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Report on policies relating to the use of LLM tools within higher education

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Executive Summary

This report aims to provide a structural overview of the current landscape of the definition and application of specific policies on the use of Generative Artificial Intelligence (hereinafter, GenAI) in Higher Education (hereinafter, HE), with an emphasis on governance. Various institutions establish policies governing the use/development/implementation of Artificial Intelligence (hereinafter, AI) at different levels, including local (such as universities), national, and international institutions (such as the European Union and UNESCO). To develop the report, traditional data sources (academic databases) and reference websites of institutions that develop global, national, and regional recommendations for AI governance policies, specifically in the field of HE, were used. The objective of this report is to map institutional policies and strategies related to the use of LLM in HE, identify key components, and develop guidelines for best practice and implementation.

This way, key findings in the reports focus on key components of policies and best practices from actual deployed policies. Main findings are grouped and listed below:

A) Key components for AI applied policies in HE institutions:

- Legal and Ethical Requirements.
- Acceptable Use and Detailed Guidelines.
- Ethical Impact Declarations.
- Training and AI Literacy Initiatives.
- Critical Thinking Strategies.
- Accountability and Enforcement Mechanisms.

B) Best Practices in the deployment of AI Policies in HE institutions:

- Legal and Ethical Practical Implementations.
- Definitions of Acceptable Use and Clear Detailed Guidelines.
- Assessment Redesign Proposals and Academic Integrity Rules.
- Training and AI Literacy plans and certification.
- Enforcement, Accountability, and Ethical Governance Practices.

Methodology

Given that the report is based on two different types of information sources (non-formal and formal sources). The first type of sources corresponds to documents and policy guides (non-formal) implemented by prestigious organizations in the field of higher education, and regional/national publications by different actors (ministries, universities, and similar institutions). The second type of sources is associated with academic literature (formal) in the usual databases of scientific publications. Each part has been developed using an independent methodology, but with similar research questions for both cases. Specifically, in the case of non-formal sources, the use of AI tools has been considered for analyzing the different documents from various organizations and institutions, as well as the specific policies examined in different countries (both EU and non-EU). In the case of formal sources, a classic approach based on a systematic review of the literature has been employed, with a specific focus on AI governance policies. The methodology used is identified in each

section.

Conclusions and Recommendations

The principal policies and strategies guiding the use of GenAI in HE center on establishing adaptive, ethical, and comprehensive institutional frameworks to balance technological opportunities (like enhanced efficiency and personalized learning) with significant risks, notably academic integrity and bias. Key policy components include defining clear standards for acceptable use in academic work, mandating transparency and disclosure of any AI assistance used by students and researchers and clearly prohibiting practices that involve outsourcing entire assignments. To protect educational integrity, institutions are urged to redesign assessments to be AI-resilient, shifting focus toward evaluating the learning process, originality, and spontaneity, using methods such as real-time assessments (e.g., in-class exams or oral defenses) and requiring detailed documentation of a student's thought process and revision history. For effective implementation and practice, it is crucial to invest in enhancing AI literacy and professional training for both faculty and students, ensuring they understand the functionality, limitations, and ethical implications of GenAI tools. Further practical advice emphasizes adopting a whole-of-government and multi-stakeholder approach to policy design, fostering collaboration across all university units (IT, teaching centers, students, etc.) to ensure coherence and address issues like the lack of equitable access to premium GenAI tools. Finally, institutions must apply multi-layered enforcement mechanisms, combining technological screening with human review, while actively promoting a culture of academic integrity and critical thinking to mitigate the risks of inaccuracies, algorithmic bias, and hallucinations generated by the systems.

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Education, AI, and Governance

AI, and more specifically GenAI, emerges as a tool with profound transformative potential in the educational domain. While its utility is widely acknowledged, there is a pressing imperative to ensure its ethical and responsible use. The scope of this impact extends from the very foundations of education to the opportunities and challenges it presents, as well as to the governance structures required for its effective integration.

AI has been integrated into educational contexts since the 1970s, with initial efforts focused on individualized tutoring through rule-based systems. Over time, its applications have diversified into several domains, including student-centered AI (supporting learning and assessment), teacher-centered AI (supporting instructional practices), and system-centered AI (supporting institutional management). Educational systems traditionally pursue three overarching objectives: qualification, socialization, and subjectivation. AI holds considerable potential to serve as a transformative tool for education by enhancing both the quality of teaching and learning, as well as the preparation of future generations. Nonetheless, such transformation must remain grounded in the historical aims of education and attuned to its broader social implications.

GenAI constitutes a branch of AI dedicated to the generation of novel content—such as text, images, audio, or code—in contrast to traditional AI, which primarily focuses on decision-making processes based on specific inputs. Breakthroughs in deep neural networks have propelled their advancement, using generative adversarial networks (GANs), the increased computational capacity afforded by GPUs and TPUs, and the growing availability of data. Models such as GPT-3 and GPT-4 have significantly expanded the ability to generate coherent and contextually relevant text across a wide range of applications.

On the other hand, the definition of Digital Education Content was created in the context of a study commissioned by the European Commission (entitled 'Digital education content in the EU – state of play and policy options') to assist in the preparation of a European Digital Education Content Framework (DEC), envisaged within the Digital Education Action Plan 2021-2027. Digital Educational Content (DEC) is defined as data that is produced, structured, distributed, and presented with an explicit educational purpose, accessible in multiple formats and styles through digital tools. This category encompasses resources ranging from simple e-books and videos to more sophisticated software, programs, and platforms that enable interactive and immersive learning activities, including educational games and simulations. What distinguishes DEC from other forms of digital content is its intentional pedagogical design—aimed at supporting study, learning, instruction, and assessment.

The relationship between Digital Education Content (DEC) and GenAI is intrinsic and multifaceted, positioning GenAI as a key driving force in the evolution, creation, and governance of the DEC ecosystem. AI-generated content explicitly fits the definition of DEC (Digital Education Content). GenAI can design entirely new types of DEC.

The rapid evolution of GenAI has underscored the pressing need to address both the challenges and opportunities it presents for Digital Educational Content (DEC). One critical challenge is the increasing regulatory complexity, as issues of copyright, intellectual property (IP), and licensing—already intricate in the context of DEC—are further compounded when dealing with AI-generated materials. The rights and responsibilities associated with IP in relation to content suggested or produced by AI remain largely untested and unsettled. Equally significant is the necessity of ethical governance and transparency: the development of clear ethical frameworks is essential to ensure the responsible integration of GenAI in teaching and learning. Such frameworks, according to Valentini et al. (2025), must incorporate principles of transparency, fairness, data privacy, and respect for copyright. Furthermore, concerns regarding bias and quality require continuous human oversight, as GAI systems are prone to generating inaccurate ("hallucinated") or biased outputs that reflect the limitations and prejudices embedded in their training data. These risks highlight the importance of fostering critical thinking among learners when engaging with AI-generated DEC.

Thus, AI literacy has become a fundamental competence for all citizens. It entails developing an understanding of how AI systems operate, recognizing their limitations, and employing them critically and responsibly, while also dismantling myths and misconceptions. Moreover, individuals must be empowered to safeguard their privacy and maintain control over their personal data in increasingly AI-mediated environments.

Finally, according to *Final report of the Commission expert group on artificial intelligence and data in education and training (2022) o*f the European Commission*,* four interdependent ethical principles, are central to the responsible use of AI and data in education: human agency, social justice, human dignity, and justified choice. These principles provide essential guidance for educators when making decisions about the adoption and use of AI systems, thereby helping to ensure that such systems remain trustworthy and aligned with educational values.

Structuring and defining the implementation of policy analysis

The previous section introduced the importance of GenAI and LLMs in the governance of HE institutions. Given this importance, this report focuses on analyzing current policies to extract key components and associated best practices defined within them. Since the formulas for publishing these policies are diverse, it is essential to select publications or reports that are publicly accessible and endorsed by prestigious institutions in the field of education, particularly in HE. In this case, it is necessary to analyze documentation provided by entities such as UNESCO, the OECD, the UN, or the EU, as well as entities working in this field, including international/European observatories, such as the AI4EDU Observatory, EDUCASE's Policy Hub, and similar organizations. In general, these institutions provide working guidelines and policy recommendations, but they are not responsible for the practical implementation of these policies in universities or HE institutions. In this case, it is also necessary to analyze different specific practices in various countries and/or universities, so that the existence of policies and/or guidelines defining the use of GenAI and/or LLMs in the domain of HE can be analyzed at the national level.

Additionally, the general scientific literature contains relevant publications with information on the application and guidance of this policy at both national and university levels. While there are not many journals or conferences focused on AI governance in universities (so a large number of publications is not to be expected), it can be assumed that the most relevant success stories are published. Thus, to complement the analysis of public documents from relevant entities/countries/universities, a systematic review of the literature should be conducted, focusing on university governance and policies, the application of good practices, and the evaluation of the results of their application.

Given the diversity of sources, we have opted to carry out two different analyses, one based on what we have termed non-formal sources (documentation from relevant entities in the different domains indicated above) and the second based on formal sources, i.e., scientific publications available in scientific databases. For each analysis, the research questions, methodology, and discussion of the results, as well as the main findings in relation to the objectives of this report, have been identified. The aim is to identify the key components of GenAI/LLM use policies and the best practices implemented. In the case of the research questions, they share a common focus but differ in the way the analysis is carried out. The methodology in each case is different due to the nature of the sources and how they are searched and analyzed. The following two sections present the two analyses independently and outline the methodology used for each.

Non-formal Sources, AI in Education: Governance and Policies

The following part of the study focuses on identifying guidelines, policies, and best practices for the use of AI, particularly GenAI, in the context of HE. To this end, we have compiled documents published by prestigious international organizations, as well as standards and guidelines issued by the European Union in this area. This review addresses the following three research questions (hereinafter, RQ):

RQ1: What strategies and legal frameworks have already been developed to regulate the ethical

use of GenAI within the European Community?

RQ2: At which levels (institutional, national) are these policies structured and implemented?

RQ3: What are the best practices for the implementation of these policies?

Methodology

The primary objective of this document is to summarize the range of policies concerning the use of AI-powered text generation tools in education, both at the international level and within the European context.

To gather relevant information, we relied on the following sources:

A. International organizations and educational agencies.

B. Reports from specialized observatories and consortia on trends and sectoral data.

From these sources, we retrieved previously identified documents. In the case of observatories and consortia, some of their reports were available either openly or upon registration on their websites. However, many others were not publicly accessible for this study. It is also essential to highlight the inclusion of the podcast "AI and Sustainability", developed by the United Nations. Episodes were downloaded in MP3 format and analyzed alongside the other documentary sources.

For the processing and analysis of these materials, we employed Google's NotebookLM, a tool that enables querying across collections of documents, audio, and video, while also generating summaries. Additionally, the platform provides the option to incorporate supplementary sources of information related to the uploaded material. The search prompt applied was the following:

"We need to review publications (formal and informal) on the policies and implementation of generative AI in higher education institutions and at the country or regional level."

The use of NotebookLM facilitated the creation of conceptual maps that outlined the key ideas contained in the source documents, allowing us to target specific fragments for closer examination. All outputs, however, were systematically reviewed and validated by the experts contributing to this report.

Strategies and Legal Frameworks

The sources provide an overview of strategies and legal frameworks being developed at various levels, ranging from supranational to institutional.

International/Supranational Legal Frameworks

UNESCO

UNESCO plays a pivotal role in shaping global norms, providing guidance, and fostering capacity-building for the ethical, equitable, and human-centered adoption of AI in education, including HE. It develops international frameworks (such as the Beijing Consensus on Artificial Intelligence and Education[1]) that set out high-level principles and policy directions for member states.

According to UNESCO's *Beijing Consensus on Artificial Intelligence and Education*, the ethical use of AI in education must be guided by a humanistic approach that safeguards human rights, equity, transparency, and accountability. Its core ethical principles include:

- Human-Centered Approach and Human Oversight. AI must remain subordinate to human development, reinforcing UNESCO's humanistic vision. Its deployment should protect human rights, enhance human capacities, and ensure that control over AI systems remains in human hands.

[1] https://unesdoc.unesco.org/ark:/48223/pf0000368303

- Ethical Design, Transparency, and Accountability. AI systems must be designed to be ethical, fair, non-discriminatory, transparent, and auditable. Their impact on individuals and society should be continuously monitored, applying ethics-, privacy-, and security-by-design principles throughout the development process.
- Equity, Inclusion, and Non-Discrimination. AI must expand access to quality education without reinforcing existing inequalities or introducing new biases. It must bridge, rather than widen, the digital divide, ensuring inclusivity across gender, disability, socioeconomic status, ethnicity, culture, and geography.
- Ethical Data Governance and Privacy. The protection of learners' and teachers' data must be a priority. Policies should balance open data access with strict privacy safeguards, while recognizing that AI applications may reflect biases from data sets or algorithmic design.
- Gender Equality. AI in education must actively promote gender equality by eliminating gender biases in applications, integrating gender considerations into data practices, and contributing to the reduction of gender disparities in education.

WithinHE specifically, UNESCO (through its IESALC branch) conducts research and comparative analyses on how AI is integrated in universities, highlighting gaps and advocating for institutional readiness, including competency frameworks tailored to HE[2]. It also monitors the uptake of AI policies across universities; for example, a recent UNESCO survey found that nearly two-thirds of HE institutions linked to UNESCO Chairs or UNITWIN networks are either developing or already have guidelines on AI use. According to this survey, this trend is seen across both public and private institutions, although it varies: around 70% of institutions in Europe and North America have or are developing guidance, compared with 45% in Latin America and the Caribbean.

Additionally, UNESCO promotes ethical governance of AI through instruments like the **Recommendation on the Ethics of Artificial Intelligence**, which provides a normative framework for translating ethical principles into actionable policy, including in the domain of education and research. Whereas the 2021 **publication AI and education: Guidance for policy-makers**[3] offers pointed policy advice.

According to this last document, AI policies in education must adopt a human-centered approach that protects human rights and equips individuals with the values and competencies necessary for effective human–machine collaboration in life, learning, and work. The primary goal of AI in education is to enhance learning and enable every student to reach their full potential. Policies should pursue four strategic objectives:

1. Ensuring inclusive and equitable use of AI in education,
2. Leveraging AI to improve teaching and learning,
3. Fostering competencies for life in the AI era, including understanding how AI works and its implications for humanity
4. Safeguarding the transparent and auditable use of educational data.

To achieve these objectives, policy planning must involve interdisciplinary collaboration, intersectoral governance, regulatory frameworks for equity and ethics, master plans for AI in management and pedagogy, and continuous piloting, monitoring, and evidence-building.

According to this guide, effective implementation requires robust governance, ethical safeguards, academic integrity, and capacity building. A systemic and collaborative governance framework is essential, mobilizing

[2]https://www.iesalc.unesco.org/en/articles/challenges-ai-higher-education-and-imperative-competency-frameworks?utm_source=chatgpt.com
[3] https://unesdoc.unesco.org/ark:/48223/pf0000376709.locale=en

interdisciplinary expertise and adopting a whole-of-government approach that integrates AI with existing education and national AI strategies. Intersectoral governance structures—such as central steering boards and coordinating bodies—should be established, alongside initiatives to foster local innovation and open-source adaptation to reduce digital divides. Policies must ensure ethical, equitable, and inclusive use by setting measurable goals for diversity and inclusion, testing AI tools for bias, enforcing strong data protection laws, and ensuring transparency in ownership, privacy, and informed consent.

Teachers must remain central to the educational process, with policies designed to empower them rather than replace them. This requires protecting teaching practices, piloting AI tools that support rather than supplant educators, and re-examining teaching roles to emphasize human interaction, higher-order thinking, and values transmission. Continuous training and professional development must be provided to ensure that teachers acquire the skills needed to integrate AI tools effectively and adapt to new work modalities.

Finally, policies must reinforce student autonomy and holistic development. Students must retain authority over their own learning, be informed about the collection and use of their data and be protected from surveillance practices. Curricula should be regularly updated in collaboration with AI providers and educators to align with evolving methodologies and assessment frameworks. Special emphasis should be placed on developing future-proof skills—critical thinking, communication, collaboration, and creativity—necessary for human–AI collaboration and lifelong learning.

Most recently, UNESCO published the **AI competency framework for students**[4] (2024) and the **AI competency framework for teachers**[5] (2024) to help education systems keep pace with the rapid advances in AI. Currently, guidance on a competency framework for students and faculty in HE is under development.

AI Act of EU

It is the first comprehensive law on AI at the global level. Its objective is to ensure that AI systems are safe, transparent, traceable, non-discriminatory, and environmentally sustainable. Its mains components are the following:

- Risk Classification: The law classifies AI systems according to the level of risk they may pose. “High-risk” systems, including those used in education and vocational training, are subject to strict requirements and assessments both before commercialization and throughout their life cycle.
- Transparency for GenAI: (such as ChatGPT) is not considered high risk by default, but it must comply with transparency requirements. This includes disclosing when AI has generated content, designing models to prevent the production of illegal content, and publishing summaries of copyrighted data used for training. In addition, AI-generated or AI-altered content (e.g., “deepfakes”) must be clearly labeled.
- Fostering Innovation: The law also supports innovation by allowing companies to develop and test AI models in controlled environments (sandboxes), enabling small and medium-sized enterprises (SMEs) to compete more effectively.
- Human Oversight: AI systems must remain under human supervision to prevent harmful outcomes.

Under the EU AI Act, universities must treat AI systems used in education and vocational training as “high-risk”, ensuring compliance with strict requirements for safety, transparency, and continuous monitoring across their lifecycle. Institutions must guarantee human oversight of AI tools employed in teaching, assessment, and management to prevent harmful outcomes. When using generative AI, universities must enforce transparency obligations, including the disclosure of AI-generated content, the clear labeling of deepfakes, and the publication of summaries of copyrighted training data. At the same time, universities should take advantage of innovation-friendly provisions, such as controlled testing environments

[4] https://unesdoc.unesco.org/ark:/48223/pf0000391105
[5] https://unesdoc.unesco.org/ark:/48223/pf0000391104

(*sandboxes*), to experiment responsibly with AI while upholding ethical, legal, and academic integrity standards.

Another vital context focused on by the EU AI Act is healthcare. Initially, AI in healthcare was implemented by early expert systems (such as MYCIN in the 1970s), which were characterized by explicit, transparent rules grounded in human knowledge. These systems operated as highly structured decision trees, with the reasoning process inherently visible and auditable. A physician could trace the system's logic step-by-step, facilitating trust, validation, and accountability based on established medical principles. However, today's dominant AI models, particularly those that leverage deep learning in areas such as diagnostics, are often black-box systems. These systems achieve superior accuracy by learning highly complex, non-linear patterns from vast datasets, but their inner workings are opaque. The outputs are recommendations without a clear, human-understandable explanation of the factors or weights that drove the decision. This opacity poses a critical challenge in high-stakes fields such as medicine. Without explainability (XAI), it is impossible to detect hidden biases in the training data, ensure that the model reaches the correct diagnosis for the right clinical reason (and not for spurious correlations), or assign liability when an error occurs. Therefore, governance is crucial for establishing regulatory compliance, ethical standards, and patient safety, and it demands tools and frameworks (such as SHAP and LIME) to demystify black-box decisions and bridge the gap between AI performance and clinical trust.

The EU AI Act imposes significant restrictions on the research and development of AI systems, especially in the healthcare sector, because these systems are classified as “high-risk”. All AI systems classified as high risk in the EU must be assessed before being placed on the market and throughout their life cycle. The mandatory requirements for these high-risk systems, which suppliers must comply with, relate to risk management, training and testing data governance, robustness, accuracy, cybersecurity, human oversight, and transparency through the provision of technical documentation. When the AI Act comes into force and becomes applicable, institutions (as users) will be able to rely on the reliability of these high-risk systems, given that the supplier's certification guarantees that the risks have been mitigated.
From an educational and research perspective in the health context, the main restriction is the legal requirement for providers to comply with a series of mandatory obligations related to risk management, robustness, accuracy, cybersecurity, human oversight, and transparency. This forces higher education institutions to focus on the ethics and advanced reliability of AI; for example, in medical research, factual correctness is particularly crucial because inaccuracies can cause serious harm (such as an incorrect differential diagnosis). Furthermore, educators and future professionals must acquire advanced competencies in ethics and social responsibility, including an understanding of deeper ethical frameworks and awareness of policies and regulations such as the AI Act and the General Data Protection Regulation (GDPR). For educators, although the complexity of the legal field can be challenging, the AI Act has the advantage of helping to ensure that providers of high-risk systems consider ethical protection, allowing educational institutions to rely on the reliability of certified AI systems.

EU Ethical guidelines on the use of AI for Educators

Along with the Artificial Intelligence Act, the European Union has developed various guidelines aimed at regulating the use of AI in Education. Among these, the 2022 guide 'Ethical guidelines on the use of Artificial Intelligence and data in teaching and learning for Educators' stands out. This European Commission document is specifically aimed at educators. The central purpose is to guide teachers and school leaders on how to integrate AI and data use in a considered, safe, and ethical manner into their daily practices, harnessing the potential of these technologies while mitigating the risks. The guidelines are structured around four key ethical considerations:

- **Human agency** relates to an individual's capability to become a competent member of society. A person with agency can determine their life choices and is responsible for their actions. Agency is the underlying concept for widely used principles such as autonomy, self-determination, and responsibility.
- **Fairness** relates to everyone being treated fairly within the social organization. This principle requires clear processes so that all users have equal access to opportunity. Fairness includes ensuring equity, inclusion, non-discrimination, and a fair distribution of rights and responsibilities
- **Humanity** addresses the consideration for people, their identity, integrity, and dignity. It requires that institutions consider the well-being, safety, social cohesion, meaningful contact, and respect necessary for a meaningful human connection. This means approaching people with respect for their intrinsic value and not viewing them as a data object or a means-to-an-end. Humanity is considered to be at the essence of the human-centric approach to AI.
- **Justified choice**, choice relates to the use of knowledge, facts, and data to justify necessary or appropriate collective choices made by multiple stakeholders in the school environment. This principle requires transparency and is based on participatory and collaborative models of decision-making, as well as explainability.

And seven requirements for trustworthy AI, providing guiding questions for educators to critically evaluate AI systems. According to the guide, the seven key requirements for Trustworthy AI are:

1. **Human agency and oversight**: This includes fundamental rights, children's rights, human agency, and human oversight. For instance, institutions must have monitoring systems in place to prevent overreliance on the AI system.
2. **Transparency**: This encompasses traceability, explainability, and communication. Educators and school leaders should be aware of the AI methods and features utilized by the system and understand how algorithms work within it.
3. **Diversity, non-discrimination, and fairness**: This covers accessibility, universal design, the **avoidance of unfair bias**, and stakeholder participation. It ensures the AI system allows use regardless of age, gender, abilities, or characteristics, with a particular focus on students with special needs.
4. **Societal and environmental wellbeing**: This includes sustainability and environmental friendliness, social impact, society, and democracy. Policies must consider the AI system's effect on the social and emotional wellbeing of learners and teachers.
5. **Privacy and data governance**: This involves respect for privacy, quality and integrity of data, and access to data. Mechanisms must be in place to ensure sensitive data is kept anonymous and that access to learner data is protected and stored securely. The AI system must comply with the General Data Protection Regulation (GDPR).
6. **Technical robustness and safety**: This requires resilience to attack, security and general safety, **accuracy, reliability**, and reproducibility. There must be sufficient security to protect against data breaches.

7. **Accountability**: This involves auditability, minimisation and reporting of negative impact, trade-offs, and redress. Accountability defines who is responsible for the ongoing monitoring of results and the final decisions made regarding the procurement and implementation of the AI system.

In addition, the text includes practical examples of AI use in educational settings and highlights the need to develop emerging competencies in educators for the ethical management of these tools, in line with the EU Digital Education Action Plan.

National/Institutional Strategies and Policies

The response to AI varies between countries. Some adopt an independent approach (autonomous AI policies, such as China's plan or the UAE's strategy), others an integrated approach (AI in existing education or ICT policies, such as Argentina), and others a thematic approach (focusing on a specific aspect such as data privacy, such as the EU's GDPR). This diversity of approaches shows that 'one size does not fit all'.

European Countries

- **Spain**: Spain's approach to AI in education highlights both its usefulness and the need for strong ethical frameworks. A report from the Spanish Congress calls for ethical use and regulatory frameworks, while CRUE (Spanish Universities) stresses clear policies, shared principles, and safeguards around data privacy, equity, academic integrity, algorithmic bias, and environmental impact. We also found two examples of AI guide from universities. The University of Cádiz proposes an ethical, reflective guide emphasizing confidentiality, data protection, critical thinking, and fair access, alongside practical teaching guidelines. The University of Navarra has adopted a responsible AI policy based on academic excellence, human dignity, transparency, sustainability, and critical awareness, requiring compliance with EU regulations, data protection, copyright respect, and prior ethical review for research projects involving AI.

- **France***:* France's approach to AI in education is embedded in a systemic vision of digital transformation that emphasizes a human-centered strategy, strong governance, and teacher autonomy. Through national strategies such as *AI for Humanity* and the *Digital Education Strategy 2023–2027*, France promotes the pedagogical use of Digital Educational Content (DEC), supported by public–private partnerships, targeted funding mechanisms (e.g., Edu-Up, P2IA), and significant investment in the EdTech sector. Policy measures also empower teachers via digital content vouchers and training programs, while HE institutions retain high autonomy in integrating digital resources. Complemented by initiatives on data protection, innovation, and multi-stakeholder governance, France positions itself as a leading actor in aligning AI with educational equity, innovation, and institutional flexibility.

- **Italy**: Italy's National AI Strategy places strong emphasis on education, skills, and human capital development. The government seeks to improve AI education at all levels, from secondary school to HE, while also promoting lifelong learning and reskilling opportunities. Specific measures include training programs to strengthen teachers' digital skills, the integration of applied AI courses into Higher Technical Institutes (ITS), and new Bachelor's, Master's, and doctoral programs with AI-related credits. Universities are encouraged to align curricula with labor market needs through collaboration with companies and public services, while investment in doctoral studies and research centers support advanced training. Female participation in AI fields is actively promoted, alongside initiatives such as challenges for students (ages 16–23) to encourage engagement in AI courses. Lifelong learning initiatives include MOOCs (e.g., *Elements of AI*) and online training to upskill the workforce, supported by tax incentives and vouchers for SMEs and public administration staff. In HE, Italy promotes interdisciplinary AI research through national centers of excellence, partnerships with industry, and regulatory sandboxes to test innovative applications. The strategy also highlights the importance of an ethical and trustworthy regulatory framework, aiming to ensure transparency, accountability, and citizen trust while fostering innovation.

- **Portugal**: Portugal's national AI strategy (*AI Portugal 2030*[6]) places education and skills at the center of its vision, linking AI adoption to human development. The policy promotes AI and digital literacy across all levels of education—from early schooling to HE and postgraduate studies—through initiatives such as *Ciência Viva* clubs, MOOCs on AI in education, specialized summer schools, and over twenty new graduate and postgraduate programs in AI and data science. Universities are encouraged to launch executive programs, advanced courses, and lifelong learning initiatives, while polytechnic institutes and training networks support reskilling and upskilling to meet labor market demands. The strategy also integrates AI into adaptive learning curricula, aiming to personalize education, foster STEM specialization, and strengthen national competencies. Overall, Portugal's approach combines investment in education, research, and innovation with policies to ensure that AI in HE supports inclusion, workforce readiness, and sustainable development.

- **Austria**: Austria's strategy and policy on AI in education (2025) combine systemic planning, large-scale investment, and practical implementation. The national AI strategy—currently under political consultation—prioritizes ethics, legal safeguards, safety, infrastructure, data sharing, R&D, and closer links between education, research, and business. It is supported by an 85-measure roadmap with €4.07 billion in funding (0.84% of 2024 GDP), plus additional EU recovery and cohesion funds. Pilot projects have already introduced AI into around 100 schools, demonstrating classroom applications and highlighting the urgent need for teacher training, governance, and equitable access. To support skills development, Austria launched the *AI Literacy Landscape*, a free catalog of more than 350 courses for educators and administrators. Governance mechanisms include an AI Service Desk under RTR and multi-stakeholder advisory boards to ensure strategy translates into classroom practice. In sum, Austria's approach blends funding, infrastructure, and policy coordination with a strong focus on AI literacy, teacher empowerment, and responsible, inclusive deployment.

- **Belgium**: Belgium has drawn up a national convergence plan for the development of AI. This plan was approved by the Council of Ministers on 28 October 2022 and proposes nine concrete actions where "Better lifelong training" is one of them[7]. So, Belgium's AI strategy emphasizes education, skills, and lifelong learning as central pillars. It promotes the integration of AI-related content across all levels of education—primary, secondary, and HE—while providing reskilling and upskilling opportunities for teachers, workers, and citizens through MOOCs and specialized programs[8].
  In Flanders, initiatives such as *Smart Education@Schools*, *EDUbox on AI*, and *i-learn* encourage personalized digital learning, STEM engagement, and the inclusion of AI in bachelor's and master's programs. The *DigiJump Action Plan* further supports schools in delivering high-quality digital education, with attention to data literacy and AI.
  In Wallonia, the *DigitalWallonia4.ai* program and the TRAIL consortium link universities and research centers to accelerate AI adoption, while Brussels supports AI education through Innoviris funding, public programs, and open teaching modules.
  In sum, Belgium's policy combines federal and regional measures to strengthen AI literacy, embed AI in curricula, expand lifelong learning, and align education with the broader AI-driven digital economy.

- **Germany**: Germany's **National AI Strategy (KI-Strategie[9])** places education, research, and skills development at the core of its priorities. The country aims to strengthen the education system at all levels to prepare society for digital transformation and the adoption of AI. The policy promotes:
  - Integration of AI into education and training through digital and AI literacy programs in schools, universities, and vocational education.
  - Teacher training and skills development in AI, including continuous professional

[6] https://ai-watch.ec.europa.eu/countries/portugal/portugal-ai-strategy-report_en
[7] https://bosa.belgium.be/en/themes/digital-administration/digital-strategy-and-policy/national-convergence-plan-development
[8] https://bosa.belgium.be/fr/AI4Belgium
[9] https://www.ki-strategie-deutschland.de/

development programs and the incorporation of AI content into curricula.
    - Support for university research via AI centers of excellence, funding for interdisciplinary projects, and networks connecting academia, industry, and civil society.
    - Emphasis on ethics and inclusion, ensuring that AI education respects democratic values, fundamental rights, and broad social participation.
    - Inter-ministerial governance: the Federal Ministries of Education and Research (BMBF) and Economic Affairs coordinate actions with the Länder, combining federal funding with local initiatives.

  In sum, Germany views AI in education as a driver of innovation, workforce development, and social cohesion, ensuring that universities, schools, and training centers are equipped with resources, regulatory frameworks, and support programs to integrate AI in an ethical, inclusive, and future-oriented manner.

- **Finland**: Finland is widely recognized as a global model for integrating AI into education. Its strategy emphasizes AI literacy for all citizens, aiming to democratize access to AI knowledge across society. The flagship initiative *Elements of AI*, developed by the University of Helsinki and Reaktor, provides free, accessible online courses in multiple languages, targeting not only students but also professionals and the public. At the school level, Finland integrates AI and digital competencies into the national curriculum, ensuring that learners acquire skills in critical thinking, problem-solving, and ethical use of technology from an early age.
  HE institutions are encouraged to develop specialized programs and research on AI, while also embedding AI literacy across disciplines beyond computer science. Teacher training plays a key role, equipping educators with the skills needed to apply AI tools in pedagogy and to critically assess AI's role in learning.
  Importantly, Finland's policy follows a human-centered and ethical approach, aligned with the country's broader AI strategy, which stresses trust, transparency, and inclusivity. The goal is to foster an AI-ready society where citizens can actively participate in digital transformation, while ensuring that education remains equitable, learner-centered, and aligned with democratic values.

- **Denmark**: Denmark's new strategic initiative on Artificial Intelligence[10] establishes three guiding principles—responsible, citizen-centered use; global competitiveness of Danish enterprises; and leadership in AI adoption within the public sector—supported by four key measures. These include: (1) a Digital AI Taskforce to scale AI solutions across the public sector, including education; (2) the creation of a Center for AI in Society to provide guidance on responsible AI use for public institutions, businesses, and universities; (3) the development of secure and transparent Danish language models to ensure high-quality, context-specific applications; and (4) the open-source release of Danish text data to foster innovation and inclusivity. Education and research are integral to this strategy, with universities and schools expected to benefit from enhanced access to resources, strengthened digital infrastructure, and clear frameworks for ethical AI adoption. The overarching goal is to embed AI as a tool for innovation, efficiency, and social welfare, while safeguarding transparency, accountability, and equitable access.

- **Hungary**: Hungary's national AI strategy[11] places strong emphasis on education, skills, and workforce development to ensure the country can fully leverage digital transformation. The policy promotes the integration of AI into curricula at all levels, from primary education to universities, with a focus on fostering STEM skills, data literacy, and AI literacy across society. Teacher training and continuous professional development are prioritized to equip educators with the skills needed to incorporate AI tools into pedagogy and to prepare students for an AI-driven economy.
  At the HE level, Hungary supports the creation of specialized AI degree programs, research hubs,

[10] https://www.digmin.dk/digitalisering/nyheder/nyhedsarkiv/2024/dec/ny-strategisk-indsats-skal-bane-vej-for-kunstig-intelligens-i-danmark
[11] https://ai-hungary.com/api/v1/companies/15/files/146074/view

and interdisciplinary collaborations that link universities, research institutes, and industry. Vocational training and reskilling initiatives are also central, ensuring that workers in traditional sectors gain access to AI-related competencies.
The strategy highlights the need for ethical and human-centered AI adoption, aligning educational policies with European standards on data protection, inclusion, and non-discrimination. Hungary also invests in digital infrastructure and innovation ecosystems, including AI laboratories and public–private partnerships, to accelerate the development of educational applications of AI.
In sum, Hungary's approach to AI in education combines curriculum reform, teacher empowerment, research investment, and lifelong learning opportunities, with the dual aim of strengthening competitiveness and ensuring equitable, responsible AI adoption in line with European values.

- **Ireland**: Ireland's refreshed National AI Strategy (*AI – Here for Good, 2024*[12]) places strong emphasis on AI education, skills, and talent development as essential pillars for responsible adoption. The government aims to ensure that the workforce is equipped to thrive in the AI era through expanded digital upskilling and reskilling initiatives (Skillnet Ireland, Springboard+, apprenticeships, and future human capital programs). HE and research are central, with the creation of a National AI Research Nexus and continued investment in Research Ireland Centres to train world-class AI talent. The strategy highlights AI literacy and inclusion, aligning with EU Digital Decade targets, particularly regarding female participation in digital skills. Moreover, it fosters a people-centred and trustworthy approach to AI in education and training, ensuring alignment with the EU AI Act while supporting innovation through regulatory sandboxes, awareness campaigns, and accessible AI computing infrastructure. In sum, Ireland's policy integrates ethical governance, research excellence, and lifelong learning pathways to position the country as a leader in AI adoption while safeguarding rights and inclusivity.

- **Lithuania**: Lithuania's AI strategy[13] emphasizes skills development, education, and research as central pillars for building an AI-ready society. The policy promotes the integration of AI-related knowledge into school and university curricula, encouraging students to pursue ICT and computer science while embedding AI competencies such as deep learning, data mining, and natural language processing. Universities, including Vilnius University, Kaunas University of Technology, and Vytautas Magnus University, play leading roles in research and training, though challenges remain in hardware infrastructure and specialized AI programs. The strategy calls for lifelong learning initiatives to reskill and upskill the workforce, ensuring citizens can adapt to digital transformation. Teacher training and interdisciplinary collaboration are prioritized to strengthen pedagogy and ensure that AI adoption aligns with ethical, human-centric values. By combining curriculum reform, research investment, and workforce training, Lithuania seeks to position education as both a driver and safeguard of responsible AI deployment.

- **Luxembourg**: Luxembourg's AI strategy (2030)[14] is embedded in a broader digital sovereignty agenda that integrates data, AI, and quantum technologies. Education and skills development are central enablers: the government promotes AI literacy, training, and talent development to prepare citizens, educators, and researchers for the digital economy. Universities and HE institutions are key partners, supported through dedicated funding, research–industry collaboration, and the creation of sovereign digital infrastructures (e.g., *MeluXina-AI* supercomputer). A flagship initiative includes a sovereign AI chatbot for education, designed to provide safe, transparent, and inclusive digital learning support. The strategy emphasizes ethical, human-centered adoption, ensuring transparency, data protection, and accountability, while encouraging innovation through open data and international cooperation. By 2030, Luxembourg aims to position itself as a European hub for trustworthy AI in education, research, and society at large, combining high technological ambition

[12] https://enterprise.gov.ie/en/publications/publication-files/national-ai-strategy-refresh-2024.pdf
[13] https://eimin.lrv.lt/uploads/eimin/documents/files/DI_strategija_ENG(1).pdf
[14] https://gouvernement.lu/dam-assets/images-documents/actualites/2025/05/16-strategies-ai-donnees-quantum/2024115332-ministere-etat-strategy-ai-en-bat-acc-ua.pdf

with strong governance and inclusivity.

- **Malta**: Malta's AI[15] strategy identifies education, skills, and talent development as key enablers to become a global hub for AI. The government emphasizes AI literacy at all levels of education, embedding digital skills and AI concepts into school curricula while promoting STEM disciplines. HE institutions are encouraged to expand AI-related degree programs, interdisciplinary research, and industry collaborations, supported by government funding and partnerships. Teacher training and continuous professional development are considered essential to ensure that educators can integrate AI into teaching and guide students in its responsible use.
  The strategy also promotes lifelong learning and reskilling initiatives, aiming to equip the workforce with AI-relevant skills to remain competitive in the digital economy. Ethical and human-centric principles are explicitly highlighted, aligning Malta's education policy with EU values on inclusion, transparency, and data protection. Overall, Malta positions education as both a foundation and accelerator of AI adoption, ensuring that AI talent, literacy, and innovation ecosystems drive sustainable social and economic development.

- **Netherlands**: The Dutch government's vision on GenAI[16] frames education as a critical domain for ensuring the responsible and future-oriented use of AI. The strategy emphasizes AI literacy for all citizens, aiming to equip students, teachers, and society at large with the skills needed to understand and critically engage with AI technologies. Schools and HE institutions are encouraged to integrate GenAI into curricula, not only as a technical subject but also in terms of ethics, social impact, and creativity.
  The policy highlights the empowerment and training of educators, ensuring they receive professional development to guide students in the responsible use of AI and to design learning environments resilient to AI-driven challenges, such as academic integrity risks. Universities are tasked with advancing interdisciplinary research on GenAI, developing new teaching methods, and contributing to evidence-based policymaking.
  In governance, the Netherlands calls for transparency, accountability, and human oversight in the educational use of AI, aligning with EU regulations such as the AI Act. At the same time, it fosters innovation and experimentation, encouraging institutions to test AI tools within controlled environments while safeguarding inclusion, non-discrimination, and data protection.
  In sum, the Dutch strategy positions education as both a driver and safeguard of AI adoption: empowering citizens with literacy and skills, supporting teachers and universities in responsible integration, and ensuring that GenAI contributes to innovation while protecting academic values and social equity.

Table 1 summarizes and compares the different approaches within the European Union. It helps us to identify the primary key components in each proposal. It also highlights the main actions performed for each analyzed member country.

Table 1- Summmary of the EU Contries' approcches in relation to the regulamentation of the use of AI'

Country	AI in Education Strategy & Policy (Summary)	Ethical Approach	Actions	Financing Mechanisms
European Union (EU AI Act)	EU AI Act classifies education/vocational AI systems as 'high-risk' with strict oversight; GenAI	Risk-based, transparency, human oversight, non-discrimination, data protection.	Classification of AI risk, mandatory transparency, labeling deepfakes,	EU regulatory framework; national implementation via compliance funding and sandboxes.

[15] https://malta.ai/ and https://malta.ai/wp-content/uploads/2019/11/Malta_The_Ultimate_AI_Launchpad_vFinal.pdf
[16] https://www.government.nl/documents/parliamentary-documents/2024/01/17/government-wide-vision-on-generative-ai-of-the-netherlands

		requires transparency, labeling, and copyright compliance; promotes innovation via sandboxes; ensures human supervision.		sandboxes for innovation.
France	Human-centered approach; strong governance (Ministry of Education + DNE); promotion of Digital Educational Content (DEC); funding via Edu-Up and P2IA; teacher autonomy with vouchers; support for EdTech; data protection.	Human-centered, fairness, inclusiveness, data privacy, ethics-by-design.	DEC strategies (France 2030, 2023–27), teacher vouchers, public-private partnerships, training programs.	Edu-Up fund (€70k/project), P2IA competitions, strong EdTech public funding (>45% companies).
Portugal	Education and skills central; AI and digital literacy from school to higher ed; MOOCs, summer schools, >20 graduate programs; universities to expand research; adaptive curricula; lifelong learning and reskilling.	Human-centered, inclusion, equity, responsible AI use.	MOOCs, AI clubs, summer schools, new degree programs, adaptive curricula, lifelong learning.	Government support for MOOCs, EU and national funding for programs, reskilling initiatives.
Austria	National AI strategy with 85-measure roadmap; €4.07bn investment; pilots in 100 schools; AI Literacy Landscape (350+ courses); strong governance (RTR Service Desk); focus on teacher training, equitable access, infrastructure.	Ethical oversight, teacher empowerment, equitable access, governance of bias.	Pilots in 100 schools, AI Literacy Landscape, RTR Service Desk, systemic governance.	€4.07bn roadmap investment, EU recovery and cohesion funds, national pilot funding.
Belgium	Federal + regional mix; Flanders (Smart Education @ Schools, i-Learn, DigiJump Action Plan); Wallonia (DigitalWallonia4.ai, TRAIL); Brussels (Innoviris funding); focus on AI literacy, curricula integration, lifelong learning.	Ethical use, inclusion, lifelong learning, data protection.	Regional initiatives (Smart Education, DigiJump, DigitalWallonia4.ai), higher ed integration, Innoviris support.	Regional and federal funding, Innoviris (Brussels), DigiJump Plan resources.
Germany	Education, research, and skills at the core; AI integrated across curricula; teacher training prioritized; AI research hubs and centers of excellence funded; ethical, inclusive approach; interministerial governance (BMBF + Länder).	Ethical, inclusive, democratic values, human rights focus.	Integration into curricula, creation of AI hubs, teacher training, and centers of excellence.	Federal and Länder funding, national research centers, university grants.
Finland	Global model; AI literacy for all (Elements of AI MOOC); integration into national curriculum; higher ed expands AI programs across disciplines; teacher training; ethical, human-centered AI adoption.	Human-centered, trust, inclusiveness, transparency.	Elements of AI MOOC, national curriculum integration, teacher training, higher ed programs.	Government funding for Elements of AI, partnerships with universities and industry.
Denmark	2024 strategy: three principles (responsible use, competitiveness,	Responsible use,	AI Taskforce, AI in Society Center,	Government funding, RTR AI

	public sector leadership); four measures (AI Taskforce, AI in Society Center, Danish language models, open data); schools/universities benefit from resources & ethical frameworks.	accountability, transparency, ethical governance.	Danish language models, open-source text data.	Service Desk, national budget for AI infrastructures.
Hungary	National AI strategy: AI literacy, STEM, curriculum integration; teacher training and upskilling; creation of AI degree programs and research hubs; focus on lifelong learning, reskilling, ethical adoption, infrastructure investment.	Human-centric, ethical adoption, alignment with EU values.	Curriculum reform, teacher upskilling, AI research hubs, vocational training, reskilling programs.	Government funding for curricula reform, AI labs, PPPs, infrastructure investment.
Ireland	AI Strategy Refresh 2024: focus on skills, talent, and research; National AI Research Nexus; digital upskilling/reskilling (Skillnet, Springboard+); AI literacy and inclusion; ethical alignment with EU AI Act; female participation in digital.	Trustworthy AI, ethical and inclusive, aligned with EU AI Act.	Skillnet, Springboard+, apprenticeships, AI Research Nexus, female participation initiatives.	Skillnet Ireland, Springboard+, SFI Research Centres, apprenticeships, EU funds.
Lithuania	AI strategy 2019: skills, education, research as pillars; AI integrated into curricula; universities develop AI programs; workforce reskilling; teacher training; lifelong learning; ethical, human-centric adoption.	Human-centric, ethics in curricula, privacy protection.	Curriculum integration, AI programs at universities, lifelong learning initiatives, teacher training.	Government and EU funding for curricula, university programs, and infrastructure investment.
Luxembourg	AI 2030 strategy under digital sovereignty; promotes AI literacy, training, and sovereign infrastructures; universities supported with funding and collaboration; AI chatbot for education; ethical, transparent adoption; inclusive focus.	Human-centered, transparency, inclusiveness, accountability.	AI chatbot for education, digital infrastructures, university-industry collaboration, open data.	Government funding, sovereign infrastructures (MeluXina), EU partnerships.
Malta	AI strategy 2019: education and talent central; AI literacy at all levels; expand AI degrees, research, and partnerships; teacher training; lifelong learning; ethical, inclusive adoption; innovation ecosystems.	Ethical, human-centered, aligned with EU principles.	Embedding AI literacy in curricula, AI degree programs, teacher training, lifelong learning.	Government funding, industry partnerships, public grants, innovation ecosystems.
Netherlands	Government-wide vision on generative AI: focus on AI literacy for all; integration into curricula (technical, ethical, social aspects); teacher empowerment and training; interdisciplinary university research; transparency, human oversight, experimentation.	Transparency, accountability, human oversight, inclusivity.	AI literacy campaigns, teacher training, interdisciplinary research, transparent governance.	Government support for AI research and literacy, university funding, EU alignment.

Non-European Countries

- **United States of America**: The National Strategic Plan for Artificial Intelligence Research and Development (2016) emphasizes improving educational opportunities and quality of life. It promotes the universal availability of adaptive automated tutoring through AI-enhanced technologies, AI tutors that complement teachers, and encourages lifelong learning and the acquisition of new skills for all. Initiatives include teaching AI coding to children (Montour School District) and the AI4K12 initiative, which provides resources for teachers to introduce students to AI. The AI-4-All program seeks to increase diversity and inclusion in AI education and development.
- **China**: The New Generation Artificial Intelligence Development Plan (2017) focuses on "smart education". This includes developing a new education system with reformed practices and interactive learning, building smart campuses with AI in teaching and management, a comprehensive three-dimensional teaching methodology and an online learning platform based on big data, AI assistants, a comprehensive educational analysis system, and a student-centered environment for personalized education. The ICT Curriculum Standards for Upper Secondary Education (2017) include 'algorithms and computational thinking,' and the Innovative Action Plan for AI in Higher Education Institutions (2018) aims to optimize innovation and talent training in AI at universities. A pilot program for 'AI Drives the Development of the Teaching Team' is also being implemented.
- **Republic of Korea (South Korea**): The Mid- and Long-Term Plan for the Smart Information Society (2016) aims to train 5,000 new AI graduates annually starting in 2020, with the goal of reaching 50,000 AI specialists by 2030. The country has shown a strong commitment to AI safety, hosting the second AI safety summit in 2024 and home to leading universities and companies in the field.
- **United Arab Emirates (UAE):** The UAE AI Strategy (2017) identifies education as one of its nine key sectors, highlighting the potential of AI to reduce costs and improve learning. The strategy emphasizes that the education system must evolve and adapt to the requirements of the Fourth Industrial Revolution and expand the curriculum to prepare children for a future workplace where decision-making is assisted by AI.
- **Japan:** Computing is part of the curriculum. HE institutions must improve AI literacy and skills across various segments of society, ensuring that graduates have a fundamental understanding of AI and algorithmic biases. The importance of considering social needs before innovation and making the conversation about AI ethics part of the beginning of innovation is emphasized. In addition, the aim is to prevent any student from being left behind due to automation in educational environments. Japan also promotes its concept of Society 5.0 and ranks high in global AI vitality.

In summary, although explicit mention of 'GenAI' in these countries' national strategies is not consistent across sources, the UN highlights it as a global transformative force and UNESCO addresses its implications (such as 'deep fakes'). These national strategies focus on preparing for the AI era, developing digital and computational skills, improving teaching and learning with AI, data management, and ethical and governance frameworks, which implicitly encompass the need to integrate and manage GenAI as this technology rapidly evolves.

Challenges for the Implementation of Strategies and Legal Frameworks

Analyzed reports and guides emphasize that policy formulation must take place in "common spaces" where the voices of the entire university community—students, faculty, technical staff, and administrators—are brought together. This fosters a fairer and more reflective approach that is aligned with the educational and social values of the institution. Collaboration among technologists, policymakers, social scientists, and the academic community is considered *essential* to develop AI that is both responsible and demonstrably reliable.

However, the formulation and implementation of policies face several obstacles:

- Rapid Technological Evolution: Advances in AI have "outpaced political debates and regulatory frameworks."
- Fragmentation and Lack of Coherence: Discussions on GenAI often occur in a fragmented manner within institutions and across different levels of government, preventing a shared approach and leading to regulatory gaps or inconsistencies.
- Skills Gap and AI Literacy: There is a widespread need for training, as many educators and staff members lack the skills required to navigate an AI-enhanced ecosystem.
- Resources and Funding: Implementing GenAI requires significant investment in hardware, software, and training, which can be costly for institutions. Moreover, there is a "lack of transparency in public budgets" allocated to Digital Educational Content (DEC).
- Resistance to Change: The introduction of GenAI can generate "multiple forms of resistance" among faculty and administrative staff.
- Legal Complexity: The intricate legal landscape poses a challenge for educators in addressing the use of AI and data.

Governance recommendations

To integrate AI into the educational system while limiting its risks, the literature emphasizes the essential role of collaboration among technologists, policymakers, social scientists, and the broader academic community. This collaboration entails the development of responsible, high-quality AI that complies with legal requirements, adheres to ethical principles, and remains robust, explainable, and subject to human oversight.

Institutional policies are crucial in mitigating risks and upholding academic standards. As an example of this fact, we can mention the EU AI Act. This is the world's first comprehensive AI law and it classifies AI systems according to their associated level of risk. High-risk systems—such as those deployed in education and vocational training—are subject to strict requirements, while GenAI systems, such as ChatGPT, must comply with transparency obligations and copyright legislation. These include disclosing when content has been generated by AI and publishing summaries of the training data used.

Other key recommendations found in the literature include:

- Guiding principles: Universities should establish shared principles for the ethical and responsible use of GenAI, ensuring safety, accessibility, equity, data privacy, and respect for copyright.
- Training and capacity building: Institutions must provide training and awareness programs for the entire university community (faculty, students, and administrative staff), enabling them to acquire the necessary skills and understand the ethical and legal dimensions of AI. Digital and AI literacy should be compulsory.
- Clear guidelines: Universities must define clear rules for students regarding the appropriate use of AI and the proper citation of sources.
- Transparent policies: Institutions should articulate explicit policies on permitted uses and their consequences, as well as transparent criteria for the handling of personal and academic data.
- Promotion of critical thinking: Universities need to cultivate critical thinking, equipping students to evaluate AI-generated information, question sources, verify data, and detect "hallucinations."
- Equitable access: Programs and funding initiatives should be implemented to guarantee that disadvantaged students have access to AI tools.
- Collaboration and dialogue: Universities should foster an institutional culture of adaptability and openness, encouraging internal discussion and the exchange of best practices across institutions.

- Research and monitoring: Continuous research on the impact of AI in teaching and learning is necessary, alongside active monitoring of technological developments and evolving legal and ethical frameworks.
- Human oversight: AI systems must remain subject to human supervision in order to prevent harmful outcomes and to allow appeals in cases of automated decision-making.

AI—particularly GenAI—constitutes an unstoppable force in education, offering enormous potential to personalize learning, enhance teaching efficiency, and democratize access. Nevertheless, its successful implementation depends on robust governance, well-defined ethical frameworks, sustained investment in literacy and training, and a collaborative and critical approach to addressing its inherent challenges.

AI for education management

AI, and in particular GenAI, offer "immense potential" to transform not only teaching and learning, but also the broader administration and management of educational institutions. These opportunities range from optimizing routine tasks to making strategic, data-driven decisions, while always being framed by the imperative of ethical governance and proactive adaptation.
AI provides multiple opportunities to enhance the efficiency, effectiveness, and resilience of educational management, including the following domains, as highlighted in the reviewed reports:

1. *Automation of Administrative Tasks and Increased Efficiency*. GenAI can automate routine administrative tasks for faculty, such as scheduling and room allocation, thereby allowing educators to dedicate more time to higher-value activities such as student engagement and pedagogical design. At the institutional level, AI can streamline administrative processes, from admissions applications to student support services.
    - For instance, the University of Navarra (Spain) is exploring the impact of AI on its administrative functions and services.
2. Educational Data Analytics (Learning Analytics) and Strategic Decision-Making. AI enables the automated collection of data on student performance and learning styles, identifying patterns and trends critical for decision-making at all levels.
    - Systems such as OU Analyse at The Open University (United Kingdom) predict student performance and identify at-risk learners by analyzing big data from Educational Management Information Systems (EMIS), allowing tutors to provide targeted support.
    - AI can generate insights into student learning, enabling faculty to adapt instructional content to students' progress and challenges.
    - AI can also assist schools in making more effective decisions regarding the allocation and use of teaching resources.
3. *Management and Curation of Digital Educational Content (DEC)*. AI has the potential to curate learning content across platforms, tailoring it to learners' personalized needs and educational levels. One project, for example, aims to organize thousands of Open Educational Resources (OER) to make them more accessible.
    - Countries such as Estonia employ learning management systems (LMS) such as *Stuudium* or *e-School* in nearly all schools. These systems manage lesson plans, study materials, student progress information, assignments, and grades, while also facilitating communication among students, teachers, and parents.
    - National platforms such as Germany's *Nationale Online-Bildungsplattform* and Poland's *Integrated Education Platform* aim to consolidate and expand access to digital educational resources.
    - Greece has also announced plans for the development of DEC in HE and the modernization of its

existing platforms.

4. *Optimization of Institutional Processes and Planning*. AI can strengthen Educational Management Information Systems (EMIS), making them more robust, accessible, efficient, and user-friendly, thereby supporting evidence-based decision-making that is flexible, dynamic, and democratized.

    - The *UniTime* project exemplifies a comprehensive AI-driven educational scheduling system that generates timetables for university courses and examinations, manages scheduling changes and room assignments, and provides individualized schedules for students.

    - AI can facilitate student admissions and deliver 24/7 information on deadlines and course offerings through chatbots.

    - Investment in AI's predictive capabilities can support system-level forecasting of skills and labor market demand, enabling governments to align educational provision with local needs and to integrate insights across sectors such as finance, economics, law, and medicine. e. AI can also be employed to monitor attendance and detect fraudulent practices in examinations.

5. *Support for Research and Knowledge* Transfer. In the research domain, AI can automate tasks such as literature searches and reviews, data extraction and classification from unstructured sources, and even hypothesis generation, thereby expediting research project management.

    - AI can optimize processes in research transfer, including industry partnership management and the evaluation of commercial feasibility for projects. For research dissemination, AI supports the creation of engaging content (e.g., summaries, infographics) and the optimization of social media publications (scheduling, customization, audience segmentation, and trend analysis).

    - Enhanced Communication and Institutional Support: GenAI tools can generate personalized responses to student inquiries, create templates for common messages, and assist in drafting institutional communications that combine professionalism with empathy.

Social Impact and Innovation of AI in Education

The analyzed literature outlines a future in which AI not only optimizes existing practices but fundamentally reimagines education to maximize social impact and foster continuous innovation. They point out the following areas:

- *Universal Access and the Promotion of Social Equity*. AI must be leveraged to provide better education for all and to reduce structural inequalities within educational systems, including expanded access to HE. So, institutions must harness AI to narrow the digital divide, making learning more accessible, secure, flexible, and learner-centered. AI must be employed to advance inclusion, particularly for marginalized groups, older adults, refugees, isolated communities, and students with special educational needs; technologies such as speech recognition should be deployed to improve accessibility for learners with disabilities. Specifically, GenAI systems must be used to produce accessible and adaptive content tailored to diverse learners, including the option to select the language of instruction. Universities must also ensure equitable access to AI tools, either by providing them uniformly or by establishing grant and subsidy programs for disadvantaged groups, thereby counteracting technological inequalities.

- *Innovation in Teaching and Learning Methodologies.* So AI must be used to personalize learning, adapting content and methodologies to individual needs, providing alternative explanations, personalized feedback, and appropriately challenging tasks, thereby enhancing motivation and performance. In particular, GenAI could serve as 24/7 virtual tutors, addressing student queries and providing guidance and support outside traditional tutorial hours, thus fostering autonomous learning. Collaboration systems and LMS platforms should evolve by combining learning analytics with GenAI to deliver personalized monitoring and adaptive learning pathways. Policies should also encourage the exploration of more diverse and authentic assessment formats, such as oral presentations, debates, and

research projects.

- *Efficiency and Empowerment of Faculty*. AI could be applied to automate routine administrative tasks, such as scheduling, space allocation, and preparation of materials, thereby enabling instructors to focus on guiding students, facilitating in-depth discussions, and designing meaningful learning experiences.
- *Advancement of Research and University Management*. AI must be used for system-level forecasting, predicting skills demand, and labor market needs to help governments prepare for local educational requirements and align them with other sectors such as finance, economics, law, and medicine. And GenAI must be employed to automate the collection and analysis of learning data, identifying performance patterns and trends to inform decision-making.
- *Development of Key Competencies and AI Literacy.* AI must be integrated into education to foster critical thinking and problem-solving, positioning AI literacy as essential for understanding its functioning, cultivating responsibility, and encouraging innovation. Education systems must prepare individuals to live and work alongside AI, ensuring the development of competencies that include understanding data collection and manipulation, as well as protecting privacy. So, students must be equipped with future-oriented skills, enabling them to think critically and responsibly about AI and its societal implications.
- *Broader Social Benefits Beyond Education.* AI regulation must ensure favorable conditions for the development and responsible use of this technology, which can contribute to improved healthcare, safer and cleaner transportation, more efficient manufacturing, and more affordable and sustainable energy. The social sciences must play a central role in shaping the ethics, policy, and governance of AI, providing historical perspectives and contextual frameworks to guide dialogue on its societal impact.

Conclusions

The main identified components defining the responsible and effective integration of AI in HE are rooted in four core aspects:

- **Defining Acceptable Use and Detailed Guidelines**. Universities must establish clear and detailed guidelines that define permissible applications—such as initial drafting, language editing, or brainstorming—while explicitly prohibiting practices like outsourcing entire assignments or exam responses. Institutions must mandate transparency and disclosure, ensuring that all AI-generated content is explicitly acknowledged in coursework, research publications, and grant proposals, consistent with established citation standards. To minimize ambiguity, policy documents should include illustrative examples and case studies that clarify both acceptable and prohibited uses for students and faculty. Furthermore, policies must remain transparent and enforceable, setting out precise criteria for permitted practices and clearly stipulating the academic and disciplinary consequences of misuse.

- **Assessment Redesign and Academic Integrity**: Institutions must adopt AI-resilient assessments that emphasize the learning process as much as the final product, moving beyond formats such as take-home essays that are highly susceptible to AI-generated work. Real-time assessment methods, including in-class examinations, oral defenses, and timed tasks—should be prioritized to ensure authentic, spontaneous responses. Universities must also require process documentation, such as drafts, work logs, and reflective narratives, to capture students' intellectual development and revision practices. Furthermore, academic integrity policies must clearly define unacceptable uses of AI, integrating technological safeguards with faculty's ethical judgment, while promoting honor codes explicitly tailored to GenAI.

- **Training and AI Literacy**. Institutions must implement staff development programs, including regular workshops on the ethical use of AI, techniques for detecting AI-generated content, and strategies for designing AI-resilient assessments. Universities must also integrate AI literacy modules into first-year student orientations and provide refresher courses throughout the academic year, covering responsible use, proper attribution, and the limitations of generative AI. Furthermore, training must cultivate critical consciousness, enabling both staff and students to understand AI's functionality, ethical and legal implications, and to consistently question and verify AI-generated outputs.

- **Enforcement, Accountability, and Ethical Governance**. Institutions must adopt multi-layered enforcement strategies, combining AI-detection tools with manual reviews conducted by trained integrity officers, and ensure transparency and accountability so that individuals are informed when interacting with AI systems and responsibilities are clearly assigned. Universities must guarantee compliance with data protection laws such as GDPR, safeguarding privacy and preventing the misuse of confidential information in AI training. Policies must also promote equity and non-discrimination, ensuring fair access to AI tools and preventing the reinforcement of biases present in training data. Furthermore, institutions must require ethical reviews prior to implementation and establish a culture of accountability that avoids deploying AI projects without prior ethical assessment. Finally, effective policymaking must be grounded in interdisciplinary and multi-stakeholder planning, engaging educators, students, IT specialists, and social scientists to ensure a coherent and system-wide approach.

At the international level, institutional policies and strategies regarding the use of AI in education focus on maximizing its benefits and mitigating its risks, ensuring an ethical, inclusive, and equitable approach. These initiatives are promoted through organizations such as the UN, UNESCO, the European Union (EU), and the OECD. In general, all these policies and strategies have the following elements in common:

- Ethical and Responsible Integration of AI: Ensuring that AI systems are fair, transparent, secure, accountable and respectful of human rights and privacy, avoiding bias and discrimination.
- Development of Digital Skills and AI Literacy: Fostering a fundamental understanding of AI, its limitations and its critical, safe and ethical use for all, from an early age and throughout life.
- Transforming Teaching, Learning, and Assessment: Exploring the potential of AI to personalise learning, provide adaptive tutors, and improve educational quality, while maintaining the central role of humans and avoiding outdated or harmful practices.
- Data Governance and Privacy Protection: Establishing robust regulatory frameworks for the collection, storage, processing, and use of educational data, ensuring confidentiality and security.
- Multi-stakeholder Collaboration and Multi-level Governance: Promoting cooperation between governments, industry, academic institutions, civil society, and educators for the development, implementation, and evaluation of AI policies and standards in education.
- Reducing the Digital Divide and Inclusion/Equity: Ensuring equitable access to AI technologies and educational opportunities, paying special attention to vulnerable groups and preventing AI from exacerbating existing inequalities.

Formal Sources, AI in Education: Governance and Policies

This part of the study comprises a systematic literature review to identify guidelines, institutional policies, and best practices aimed at promoting the honest and responsible use of LLM and GenAI in HE in the European context. The selected articles examine the ethical dimensions considered in these guidelines and how they are structured and implemented at various levels, including local, national, and European. The sources highlight the opportunities and challenges posed by the integration of general AI into HE. This review addresses the following three research questions (hereinafter, RQ):

RQ1: What guidelines, institutional policies, and best practices have already been developed to promote the honest and responsible use of LLM in HE within the European Community?

RQ2: At which levels (institutional, national) are these policies structured and implemented?

RQ3: Which ethical dimensions are explicitly addressed in the formulation and application of these policies?

Methodology

To identify the relevant articles, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher et al., 2009) was used to conduct this review. The final search was carried out on September 5, 2025. The National Distance Education University (UNED) online library was used to search for the Web of Science Core Collection and Scopus databases. The search equation used is as follows:

("Large Language Model*" OR LLM OR "Generative AI" OR ChatGPT)
AND ("Higher Education" OR Universit*)
AND (polic* OR "institutional polic*" OR "national polic*" OR "regional polic*" OR guidelin* OR recommendation* OR framework* OR "best practice*")
AND (criteri* OR standard* OR principle* OR requirement* OR dimension* OR indicator*)
AND (institutional OR national OR regional OR Europe OR "European Union" OR European)

The search restrictions considered were as follows: title, abstract, and keywords; period: from January 1, 2020, to the present; document type: article; source type: journal; language: English; and the geographical scope was limited to Europe and the USA.

The criteria used to restrict the search were as follows: title, abstract, and keywords. Period: January 1,

2020, to the present. Document type: Article. Source type: Journal. Language: English. Geographical scope: Europe and the United States.
The Web of Science Core Collection yielded 50 articles. Firstly, four papers were excluded because they did not meet the language inclusion criteria (two were in German, one was in Russian, and one was in Spanish). Consequently, 46 items from Web of Science were identified. Secondly, following the application of filters to restrict the analysis to specific regions and countries, the below-listed articles were excluded:

(i) One paper from each of the following countries: Bolivia, Brazil, Ecuador, Egypt, Indonesia, Israel, Jordania, Lebanon, Morocco, Nigeria, Palestine, Philippines, Qatar, Serbia, South Korea, and United Arab Emirates, and Venezuela.

(ii) Two articles from each of the following countries: Canada, Mexico, Oman, Singapore, and South Africa.

(iii) Three articles from Saudi Arabia and the People's Republic of China.

A total of 33 articles were excluded. Then, we excluded one proceeding paper and one editorial material when document type filter was applied. As a result, a total of 11 articles advanced to the subsequent stage: Title and Abstract Screening. During the Title and Abstract Screening, 11 articles were read to identify those that met all the inclusion criteria and none of the exclusion ones. During this process one article was filtered out. The result was a total of ten articles.

The next step entailed Full-text Screening. The remaining eleven articles were read in full to ensure they met the inclusion criteria, resulting in the exclusion of one paper. As a result, ten papers were identified for the review. For organizational purposes, the data was compiled into an Excel file.

Table 2. Inclusion and exclusion criteria

Criteria	**Inclusion**	**Exclusion**
Subject	GenAI policies, recommendations, guidelines and best practices in HE and University at national, regional, and EU levels	Do not address GenAI policies, recommendations, guidelines and best practices in HE and University (such as other educational levels, work contexts).
Document Type	Article Early access Review Article	Grey literature, proceeding paper, conference papers, blog entries, reports, etc.
Time period	1 January 2020 to present	Articles outside the time period set
Language	English	Non-English
Geographical scope	European countries and USA	Non-European

A second search was carried out in the Scopus database using the same search restrictions and equations as the first one. A total of 91 articles were retrieved from the database. First, the language filter was applied, excluding two papers in Spanish and German, as well as one paper in Ukrainian. Thus, 86 items remained from the Scopus database. Following the filtering process, the following 54 items were excluded as follows:

(i) One from each of the following countries: Vietnam, Thailand, Taiwan, South Korea, Singapore, Serbia, Qatar, Philippines, Palestine, Morocco, Lebanon, Jordan, Egypt, Ecuador, Brunei Darussalam, and Bolivia.
(ii) Two papers from each of these countries: Turkey, South Africa, and Australia.
(iii) Three papers from each of these countries: People's Republic of China, Oman, Nigeria, Mexico, and India.
(iv) Four articles from the United Arab Emirates, Indonesia, Canada.
(v) Five papers from Saudi Arabia.

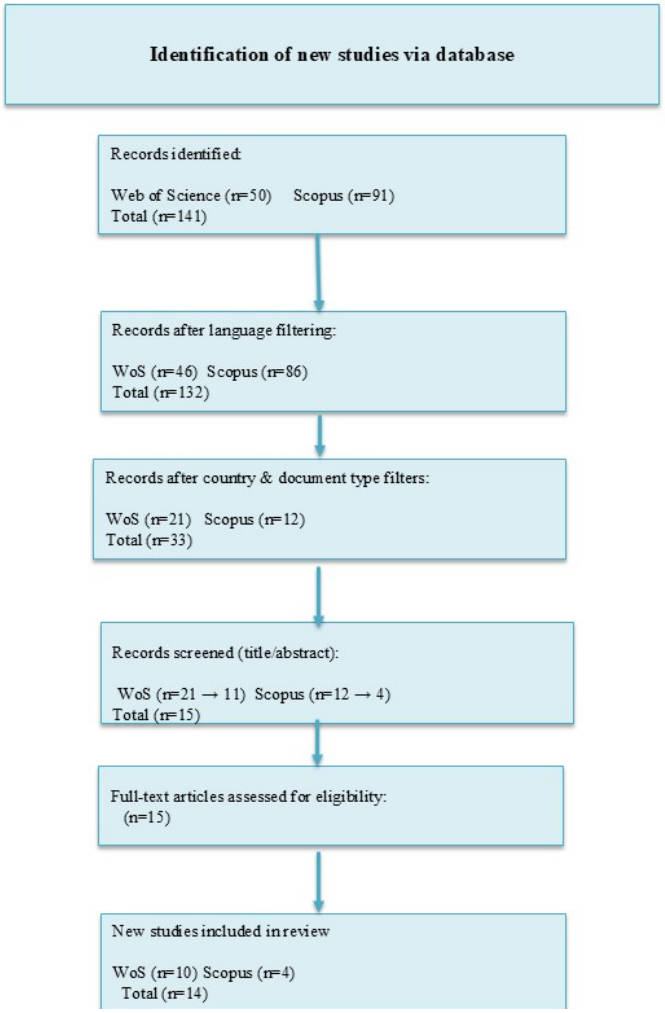

Figure 1. PRISMA Flowchart -- Source: PRISMA flowchart using the template by Page et al. (2021).

A total of 32 papers remained and advanced to the next phase. Subsequently, during the filtering by document type eight items (conference papers, reviews, etc.) were excluded. The resulting list consisted of 24 items including articles, chapters, and reviews. Then, the documents duplicates were filtered out, resulting in the identification and exclusion of 12 documents. Therefore, a total of 12 items proceeded to the Title and Abstract Screening phase. After reading the journal articles during the Full-Article Screening, eight items were excluded, and four articles were included in this systematic review.

During the preparation of this report, several GeneAI tools (Notebook.ai, DeepL, Consensus, and

Grammarly) were utilized for tasks such as text summarization, information systematization, language correction, and overall writing improvement.

Table 3. Articles selected for the review

Assigned number	Article
1	Alexander et al., 2023
2	Agostini & Picasso, 2024
3	Batista et al., 2024
4	Kshetri, 2024
5	Symeou et al., 2024
6	Vetter et al., 2024
7	Adarkwah, 2025
8	Amigud & Pell, 2025
9	Gonsalves, 2025
10	Ilieva et al., 2025
11	Muñoz-Martínez et al., 2025
12	Rughiniș et al., 2025
13	Triola and Rodman, 2025
14	Wilson, 2025

In Annex A, a summarized version of the features considered for each paper analyzed is presented: Method/Instrument, Participant Profile, Outcome, Policy Level, Policy Dimensions, Policy Implementation, Limitations, and Quality/Bias.

Main Findings

The data were systematically organized into two primary categories based on their central themes. Category 1, Institutional responses and global policy development, which was further subdivided into two subcategories: (i) institutional responses and (ii) global policy development. Category 2, Frameworks and guidelines for the ethical integration of GenAI, was grouped into three subcategories: (i) conceptual frameworks and guidelines, (ii) empirically tested frameworks, and (iii) No framework proposal. This classification enabled a structured analysis of policy and method-oriented contributions to the field.

Institutional responses and global policy development

While all the papers analyzed the institutional (universities, publishers, etc.) responses to the integration of GenAI in HE, only ten of them were based on global or international policies and recommendations such as ISO 21001:2018 standards, UNESCO guidelines, the European Union's AI Act and European Association for Quality Assurance in Higher Education (ENQA). These papers outlined trends and challenges focusing mainly on the need for comprehensive guidelines (Agostini and Picasso, 2024; Symeou et al., 2024; Vetter et al., 2024; Adarkwah, 2025; Amigud and Pell, 2025; Gonsalves, 2025; Ilieva et al., 2025; Muñoz-Martínez et al., 2025; Rughiniș et al., 2025; Wilson, 2025).

Institutional responses

Alexander et al. (2023) studied the difficulties that English as a Second Language (ESL) instructors in HE when detecting AI-generated texts, with a focus on those produced by ChatGPT. The authors investigated the effectiveness of existing plagiarism and AI detection tools and the evaluation criteria used by ESL instructors for academic writing, together with the precision of these criteria in differentiating between human- and AI-generated texts. The authors concluded that AI systems and human evaluators were both unreliable at detecting AI-generated content. The paper emphasized the need to modernize assessment policies and institutional safety measures to preserve academic integrity, as well as the importance of providing teachers with robust digital literacy training.

Batista et al. (2024) is a paper by Portuguese researchers who carried out a systematic literature review of empirical studies, 2023-2024, on international literature on GenAI use in HE. The review examined the impact of GenAI on teaching, learning, and institutional practices. It pointed out opportunities, such as improved ways to help students and more innovative learning experiences, as well as problems, such as issues with academic integrity, assessment practices, and ethics. Several gaps were identified, and a proposal was made for a future research agenda that focuses on assessment integrity, ethical policy development, instructional strategies, opinions of the parties involved, digital upgrades, and teacher training.

Gonsalves (2025) analyzed 50 leading HE institutions around the world and found that 57% had guidelines for AI use, mainly advising students to acknowledge or cite AI-generated content. Yet, it was also detected that even with guidelines in place, there remained two important challenges: the enforcement of these policies and student compliance. Additionally, the authors observed the need for context-specific interventions and clearer and consistent policies.

Global policy development

Symeou et al. (2024), at the European University of Cyprus, proposed a comprehensive, cross-disciplinary and consensus-based framework for integrating GenAI in HE with a focus on the European learning context. The shared components with broader European structures encompass institutional foresight, functioning infrastructure, well-established protocols, and ongoing staff training to promote ethical AI integration. The paper included references to international policies and UNESCO's global survey and guidance for policymakers on AI in education.

Amigud and Pell (2025) examined, at a broader level, the responses of HE institutions to the rise of GenAI, particularly LLM, centering the efforts on the difficult task of preparing students for a technology-driven workforce with the essential need to uphold academic integrity. The authors made references to global policies such as UNESCO recommendations on ethical AI use and to the World Economic Forum's seven principles for the responsible use of AI in education. The authors also emphasized the relevance of these recommendations in shaping institutional and national guidelines. Their multiple-case study of 50 universities across eight countries detected significant confusion and inconsistency in institutional responses, with approaches ranging from prohibitions to the development of in-house AI tools. Academic integrity and the potential for cheating with AI during evaluation were among the top concerns. Furthermore, the authors recommended integration of human-supervised assessments to maintain academic reliability.

In the UK, Gonsalves (2025) investigated why students at the Business School at King's College London rarely disclose their use of AI tools in scholarly work, despite a mandatory policy requiring such disclosure. Among the findings, the author, by using the Theory of Planned Behavior, identified that among the main reasons for the lack of compliance were fear of academic repercussions, ambiguous guidelines, inconsistent enforcement, and peer pressure. It was also found that a low percentage of students declare AI use (74% non-compliance) despite being required. Additionally, it was also noted that there was a lack of transparent and uniform institutional policies that preserve academic integrity in HE.

Furthermore, in the UK, Wilson (2025), who analyzed the situation of universities in the Russell Group, detected that those universities within the Russell Group had implemented principles and guidance concerning academic integrity, assessment methods, and the use of GenAI by faculty, students, and staff. Such policies were designed to promote responsible use, preserve academic standards, and provide clear frameworks for the academic community. Nevertheless, non-Russell Group universities may still struggle to develop comprehensive policies due to limited financial resources.

Frameworks and guidelines for ethical GenAI integration

The selected papers were systematically categorized into three groups based on their content: (i) studies presenting conceptual frameworks and guidelines that inform theoretical foundations and structured recommendations; (ii) studies that presented empirically tested models offering evidence-based validation; (iii) No-framework proposal papers analyzing pre-existing models.

Studies presenting conceptual frameworks and guidelines

Articles by Agostini and Picasso (2024); Kshetri (2024); Symeou et al. (2024); Vetter et al. (2024); Adarkwah (2025); Muñoz-Martínez et al. (2025); Rughiniș et al. (2025); and Triola and Rodman (2025) proposed specific models or detailed guidelines for integrating GenAI into aspects of HE, such as assessment, learning, or academic writing, with a strong emphasis on ethical considerations.

Agostini and Picasso (2024) developed a theoretical and pedagogical framework called AI-Mediated Assessment Academics and Students, AI-MAAS, which integrates LLM into assessment and feedback practices in HE. It examined the challenges and the opportunities of using GenAI to enhance the effectiveness, sustainability, and authenticity of assessment, focusing on both summative and formative processes. The AI-MAAS model is based on literature, international guidelines, and comparative analyses. It was designed to help educators sensibly exploit AI tools while considering ethical, practical, and developmental aspects. Although it has not yet been submitted to empirical testing. The paper included strategies for future testing, which include a Delphi study and classroom experimentation. The authors used UNESCO recommendations as a foundation for their study. For instance, “Guidance for generative AI in education and research and AI and education”; “Guidance for policymakers”; together with the U.S. Department of Education, Office of Educational Technology, “Artificial Intelligence and Future of Teaching and Learning”.

Kshetri (2024) examined the diverse initial responses of academic institutions to GenAI tools with a particular focus on the causes of initial resistance and the motives that influenced the eventual acceptance of GenAI. It aimed to inform policymakers and guide future empirical studies. Using institutional theory, the author proposed a conceptual framework that defined how academic institutions might adapt to GenAI. The main instruments that outlined institutional adaptation were identified: (i) external pressure, such as students and advisory board demands; (ii) many educators or technology advocates function as change agents; and (iii) the re-evaluation of the potential of GenAI by practical experience. While the framework has not been implemented nor empirically tested yet. This exploratory study intends to inform policymakers with suggestions that may guide research or be empirically tested in prospective studies.

Another conceptual framework is the one proposed by Symeou et al. (2024) at European University Cyprus. The paper described the development process and content of the framework. The guidelines emphasized the following issues: (i) promoting transparent communication; (ii) ensuring responsible AI use by students

and educators; and (iii) safeguarding academic integrity through clear policies and practical recommendations. Rather than a model that had been tested through empirical research, it was based on literature and expert opinions.

The paper by Vetter et al. (2024) conducted a single-case study that delved into students' interactions with ChatGPT as a writing companion. The authors proposed the "Local Ethics Framework," a foundational and exploratory model for ethical engagement with AI in the classroom. It was intended as a complement to broader policies. This framework focused on didactics strategies in a local context (course-based), criticality, agency, reliability, and accessibility. By the time the paper was published, the framework was still in its early stages and had not yet been empirically tested. It was based on a single qualitative case study of one undergraduate student's experience in a writing course. The authors acknowledged this limitation and suggested that further research be conducted.

Adarkwah (2025) proposed a conceptual framework called the GenAI Adult Learning Ecology (GenAI-ALE) to guide the integration of GenAI technologies, such as large LLM, into adult learning in HE. The framework identified eight essential principles grouped into institutional (curriculum design, digital divide, policy, ethics) and interpersonal (human-centered andragogy, literacy, interest, virtual learning) factors. The author acknowledged that the framework had not yet been empirically validated, and he called for future studies to test it in authentic settings. Additionally, the author made references to global policies, specifically those that provide guidance on the use of GenAI in education and research, such as those of UNESCO. Specifically, the reports cited "Guidance for generative AI in education and research" (2023) and "Generative AI and the future of education" (2023). The transformative potential and risks of GenAI in adult education were highlighted in the paper, and structured policies and additional research were called for.

Muñoz-Martínez et al. (2025) examined how GenAI has been integrated into the European distance HE context, concentrating on its impact on critical thinking. The authors referenced the policies developed by UNESCO "AI Competency Framework for Teachers" (2024) and the "Strategy on Technological Innovation in Education" (2021). A conceptual framework, which includes five strategic action paths to guide the integration of GenAI as well as the development of critical thinking in online HE, was proposed. Using semi-structured interviews with eleven experts in education, including faculty members and pedagogues, the authors detected that the core barriers were (i) insufficient teacher training; (ii) institutional resistance; and (iii) the lack of clear guidelines. Additionally, the authors identified accelerators like (i) digital literacy and (ii) pedagogical innovation for stimulating critical thinking in AI-mediated contexts. The study also discussed technological alternatives, social challenges, and the consequences of promoting critical thinking, ultimately proposing their five strategic action areas for HE institutions, educators, and policymakers to ensure ethical and effective use of GenAI.

Rughiniș et al. (2025) analyzed how prestigious universities, and main academic publishers conceptualize and standardize the use of AI, particularly GenAI and LLM, in academic knowledge construction. The authors compared international approaches and studies based on data from sources such as the Digital Education Council's 2024 Global AI Student Survey, Wiley ExplanAItions, and research papers that analyzed universities' policies. Furthermore, using boundary work theory and actor-network approaches, the authors examined official AI policy documents from 16 leading universities (mainly in the US and UK) and 12 major publishers. The author proposed a conceptual framework in which they introduced two main analytical concepts: (a) "dual black-boxing" (the opacity of both AI systems and their use); (b) "legitimacy-dependent hybrid actors" (human–AI collaborations whose legitimacy depends on context and disclosure). The framework aimed to contribute to understanding and analyzing the strains and institutional responses to GenAI integration in academic knowledge production. The findings showed that institutions primarily concerned themselves with the opacity of AI by establishing transparency requirements. The authors considered issues such as usage disclosure and attribution while establishing adaptable yet selective margins for legitimate GenAI use. Among their findings were matters like universities' tendency to allow more flexible and process-oriented GenAI use. By contrast, publishers enforced harsher, product-focused limits.

Both emphasized issues like transparency, human oversight, and alignment with academic values. They also acknowledged constraints in completely overcoming GenAI's internal transparency issues and the difficulty of verification.

Triola and Rodman (2025) reviewed the rapid integration of GenAI, including LLM, into medical education at two prestigious North American universities: NYU Grossman School of Medicine and Harvard Medical School. According to the study, medical schools must adapt by developing policies, governance structures, and curricula that address the ethical, technical, and pedagogical implications of this technology. The authors proposed a conceptual framework that is organized around three main domains: (i) policy; (ii) governance; and (iii) curriculum to efficiently integrate GenAI into medical education. Additionally, the paper suggested establishing well-defined policies, governance bodies with student involvement, and defining new know-how for students and faculty. The authors concluded that the importance of ongoing adaptation, the exchange of best practices, and readying learners for GenAI-workforce were essential elements for an effective medical education.

Studies proposing empirically tested frameworks

The following two papers, authored by Gonsalves (2025) and Ilieva et al. (2025), provided confirmation of tested models. These authors conducted empirical validation of the frameworks presented in their studies.

Gonsalves (2025) used the Theory of Planned Behavior (TPB) as a conceptual framework to explore student compliance with AI use declarations. As a conceptual framework, its goal is to guide research and interpret findings. The author undertook a single-case study methodology, gathering survey and interview data from students at King's Business School. The data was then tested empirically within the case study.

Ilieva et al. (2025) proposed a novel framework for assessment practices in HE that integrates GenAI, particularly LLM. It involved instructors, students, and control authorities, and it was validated through a case study. As part of their study, the authors outlined guidelines at the international level. Among these references, they included the ISO 21001:2018 standards and the ISO 29990:2010. These standards are aimed at providing guidance for educational institutions around the world, stressing learner satisfaction, aligning outcomes, and improving assessment practices continuously. The latter standardized non-formal learning. Additionally, at the European level, the ENQA was also mentioned, together with its update in response to the incorporation of GenAI into assessment practices. National agencies, such as the UK's Quality Assurance Agency (QAA), were complementarily added since they contain detailed regulations on assessment practices, such as reliability, moderation protocols, and balanced integration of formative and summative methods. The study underscored both the opportunities and challenges of using AI in academic evaluation, emphasizing the imperative need for responsible, transparent, and quality-assured integration of AI tools. The authors proposed a conceptual framework for GenAI-assisted assessment in HE. They empirically tested it through a case study conducted in a university-level course, in which human and AI-based evaluation was compared.

No-framework proposal

Instead of proposing novel, original frameworks for policies regarding GenAI in HE, these three studies, Alexander et al. (2023), Batista et al. (2024), and Wilson (2025), critically examined existing frameworks and analyzed institutional responses. See Table 3 for the classification of the papers included in this systematic review.

Table 3 presents a classification of the studies included in this systematic review by their thematic focus and methodological approach. Papers are grouped into three categories: (i) papers that proposed novel frameworks, (ii) empirically tested models, and (iii) critical analyses of existing frameworks. This provides an overview of how the papers contributed to the discourse on integrating GenAI and LLM into HE settings.

Table 4. Classification of selected papers

Category	Subcategory	Article
Institutional responses and global policy development	References to global policy	Yes 2, 5, 6, 7, 8, 9, 10, 11, 12, 14
		No 1, 3, 4, 13
	Institutional responses	All articles
Framework proposal	Conceptual	2, 4, 5, 6, 7, 11, 12, 13
	Empirically tested	9, 10,
No framework proposal	1, 3, 14	

Note: *See article number correspondence on Table 2. Articles selected for systematic review.
Source: own elaboration.

Summary of the results

By contrasting the information across the fourteen papers, several key conclusions can be drawn regarding GenAI policies in HE within the European context.

Institutional-level response with emerging multi-level integration

All papers selected maintained that policy development and implementation originated at the classroom, institutional, or university levels (Alexander et al., 2023; Agostini and Picasso, 2024; Batista et al., 2024; Kshetri, 2024; Symeou et al., 2024; Adarkwah, 2025; Amigud and Pell, 2025; Rughiniș et al., 2025; Wilson, 2025).

These institutional efforts often reflect specific contexts such as, concerns in a particular discipline and instructors like ESL (Alexander et al., 2023), availability of institutional financial resources or lack of them (Wilson, 2025); contrasting the variations in regulation between renowned universities, and main academic publishers (Rughiniș et al., 2025).

A multilayer approach is explicitly outlined by several authors (Vetter et al., 2024; Agostini and Picasso, 2024; and Ilieva et al., 2025). The authors identified policy structures at various levels, including the European level (e.g., the EU AI Act and the ENQA standards), national level (e.g., the UK QAA), and the institutional and local levels. For example, most universities are formulating internal policies, rubrics, and moderation processes to ensure alignment with both national and European standards (Ilieva et al., 2025). This indicates that while institutions are leading the process, there is an increasing recognition and integration of more extensive regulatory and quality assurance frameworks.

The main situation presents a significant degree of institutional autonomy in policymaking. In addition, there is a perceptible trend towards the incorporation of international and European principles into local contexts, although specifics concerning, HE policies at the EU level are not yet entirely outlined or standardized (Symeou et al., 2024; Agostini and Picasso, 2024).

Collective interest and concern on ethical dimensions

A collective awareness and concern regarding four main ethical dimensions are evident among the authors of the journal articles included in this systematic review.

Academic integrity: preventing plagiarism, cheating and ensuring authenticity. Emerges as the most

consistently addressed ethical dimension and policy focus area which is specifically mentioned in 12 of the 14 papers (Alexander et al., 2023; Batista et al., 2024; Kshetri, 2024; Symeou et al., 2024; Vetter et al., 2024; Adarkwah, 2025; Amigud and Pell, 2025; Gonsalves, 2025; Ilieva et al., 2025; Muñoz-Martínez et al., 2025; Rughiniș et al., 2025; Wilson, 2025) For instance, Imperial College London notes: "Unless explicitly authorized to use as part of an assessment, the use of GenAI tools to create assessed work can be considered a form of contract cheating." And again, Columbia University states: "The unauthorized use of AI shall be treated similarly to unauthorized assistance and/or plagiarism (Rughiniș et al., 2025, p. 6).

Transparency and disclosure: attribution of LLM use, or stating no AI was used is addressed in 11 of the reviewed papers (Agostini and Picasso, 2024; Batista et al., 2024; Symeou et al., 2024; Vetter et al., 2024; Adarkwah, 2025; Amigud and Pell, 2025; Gonsalves, 2025; Ilieva et al., 2025; Muñoz-Martínez et al., 2025; Rughiniș et al., 2025; Wilson, 2025) For instance, Imperial College London requires: "You should include a statement to acknowledge your use of generative AI tools for all assessed work, in accordance with guidelines from your department or course team." Also, the University of Edinburgh requires: "Credit use of tools: Before handing in your assessed work, make sure you acknowledge the use of GenAI, where used." (Rughiniș et al., 2025, p. 6.)

Human accountability[17]: ensuring that humans remain responsible for the accuracy and integrity of their work was present in ten of the articles reviewed (Batista et al., 2024; Kshetri, 2024; Symeou et al., 2024; Vetter et al., 2024; Gonsalves, 2025; Ilieva et al., 2025; Muñoz-Martínez et al., 2025; Triola and Rodman, 2025; Wilson, 2025). For example, Cornell University notes: "You are accountable for your work, regardless of the tools you use to produce it." Yale University stresses individual responsibility: "We are each responsible for the content of our work product. Always review and verify outputs generated by AI tools, especially before publication." (Rughiniș et al., 2025, p. 6).

In addition, consensus was observed among the authors about the relevance of **bias and reliability** with ten papers focusing on this dimension (Alexander et al., 2023; Agostini and Picasso, 2024; Symeou et al., 2024; Vetter et al., 2024; Adarkwah, 2025; Amigud and Pell, 2025; Ilieva et al., 2025; Muñoz-Martínez et al., 2025; Triola and Rodman, 2025). Several authors warned against the potential for LLM to produce racial and gender bias, inaccurate, or fabricated content. For instance, Columbia University advises: "Check the output of Generative AI tools for bias." (Rughiniș et al., 2025, p.).

Equitable AI Access: is observed in eight papers by Agostini and Picasso (2024); Symeou et al. (2024); Vetter et al. (2024); Amigud and Pell (2025); Ilieva et al. (2025); Muñoz-Martínez et al. (2025); Rughiniș et al. (2025); and Wilson (2025). **Privacy and data protection** were included in half of the papers analyzed in this review (Symeou et al., 2024; Vetter et al., 2024); Adarkwah, 2025; Amigud and Pell, 2025; Rughiniș et al. (2025); Triola and Rodman, 2025; and Wilson, 2025).
Training and AI literacy. Readying the academic community faculty, learners, and staff members with robust training in ethics and AI technologies was included by five of the fourteen authors (Batista et al., 2024; Kshetri, 2024; Symeou et al., 2024; Gonsalves, 2025; and Wilson, 2025).
At the same time, fewer authors included dimensions such as **Critical thinking** (Vetter et al., 2024, and Amigud and Pell, 2025). **Inclusion, non-discrimination, and fairness** (Symeou et al., 2024¸; Adarkwah, 2025). **Intellectual property** was addressed by the authors in these three papers: Adarkwah (2025), Amigud and Pell (2025), and Wilson (2025).

Preparing students for AI-driven labor environments (Kshetri, 2024). **Human agency**, referring to the capacity to make choices and influence one's life and outcomes, is highlighted in Vetter et al. (2024). Moreover, authors such as Triola and Rodman (2025) advocated for **the importance of students' participation** and oversight in GenAI governance. Adarkwah (2025) is the only author who included the two dimensions of **overreliance and linguistic and cultural diversity**.
This highlights a joint fundamental concern in HE regarding the impact of GenAI on **learning outcomes and**

[17] 'Human accountability' stipulates that the final responsibility for academic work remains with the human author, regardless of external assistance

academic standards. This is exemplified by Alexander et al. (2023), who warned about the risk of students failing to meet learning objectives due to 'cognitive offloading[18]' to AI tools. While the specific mechanisms and depth of policies vary, there is a strong consensus on the ethical imperatives of maintaining academic integrity, promoting transparency in AI use, and ensuring human oversight and responsibility.

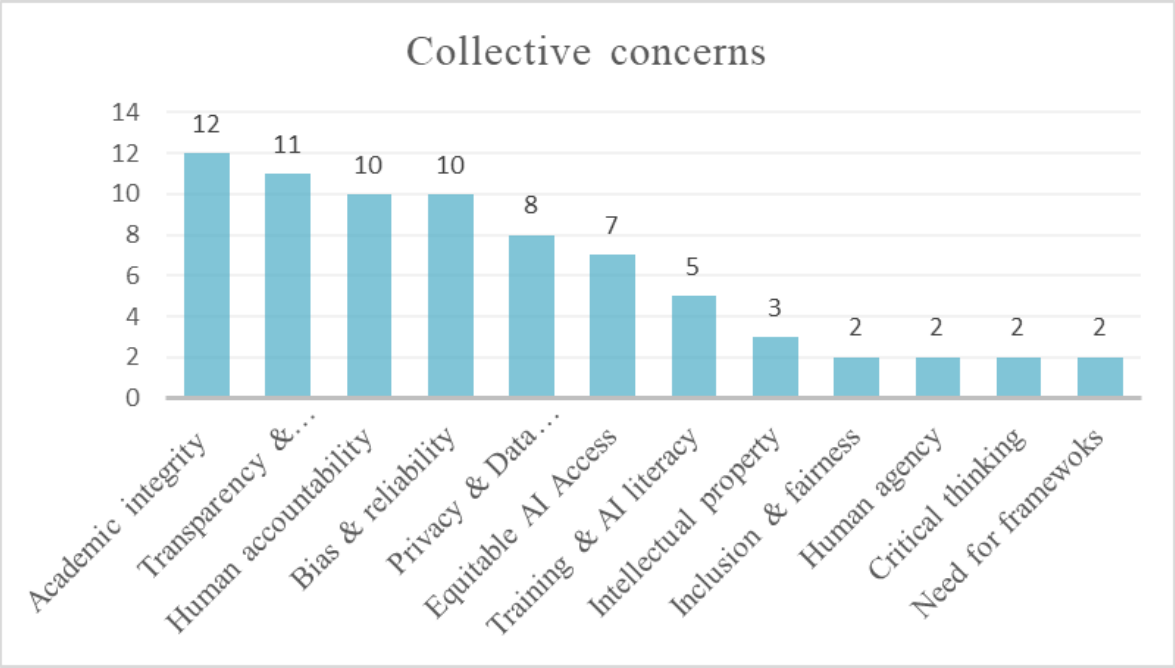

Figure 2. Collective concerns

The need for ethical frameworks, guidelines, and regulatory clarity is included in Muñoz-Martínez et al. (2025) and Triola and Rodman (2025), underscoring the pressing need for more **solid and consistent guidance** on how to confront the challenges of AI.

Inconsistency in guidance and identified gaps

The existing literature, including the work of Amigud and Pell (2025), Muñoz-Martínez et al. (2025), and Wilson (2025), revealed significant inconsistencies, confusion, and variations in institutional responses to GenAI integration. One notable example of this discrepancy is the varied stance of institutions on GenAI usage, with some prohibiting it and others developing customized tools.
Additionally, Symeou et al. (2024) concluded that while many European universities have guidelines, less than half have comprehensive policies. They also found that specific regulations on the use of GenAI are often absent.

While Rughiniș et al. (2025) provided detailed examples of specific policy mechanisms, such as categorical frameworks and data protection rules (for instance, University College London). This demonstrates a level of specifications that contrasts with the more general calls for policy development in other papers (e.g., Alexander et al., 2023; Batista et al., 2024; Muños-Martínez, 2025; Triola and Rodman, 2025; Wilson, 2025).

Several of the reviewed studies explicitly identified gaps and limitations. These included:

- Disparities in policy development, often related to resource constraints (Alexander et al., 2023; Wilson, 2025; Muñoz-Martínez et al., 2025)
- The predominance of theoretical frameworks and lacking empirical validation (Agostini and Picasso, 2024; Kshetri, 2024; and Adarkwah, 2025)

[18] The term 'cognitive offloading' refers to a moment when the cognitive demands of the task are reduced by using technology, for instance, the use of the writing assistant tool Grammarly (Dawson, 2020, cited in Alexander et al., 2023, p. 27).

- The prioritization of technical training over ethical training (Alexander et al., 2023; Muñoz-Martínez et al., 2025).
- The limited generalizability of findings derived from single-case studies (Vetter et al., 2024; Adarkwah, 2025)
- The need for continuous updates of guidelines to prevent obsolescence in rapidly evolving technological contexts (Triola and Rodman, 2025; Wilson, 2025).

Conclusions

A thorough examination of the relevant literature reveals the following conclusions regarding the structure, implementation, and ethical dimensions of GenAI policies in HE within the European context. Efforts and awareness of GenAI have surged in European HE, but the current policy scenario is marked by its developmental stage and fragmentation. There is an evident need for more comprehensive policies, practical guidance, and continued adaptation to keep up with evolving technological capabilities and ethical challenges. This evolution requires a transition from general principles to robust, implementable frameworks.

Here is a synthesis of the findings from the papers in relation to the research questions:

RQ1: What guidelines, institutional policies, and best practices have already been developed to promote the honest and responsible use of LLM in HE within the European Community?

Within the European Community, there is a marked increase in the need for guidelines and institutional policies to ensure the responsible use of GenAI and LLM in HE (Alexander et al., 2023; Batista et al., 2024; Muñoz-Martínez et al., 2025). In response to this challenge several pivotal overarching frameworks have been developed to address this matter. For instance, UNESCO's "Guidance for GenAI in education and research" which assists governments in implementing urgent steps and developing long-term policies (Agostini and Picasso, 2024; Wilson, 2025). Currently, the UK Department for Education has explored experiences, opportunities, and risks of GenAI in education, and the Office of the European Union has outlined the state of AI and its prospective applications, establishing the foundation for subsequent policy initiatives (Agostini and Picasso, 2024).

The European Union's AI Act is the first global attempt to regulate AI, requiring risk assessments from potentially unsafe AI companies (Vetter et al., 2024). Additionally, the European Commission has issued "Living guidelines on the responsible use of GenAI in research," covering ethical use, legislation, transparency, and intellectual property rights (Wilson, 2025). The ENQA has updated its quality standards, including the Standards and Guidelines for Quality Assurance, ESG, Standard 1.3, to address AI integration in assessment, focusing on student-centered learning, fairness, transparency, and timely feedback (Ilieva et al., 2025).

At the institutional level, many top-ranking European as well as North American universities have begun developing their own guidelines for the ethical and responsible use of LLM, though less than half have comprehensive policies in place (Symeou et al., 2024; Vetter et al., 2024; Gonsalves, 2025; Triola and Rodman, 2025). These often focus on academic integrity, assessment design, and communication with students (Muñoz-Martínez et al., 2025). Common elements in these emerging frameworks include an institutional vision, infrastructure, stakeholder involvement, a structured methodology, specific guidelines for students and instructors, established communication channels, and AI literacy training (Symeou et al., 2024). For instance, UK universities, particularly the Russell Group (Wilson, 2025) and King's Business School at King's College London (Gonsalves, 2025), have developed principles to guide the responsible and ethical implications of AI-assisted use. These guidelines include supporting AI literacy, equipping staff, adapting teaching and assessment, ensuring academic integrity, and the need for transparency in academic submissions.

National agencies, such as the UK's QAA, provide in-depth guidance on assessment practices, emphasizing

reliability, moderation protocols, and a balanced integration of formative and summative methods. Institutional policies often specify expectations for validity, fairness, and consistency, often employing tools such as grading rubrics and peer moderation to ensure alignment with program-level outcomes (Amigud and Pell, 2025; Gonsalves, 2025; Ilieva et al., 2025).

Specific best practices and policy elements, drawing from examples across and relevant to the European context, highlight several core areas. Many universities now require explicit instructor permission for LLM use in coursework, often defaulting to restriction unless allowed. Well-known universities like UCL use categorical frameworks to define how LLM can be used. Transparency and disclosure are standard, necessitating mandatory citation, attribution, and disclosure of LLM use (Rughiniș et al., 2025).

RQ2: At which levels (institutional, national, and Europe use) are these policies structured and implemented?

Firstly, it is evident that policies for the responsible use of LLM in HE are predominantly structured and implemented at the institutional or university level (Kshetri, 2024; Symeou et al., 2024; Gonsalves, 2025; Muñoz-Martínez et al., 2025; Wilson, 2025). While broader European and international standards from bodies like the EU, UNESCO, and OECD provide a foundational ethical and legal framework, individual universities are primarily responsible for developing and tailoring specific guidelines to their unique contexts and needs. This institutional-level implementation often involves a multidisciplinary, consensus-based approach with iterative refinement (Symeou et al., 2024).

The ethical considerations are integrated into policies structured and implemented across multiple levels, from overarching European standards (e.g., EU A.I. Act, ENQA's ESG) and national guidelines (e.g., QAA) down to institutional directives and local, classroom-level negotiations (Agostini and Picasso's, 2024; Vetter et al., 2024; Ilieva et al., 2025; Amigud and Pell, 2025; Adarkwah, 2025).

However, the analysis also reveals several limitations and areas for further development (Gonsalves, 2025). Many authors highlight disparities in policy maturity and implementation across institutions, particularly between well-resourced and less-resourced universities, raising concerns about equity (Wilson, 2025).
There is also a noted lack of comprehensive integration of AI policies into broader information policies and a frequent reliance on the discretion of individual faculty members and leading to inconsistencies (Agostini and Picasso, 2024; Kshetri, 2024; Amigud and Pell, 2025). Researchers consistently call for ongoing research, standardization, and adaptation of policies due to the rapid evolution of AI technology and educational practice (Vetter et al., 2024; Adarkwah, 2025; Triola and Rodman, 2025).

Methodological limitations in current studies, such as reliance on publicly available documents, limited sample sizes, and a need for more empirical validation in diverse contexts, underscore the necessity for more detailed, context-sensitive, and locally negotiated ethical frameworks, especially at the classroom level, to ensure effective and generalizable policy application (Agostini and Picasso, 2024; Battista et al., 2024) Vetter et al., 2024; Ilieva et al., 2025; Amigud and Pell, 2025; Gonsalves, 2025; Rughiniș et al., 2025; Wilson, 2025).

The reviewed policies reveal a fragmented governance structure, particularly in relation to formal documentation and reporting obligations. Most proposed frameworks -such as those by Agostini & Picasso (2024); Kshetri (2024); Symeou et al. (2024); Vetter et al. (2024); Adarkwah (2025); Muñoz-Martínez et al. (2025); Rughiniș et al. (2025); Triola & Rodman (2025) are institution- or discipline-specific and do not define systematic procedures for traceability, accountability, or transparency. Furthermore, they show a lack of generalizability (Muñoz-Martínez et al., 2025; Rughiniș et al., 2025), limited diversity (Vetter et al., 2024) and potential bias due to sample sizes, scope or disciplines (Symeou et al., 2024; Adarkwah, 2025; Muñoz-Martínez et al., 2025; Triola and Rodman, 2025). Several authors (Alexander et al., 2023; Batista et al., 2024; Vetter et al., 2024) call for the development and implementation of updated policies due to the fast advance of technology. Therefore, it is recommended that institutions adopt detailed guidelines for monitoring

processes to strengthen transparency and accountability in the use of AI in HE across Europe.

RQ3: Which ethical dimensions are explicitly addressed in the formulation and application of these policies?

The ethical dimensions most frequently and consistently addressed in these policies revolve around academic integrity, transparency, and human accountability (Kshetri, 2024; Vetter et al., 2024; Amigud and Pell, 2025; Adarkwah, 2025; Ilieva et al., 2025; Muñoz-Martínez et al., 2025; Rughiniș et al., 2025).

Regarding human accountability, it has been observed that guidelines often allow the use of LLM for tasks such as brainstorming, editing, translation, and ideation. However, the boundaries generally do not include generating final products or evaluation (Alexander et al., 2023; Rughiniș et al., 2025). Transparency is mandated, typically requiring students to disclose and attribute their use of LLM in all assessed work, as seen at Imperial College London (Vetter et al., 2024; Rughiniș et al., 2025; Adarkwah, 2025).

Furthermore, data protection is a critical concern, with strict rules against inputting confidential or sensitive data into public LLM (Rughiniș et al., 2025). Best practices also extend to pedagogical approaches, advocating for clear assessment criteria, timely response, the separation of feedback from grading, and the use of formative assessment processes (Agostini and Picasso, 2024; Vetter et al., 2024; Ilieva et al., 2025).

Overall, there is a strong emphasis on establishing comprehensive policies and guidelines for ethical and responsible GenAI use, covering data privacy, intellectual property, and academic integrity (Vetter et al., 2024; Adarkwah, 2025).

Bias and reliability are significant concerns, with policies warning against the potential for LLM to produce inaccurate, biased, or fabricated content, and advising users to critically check outputs (Batista et al., 2024; Vetter et al., 2024; Ilieva et al., 2025; Amigud and Pell, 2025; Adarkwah, 2025; Rughiniș et al., 2025).

Data privacy is consistently addressed, prohibiting the input of confidential or sensitive data into public LLM (Adarkwah, 2025; Rughiniș et al., 2025; Triola and Rodman, 2025).

Policies also stress the importance of fostering critical thinking, mitigating overreliance, and providing robust training in AI competencies to learners and educators to ensure honest and responsible use (Batista et al., 2024; Kshetri, 2024; Symeou et al., 2024; Gonsalves, 2025).

Other critical dimensions include fairness and equity in assessment and access to GenAI tools with the goal of ensuring comparable conditions for all students (Agostini and Picasso, 2024; Symeou et al., 2024; Vetter et al., 2024; Ilieva et al., 2025; Muñoz-Martínez et al., 2025; Rughiniș et al., 2025; Wilson, 2025).

In addition, policies recognize the importance of intellectual property rights (Adarkwah, 2025; Amigud and Pell, 2025; Wilson, 2025). At the same time, other authors advocate for linguistic and cultural diversity (Adarkwah, 2025) together with preparing students for AI-driven labor environments (Kshetri, 2024). These thorough ethical considerations underscore a collective effort to ensure that GenAI is utilized as a reliable, beneficial, and responsible tool in education and research.

As a conclusion, the present systematic review indicates that while European HE is actively confronting the challenges of the incorporation of LLM and GenAI, there is an evident increasing number of institutional policies and a growing attention to ethical dimensions. However, the study notes a current absence of a unified or consistently comprehensive policy framework.

Although there is an increasing awareness of the need to align with broader European and international standards, efforts are largely concentrated at the classroom and institutional level. Still, significant challenges remain in achieving consistency, depth, and broad implementation across the diverse European

HE landscapes.

Identified Key components and best practices

As a result of the two analyses and merging the conclusions presented for every type of analysis, we can conclude that the key components for AI applied policies in HE institutions are the following:

- **Legal and Ethical Requirements**: comply with the EU AI Act. Ensure transparency and copyright protection.
- **Acceptable Use and Detailed Guidelines**: Effective policymaking on generative AI (GenAI) in academia requires the explicit delineation of acceptable and unacceptable uses.
- **Ethical Impact Declarations**: Policies on academic integrity must explicitly address the impact of AI by mandating the redesign of assessment practices to foster originality and resilience against misuse.
- **Training and AI Literacy Initiatives**. Effective policies require that all academic stakeholders be equipped with the necessary knowledge through systematic training and AI literacy initiatives.
- **Critical Thinking Strategies**. It is essential to provide education strategies that encourage the development of critical thinking among AI users. So that they can critically evaluate both AI solutions and their impact on society, enabling users to question biases and limitations, verify outputs, and ensure human judgment is prioritized over dependency.
- **Accountability and Enforcement Mechanisms**. Policies must incorporate robust mechanisms to manage risks, protect sensitive data, and ensure the ethical deployment of AI across HE.

As best practices in the deployment of AI Policies in HE institutions, the primary practices identified are the following:

- **Legal and Ethical Practical Implementations**. Best practices measures include guaranteeing robust data privacy and security through informed consent, mandating transparency and disclosure of AI-generated content, and integrating 'ethics by design' to mitigate biases and uphold human rights actively.
- **Defining Acceptable Use and Clear Detailed Guidelines**. Universities should create clear, enforceable policies that define acceptable and prohibited uses of AI, require transparency and disclosure, and provide examples to guide students and faculty while outlining consequences for misuse.
- **Assessment Redesign Proposals and Academic Integrity Rules**: Institutions should implement AI-resilient assessments that prioritize authentic, process-focused learning through real-time tasks and documentation, while clearly defining unacceptable AI use and reinforcing academic integrity with tailored honor codes.
- **Training and AI Literacy plans and certification**. Universities should provide ongoing staff training and student modules on AI ethics, detection, and responsible use, while fostering critical awareness of AI's functions, limits, and implications to ensure informed and ethical engagement.
- **Enforcement, Accountability, and Ethical Governance Practices**. Institutions should enforce AI policies through the use of detection tools, manual reviews, and ethical oversight, ensuring transparency, GDPR compliance, equity, and the prevention of bias, while fostering accountability

and inclusive, multi-stakeholder policymaking.

As summarized by the key components and best practices described above, a comprehensive AI governance framework can be defined along different axes, which correspond to the key aspects to be considered in developing a policy for the adoption and use of GenAI and LLMs in universities. Figure 3 shows these axes using an umbrella metaphor for the institution/university in the case of misuse or unethical use of the tools.

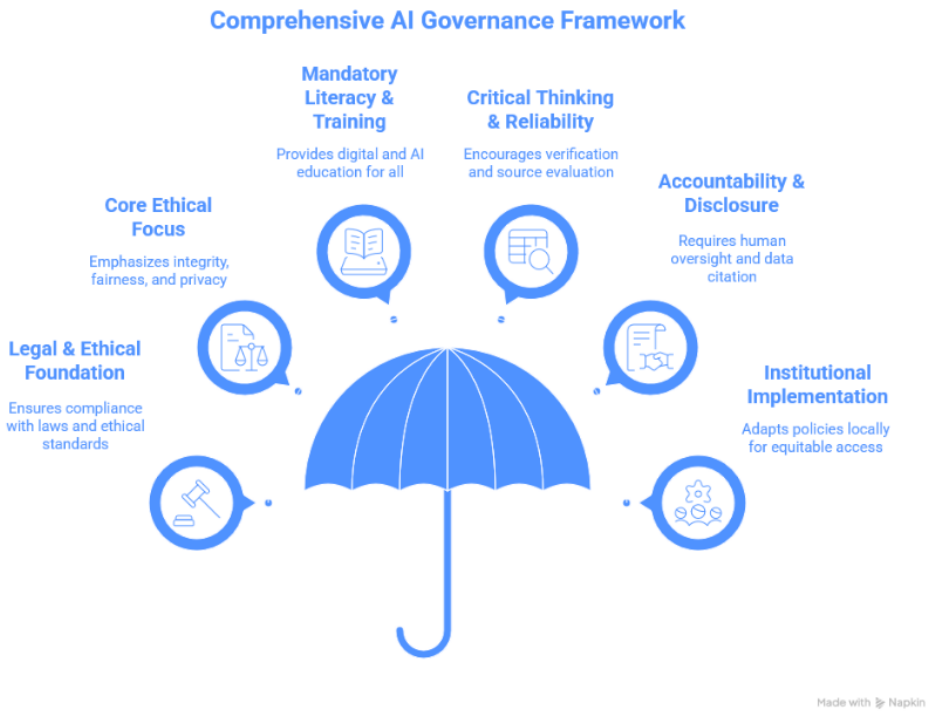

Figure 3. AI Governance Policy Areas-- Image source: Made with Napkin.ai

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ANNEX A

Nº	Author & Year	Country Institution	Method / Instrument	Participant profile	Outcome	Policy Level	Policy dimensions	Policy Implementation	Limitations	Quality/Bias
1	Alexander et al., 2023	Cyprus University of Nicosia	Qualitative study Analysis of four academic essays (AI-generated and human-written) by six ESL lecturers Comparison of texts using four AI detection tools	Six ESL (1) lecturers (three male, three female) Aged 35–41, Teaching experience (5-20 years) Teaching C1 level academic writing courses	Need for: Digital literacy training Advanced detection tools Policy review	Institutional Calls for further research Need for policy development No references to global policies	Academic integrity Digital literacy Assessment practices Responsible use of AI Teacher training	Call for the development & implementation of new policies Need of training programs	Small sample size Single institution Limited generalizability Qualitative and subjective analysis	Exploratory Not generalizable Acknowledgement of potential for participant and researcher bias
2	Agostini & Picasso, 2024	University of Trento, Italy Focus on European & international context	Literature review Comparative analysis Model design Planned Delphi study for validation	Model & policy analysis Planned Delphi study (30 education experts)	AI-MAAS (2) model for responsible, sustainable, & authentic use of LLMs in assessment & feedback	Institutional References to global policies UNESCO & U.S. Department of Education, Office of Educational Technology, AI and Future of Teaching and Learning	Transparency Privacy Equality Beneficence Bias Sustainability Authenticity Formative & summative assessment	Guidelines Best practices Model adoption at multiple levels Planned validation via Delphi Classroom experimentation	Lack of replicability Experimental evidence needed Potential privacy & bias issues	Comprehensive & comparative Limited by current evidence base & generalizability
3	Batista et al., 2024	Portugal International literature is covered Not limited to Europe	Systematic Literature Review following PRISMA(SLR) guidelines	Review of published empirical studies 102 articles were Identified	Identification of lack of institutional policies, ethical guidelines, & best practices for responsible GenAI/LLM use Does not list specific existing policies	Primarily institutional No coverage of national or European-level policies	Academic integrity Ethical & responsible use Transparency	Emphasizes the need for policy development & implementation at the institutional level No examples of implementation provided	Short time frame Jan. 2023–Jan 2024 Search criteria may have missed relevant studies (Scopus &Web of Science)	Review, SLR & PRISMA protocols, enhances reliability & reproducibility Short review period

№	Author, Year	Location, Institution	Research Instrument	Participant profile	Outcome	Policy Level	Policy dimensions	Policy Implementation	Limitations	Quality/Bias
				37 meeting the inclusion criteria			Risk management Training		Focus limited to HE Does not provide detailed critique of individual policies or their effectiveness	Specific search terms may introduce selection bias Lack of in-depth critical appraisal of individual policy effectiveness or cross-national comparisons
4	Kshetri, 2024	United States Bryan School of Business and Economics University of North Carolina at Greensboro	Conceptual & theoretical approach Qualitative analysis	Not applicable Used literature, reports, and examples	Proposes an institutional theory framework for understanding academic responses to GenAI Factors influencing resistance and acceptance are identified Proposals for future empirical testing	Institutional Bryan School of Business and Economics and University of North Carolina at Greensboro) References for national and international examples No references to global policies Discusses institutional trends	Focuses on legitimacy Stakeholder pressure Institutional change Value creation, and adaptation Ethical concerns Cheating Academic integrity	Not empirically tested Description of ways of implementation Examples of institutional level implementation such as bans, integration, guideline development	Conceptual & exploratory only Lacks empirical data	Theoretical, not empirical Potential bias in selection of examples Need for empirical validation is acknowledged
5	Symeou et al., 2024	European University Cyprus References to European context	Multidisciplinary, consensus-based framework development Literature review Stakeholder consultation	Participation of faculty from all academic schools (IT expert, instructional designer, accessibility specialist, & students)	Development of a comprehensive, evidence-based, multidisciplinary, & consensus-based framework	Institutional level (designed as an umbrella framework) Informed by national and European guidelines (e.g. UNESCO)	Ethical use and academic integrity Huma-centered Inclusion Non-discrimination & fairness Data privacy Safety & security	Multidisciplinary task group formed Iterative consensus-building, literature review, & stakeholder consultation Drafting, review, and refinement of the framework using both human & GenAI input Dissemination through workshops, webinars, & ongoing training	Lack of robust, high-quality experimental research on AI in education Regular updates required Challenge of monitoring students outside formal educational settings Framework is institution-specific	The process was inclusive, multidisciplinary, and consensus-based, involving a wide range of stakeholders and iterative feedback Possible institutional or disciplinary biases Limited generalizability

№	Author & Year	Country/ Institution	Research Instrument	Participant profile	Outcome	Policy Level	Policy dimensions	Policy Implementation	Limitations	Quality/Bias
							Communication & transparency Responsible use by students & educators Risks & opportunities of GenAI Continuous improvement & adaptability	Departments and schools are encouraged to develop subject-specific guidelines within the overall framework		Lack of experimental validation Reliance on expert opinion & literature review
6	Vetter et al., 2024	Indiana, USA University of Pennsylvania University of Connecticut, University of Pittsburgh	Qualitative single-case study Semi-structured interviews, student logs, classroom observations, & course documents	One white 19-year-old male undergraduate majoring in Computer Science & minoring in Cyber Security	Development of a “Local Ethics Framework” for AI use in the classroom Including a heuristic model with elements such as pedagogy, criticality, reliability, & accessibility	Institutional Lined up with institutional & broader guidelines References for European Union’s A.I. Act & U.S. Department of Education	Pedagogy Agency Reliability Accessibility	Through classroom policy Documentation of AI use required Negotiation between student & instructor Reflective practice	Single case study with one participant Limited diversity Generalizability is restricted Calls for more diverse & longitudinal research	Limited diversity Restricted generalizability
7	Adarkwah, 2025	Friedrich-Schiller-Universität Jena, Germany International focused References for UNESCO & Europe	Systematic literature review Content analysis of highly cited articles & UNESCO reports	Conceptual & theoretical paper No empirical participants	Proposed GenAI-ALE (3) framework Policy elements include curriculum, ethics, digital divide, policy, etc.	Institutional References to international guidance UNESCO No specific national/EU policies	Ethics Curriculum Digital divide Policy Human-centered Literacy Interest Virtual learning	Framework is theoretical Recommends iterative, context-specific adoption steps No empirical implementation	Theoretical focus Lack of empirical validation Limited to literature from 2023-2024	Systematic literature review Limited by scope recency Lack of empirical data

№	Author & Year	Country/ Institution	Research Instrument	Participant profile	Outcome	Policy Level	Policy dimensions	Policy Implementation	Limitations	Quality/Bias
8	Amigud & Pell, 2025	Australia Canada Hong Kong Ireland India Nigeria UK USA	Multiple-case qualitative study Content analysis of institutional documents	Analysis of institutional policies & guidelines of 50 universities	Wide variation in policy responses Main concern is academic integrity Recommendations for human-proctored assessments	Institutional References to national & international policies (e.g., UNESCO & the Word Economic Forum's seven principles)	Academic integrity Privacy Intellectual property Equality Bias Critical thinking	Inconsistent Left to individual faculty discretion Lack of comprehensive or coordinated policies	Modest sample size English-only documents Dynamic policy environment	Systematic approach with reliability checks Possible selection bias
9	Gonsalves, 2025	UK King's Business School King's College London	Sequential Mixed methods: anonymous survey and semistructured interviews	57 students Survey: 63% undergraduate, 37% postgraduate Diverse disciplines 17 interviewees from various programs and levels	Mandatory AI use declaration on coursework coversheet Policy requires students to declare AI use or state none was used Policy emphasizes transparency but does not penalize declared use	Institutional (King's Business School/King's College London) Reference to broader university and sectoral trends References to global policies and guidelines	Transparency Honesty Academic integrity Clarity of guidelines Trust Support for ethical AI use	Implemented via a mandatory coversheet on Moodle Enforcement inconsistent across courses Low compliance (74% non-compliance)	Single-case study Small sample size Context-specific (King's Business School) Limited generalizability	Limited generalizability Gaps were identified in the effectiveness of current declaration mechanisms Acknowledges need for further studies and clearer, more consistent, and trust-based policies
10	Ilieva et al., 2025	Bulgaria European context	Conceptual framework Case study	15 university students 3 instructors	Proposed framework for generative AI-supported assessment in HE Includes guidelines for responsible use Transparency Quality assurance	Institutional, with implications for national & European levels References to global policies and guidelines e.g. ISO 21001:2018 & ENQA (4)	Academic integrity Transparency Fairness Accountability Feedback Bias mitigation Alignment with learning outcomes	Framework validated via a university-level course Includes rubric-based assessment Human-AI comparison Recommendations for policy & practice	Single institution & course Small sample size Static dataset Not fully tested in live class settings Limited generalizability	Transparent about limitations Limited empirical validation Need for broader, longitudinal & multi-institutional research

№	Author & Year	Country/ Institution	Method / Instrument	Participant profile	Outcome	Policy Level	Policy dimensions	Policy Implementation	Limitations	Quality/Bias
11	Muñoz-Martínez et al., 2025	Spain Focuses on European HE Area	Qualitative Semi-structured interviews Semantic and content analysis	Eleven HE experts	Identification of barriers and facilitators to critical thinking in AI-integrated distance education Conceptual framework proposed. Five strategic action vectors for policy & guidelines	Institutional National European International (UNESCO 2021 & 2024)	Ethics Academic integrity Digital literacy Equity Algorithmic bias Critical thinking	Early stage Mostly institutional initiatives Some national/international frameworks Need of standardization	Small & homogeneous sample Limited to distance universities in Europe Qualitative, not generalizable	High coding reliability Potential bias due to sample size and scope Acknowledges need for broader studies
12	Rughiniș et al., 2025	US UK	Qualitative content analysis	16 top universities, 12 publishers	Categorical Permission/prohibition Transparency Attribution Human Accountability Data Protection	Institutional (university and publisher) References to global policies e.g. Digital Education Council's 2024 Global AI Student Survey	Academic integrity Transparency Accountability Bias Privacy Accessibility	Instructor level authority Mandatory disclosure, Process-oriented boundaries	Focus on top institutions Formal policies Restricted coverage	Robust analysis Limited generalizability Possible bias toward early adopters & English-language policies
13	Triola and Rodman, 2025	United States Grossman School of Medicine Harvard Medical School	Scholarly Perspective Expert Commentary Literature and institutional experience	Not applicable	Conceptual framework created structured in 3 main domains: policy, governance, and curriculum (medical education) Curriculum development for GAI in medical education recommendations	Institutional Recommendations for local governance and student involvement No references to global policies	Ethics Data privacy Bias Professionalism Application to clinical care, quality and accuracy assessment	Suggested through local governance bodies, curriculum integration, and student & faculty training	No empirical data USA focused Fast evolving field Need for continuous recommendations updates	Expert opinion Potential bias from institutional experience Acknowledges need for ongoing adaptation and evaluation
14	Wilson, 2025	United Kingdom focuses on	Document analysis of publicly available policies	Institutional document analysis	Identification & analysis of policy elements for GenAI use in HE	Institutional	Academic integrity & plagiarism	Varies by institution	Reliance on publicly available documents	Comprehensive overview with valuable insight into

№	Author & Year	Country/ Institution	Research Instrument	Participant profile	Outcome	Policy Level	Policy dimensions	Policy Implementation	Limitations	Quality/Bias
		Russell Group universities			Documentation of best practices & challenges in policy development & implementation	National & Russell Group principles References for: the European Commission's Living Guidelines the US Department of Education Report UNESCO's AI and Education Guidance	Assessment & evaluation AI literacy & training Ethical use, transparency, & citation. Equity & access Data privacy & intellectual property	Collaborative approaches e.g., GAIN (5)	Rapidly evolving field, so findings may become outdated. Small sample size for non-Russell Group universities; possible underrepresentation of less-resourced institutions	early policy responses. Potential bias toward well-resourced institutions The most current or internal practices may not be among findings

Table Notes (1) ESL: refers to English as a Second Language lecturers. (2) AI-MAAS: AI-Mediated Assessment Academics and Students. (3) GenAI-ALE: GenAI Adult Learning Ecology. (4) ENQA European Association for Quality Assurance in Higher Education (5) GAIN stands for GenAI Network managed by the University of Liverpool's Centre for Innovation in Education, which facilitates the sharing of policy & best practices.