. Giannakos, M., Azevedo, R., Brusilovsky, P., Cukurova, M., Dimitriadis, Y., Hernandez-Leo, D., Järvelä, S., Mavrikis, M., & Rienties, B. (2025). The promise and challenges of generative AI in education. *Behaviour and Information Technology*, *44*(11), 2518–2544. https://doi.org/10.1080/0144929X.2024.2394886
20. Hamamra, B., Khlaif, N., Z., & Mahamid, N. (2026). AI literacy and mediated learner autonomy in ChatGPT-supported EFL writing: a qualitative study at a Palestinian university. *International Journal of Educational Technology in Higher Education*, *23*(1). https://doi.org/10.1186/s41239-026-00597-7
21. Jauhiainen, J. S., & Garagorry Guerra, A. (2025). Generative AI in education: ChatGPT-4 in evaluating students' written responses. *Innovations in Education and Teaching International*, *62*(4), 1377–1394. https://doi.org/10.1080/14703297.2024.2422337
22. Johnson, A. K. (2026). Generative AI as an Equity Tool: Reframing Writing and Pedagogy in Higher Education. In *College Teaching*. Taylor and Francis Ltd. https://doi.org/10.1080/87567555.2026.2634124
23. Lee, J., Cimová, T., Foster, E. J., France, D., Krajňáková, L., Moorman, L., Rewhorn, S., & Zhang, J. (2025). Transforming geography education: the role of generative AI in curriculum, pedagogy, assessment, and fieldwork. *International Research in Geographical and Environmental Education*, *34*(3), 237–253. https://doi.org/10.1080/10382046.2025.2459780

24. Lee, S., & Kang, S. (2025). The influence of generative AI with prompt engineering on creative design in architectural education. *Journal of Asian Architecture and Building Engineering*, 1–16. https://doi.org/10.1080/13467581.2025.2552446
25. Liang, E. S., & Bai, S. (2025). Generative AI and the future of connectivist learning in higher education. *Journal of Asian Public Policy*, *18*(2), 329–351. https://doi.org/10.1080/17516234.2024.2386085
26. Lindell, T. L., & Utterberg Modén, M. (2025). Conflicting motives: challenges of generative AI in education. *Learning Media and Technology*, *50*(3), 324–337. https://doi.org/10.1080/17439884.2024.2438933
27. Lopez-Llantuy, N., Jiang, L., & Sanders, E. (2026). Virtual avatars and generative AI: fostering inclusive innovation in hospitality education. *Journal of Teaching in Travel and Tourism*. https://doi.org/10.1080/15313220.2026.2681045
28. Magzoub, M. E., Zafar, I., Munshi, F., & Shersad, F. (2025). Ten tips to harnessing generative AI for high-quality MCQS in medical education assessment. *Medical Education Online*, *30*(1). https://doi.org/10.1080/10872981.2025.2532682
29. Misawa, T., Koizumi, A., Tamura, R., & Yoshimi, K. (2025). Exploring utilisation of generative AI for research and education in data-driven materials science. *Science and Technology of Advanced Materials: Methods*, *5*(1). https://doi.org/10.1080/27660400.2025.2535956
30. Mulyani, H., Istiaq, M. A., Shauki, E. R., Kurniati, F., & Arlinda, H. (2025). Transforming education: exploring the influence of generative AI on teaching performance. In *Cogent Education* (Vol. 12, Number 1). Taylor and Francis Ltd. https://doi.org/10.1080/2331186X.2024.2448066
31. Oben, A. I., Hui, X., Bahtilla, M., & Quanguo, L. (2025). Teaching with Generative Artificial Intelligence (GenAI): Should educators trust AI to guide student learning? *Innovations in Education and Teaching International*. Routledge. https://doi.org/10.1080/14703297.2025.2587333
32. Papyshev, G. (2025). Situated usage of generative AI in policy education: implications for teaching, learning, and research. *Journal of Asian Public Policy*, *18*(2), 311–328. https://doi.org/10.1080/17516234.2024.2370716
33. Schrepel, T. (2026). Generative AI in legal education: a two-year experiment with ChatGPT. *Law Innovation and Technology*, *18*(1), 1–42. https://doi.org/10.1080/17579961.2026.2633673
34. Sharples, M. (2023). Towards social generative AI for education: theory, practices and ethics. *Learning: Research and Practice*, *9*(2), 159–167. https://doi.org/10.1080/23735082.2023.2261131
35. Supianto, & Widyaningrum, R. (2026). Teaching in the Age of Generative AI: Are We Assessing Learning or Tool Proficiency? In *College Teaching*. Taylor and Francis Ltd. https://doi.org/10.1080/87567555.2026.2687856
36. Tarhini, A., Al-Sharafi, M. A., & Al Lawati, H. (2026). Role of AI characteristics, AI literacy, and institutional policy in shaping generative AI use and learning outcomes among higher education students. *Interactive Learning Environments*. https://doi.org/10.1080/10494820.2026.2628249

37. Thompson, N. (2026). Generative AI-supported reflective practice in early childhood education and care: a critical review of ethical, policy, and professional implications. *European Early Childhood Education Research Journal*. https://doi.org/10.1080/1350293X.2026.2676841
38. Tisza, G., Markopoulos, P., Serholt, S., Nasir, J., Mubin, O., Tapus, A., Anzalone, S., Hindriks, K. V., Vogt, P. A., Charisi, V., Krahmer, E., Neerincx, M. A., Väänänen, K., Conti, D., de Wit, J., & Barakova, E. I. (2025). Generative AI-powered social robots in education: opportunities and challenges from a Delphi study. *Behaviour and Information Technology*. https://doi.org/10.1080/0144929X.2025.2604060
39. Usher, M. (2025). Generative AI vs. instructor vs. peer assessments: a comparison of grading and feedback in higher education. *Assessment and Evaluation in Higher Education*, *50*(6), 912–927. https://doi.org/10.1080/02602938.2025.2487495
40. Verboom, A. D. P. R., Pais, L., Zijlstra, F. R. H., Oswald, F. L., & Santos, N. R. (2025). dos. Perceptions of artificial intelligence in academic teaching and research: a qualitative study from AI experts and professors' perspectives. *International Journal of Educational Technology in Higher Education*, *22*(1). https://doi.org/10.1186/s41239-025-00546-w
41. Virmani, N., Sharma, D., Sahu, A., & Garza-Reyes, J. A. (2026). From chalkboards to chatbots: generative AI impact on education in emerging economies. *Interactive Learning Environments*. https://doi.org/10.1080/10494820.2026.2632172
42. Wang, S., Wang, F., Zhu, Z., Wang, J., Tran, T., & Du, Z. (2024). Artificial intelligence in education: A systematic literature review. *Expert Systems with Applications* (Vol. 252). Elsevier Ltd. https://doi.org/10.1016/j.eswa.2024.124167
43. Wessel, M., Adam, M., Benlian, A., Majchrzak, A., & Thies, F. (2025). Generative AI and its Transformative Value for Digital Platforms. *Journal of Management Information Systems*, *42*(2), 346–369. https://doi.org/10.1080/07421222.2025.2487315
44. Yang, Y., Luo, J., Yang, M., Yang, R., & Chen, J. (2024). From surface to deep learning approaches with Generative AI in higher education: an analytical framework of student agency. *Studies in Higher Education*, *49*(5), 817–830. https://doi.org/10.1080/03075079.2024.2327003
45. Zahid, H., Danish, M., Ali, S., Huo, C., & Khalid, N. (2026). Generative AI chatbots in higher education: addiction, cognitive offloading, and the role of AI literacy. *Interactive Learning Environments*. https://doi.org/10.1080/10494820.2026.2677727
46. Zhang, J., Wang, C. Z., & Liu, M. (2026). Generative AI use profiles and academic outcomes in higher education: the role of institutional support. *Interactive Learning Environments*. https://doi.org/10.1080/10494820.2026.2668610
47. Zhang, K., Li, S., & Huang, Y. (2026). Generative AI-driven feedback in higher education: a scoping review. *Assessment and Evaluation in Higher Education*. https://doi.org/10.1080/02602938.2026.2617157

Figures

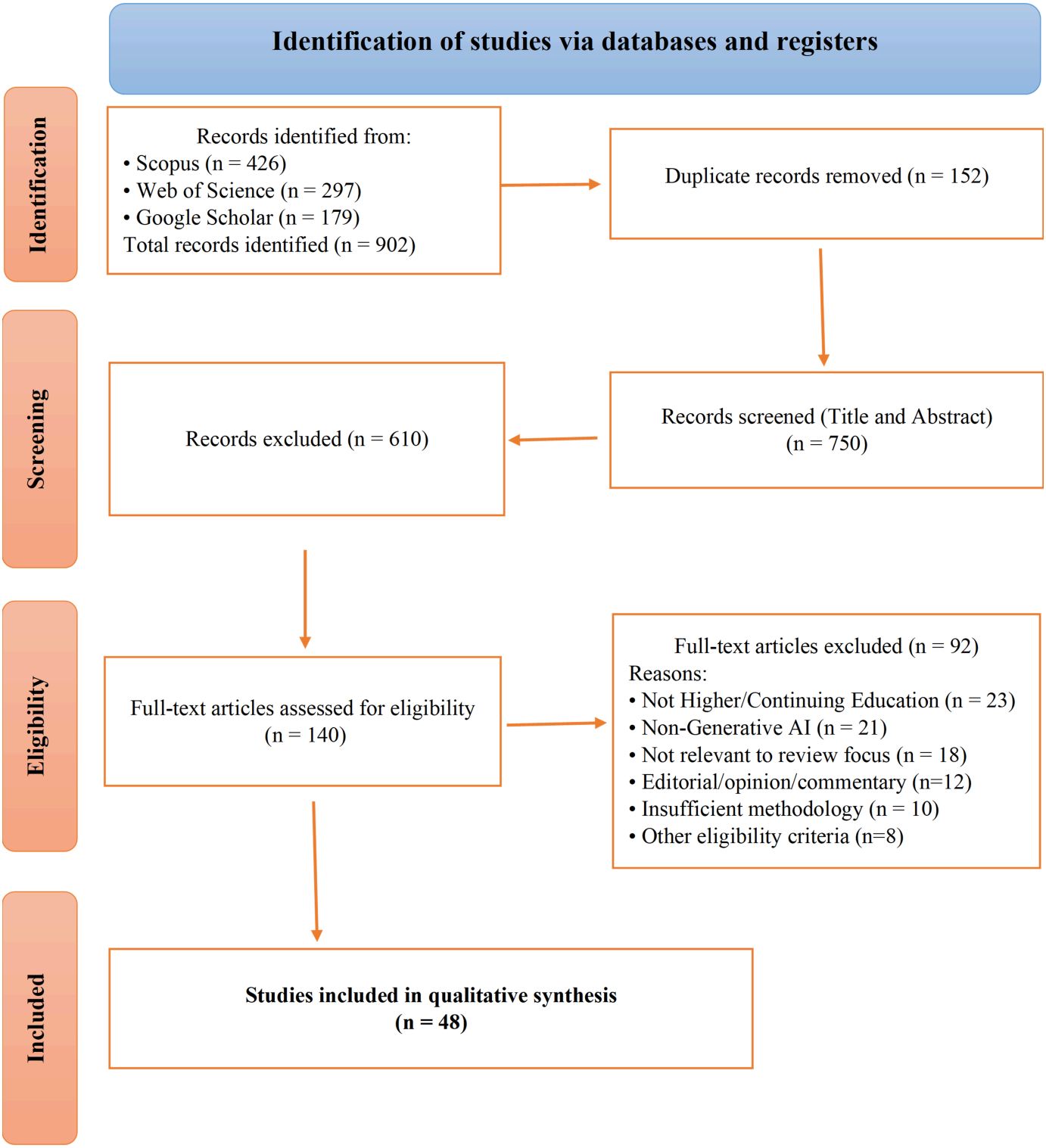


Figure 1

Legend not included with this version.