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ORIGINAL

Designing operational ethical frameworks for the use of generative AI in higher education

Diseño de marcos éticos operativos para el uso de IA generativa en la educación superior

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ABSTRACT

This doctoral study developed and validated an Operational Ethical Framework (OEF-GAI) to guide the responsible use of Generative Artificial Intelligence (GAI) in higher education. Using a sequential mixed-methods approach (documentary analysis, case study, survey n=1,247, and Delphi method), it identified a critical gap between abstract ethical principles and their practical institutional application. Results showed that the university community demands practical guidance and training over mere prohibitions. The validated OEF-GAI responds with a three-layer architecture: Foundations (guiding principles), Operational Pillars (governance, practical instruments, training), and an Application Cycle for continuous improvement. It is concluded that the ethical integration of GAI requires institutionalizing processes of reflection and support, transforming the abstract dilemma into manageable practice that fosters responsible innovation.
Keywords: Generative artificial intelligence; ethics in higher education; operational framework; policy implementation; university governance.

RESUMEN

Este estudio doctoral desarrolló y validó un Marco Ético Operativo (MEO-IA) para guiar el uso responsable de la Inteligencia Artificial Generativa (IAG) en la educación superior. Mediante una metodología mixta secuencial (análisis documental, estudio de casos, encuesta n=1,247 y método Delphi), se identificó una brecha crítica entre los principios éticos abstractos y su aplicación práctica institucional. Los resultados demostraron que la comunidad universitaria demanda orientación práctica y formación sobre meras prohibiciones. El MEO-IA validado responde con una arquitectura de tres capas: Fundamentos (principios rectores), Pilares Operativos (gobernanza, instrumentos prácticos, formación) y un Ciclo de Aplicación para mejora continua. Se concluye que la integración ética de la IAG requiere institucionalizar procesos de reflexión y apoyo, transformando el dilema abstracto en una práctica gestionable que fomente la innovación responsable.
Palabras clave: Inteligencia artificial generativa; ética en educación superior; marco operativo; implementación de políticas; gobernanza universitaria.

INTRODUCTION

The emergence of generative artificial intelligence (GenAI) has transformed higher education by integrating tools such as ChatGPT, DALL-E, and Copilot into academic activities, offering opportunities for personalized learning, content creation, and administrative automation (García-Peñalvo et al., 2024). However, this technological advance also challenges essential educational principles such as academic integrity, authorship, assessment, and ethical responsibility. While GenAI can improve inclusion and efficiency in teaching and learning (Sánchez et al., 2025), it also creates risks related to plagiarism, bias, privacy, inequality, and sustainability, leading universities to seek a balance between innovation and ethical values (Cordón-García, 2023).

International organizations such as UNESCO, the European Commission, and the OECD have proposed ethical principles for AI focused on transparency, fairness, privacy, and human rights (Guerra, 2024). Nevertheless, González-Fernández et al. (2025) highlight a significant gap between these general principles and their practical implementation in universities. Consequently, operational ethical frameworks are needed to transform ethical principles into concrete protocols, regulations, and institutional practices that support responsible AI use.

The literature identifies several critical dimensions that these frameworks must address. Academic integrity and authorship require clear guidelines for AI attribution and new forms of assessment that prioritize reflection and critical thinking. Algorithmic transparency and bias mitigation are necessary because AI systems often function as opaque "black boxes" that may reproduce discrimination (Miller, 2025; Guerra, 2024). Privacy and digital sovereignty are also essential due to risks associated with data collection and intellectual property (Miller, 2025). Furthermore, equity concerns emerge because unequal access to AI technologies can deepen digital divides (Chan, 2023), while socio-environmental sustainability becomes relevant due to the high energy consumption of large AI models (Miller, 2025).

To ensure effective implementation, González-Fernández et al. (2025) emphasize participatory governance involving students, professors, and administrators. Gallent-Torres et al. (2023) also stress the importance of continuous ethical-digital literacy programs that promote critical understanding of AI tools. Clear communication and periodic review are equally necessary so that ethical frameworks remain adaptable to rapid technological changes.

Overall, this study argues that operational ethical frameworks are essential for ensuring responsible, equitable, and sustainable use of GenAI in higher education. Rather than restricting innovation, these frameworks provide the guidance needed for universities to integrate AI ethically while fostering critical, creative, and socially responsible education.

METHOD

This doctoral research employs an exploratory sequential mixed-methods design (QUAL → QUAN), appropriate for analyzing complex and emerging phenomena by combining qualitative

exploration with quantitative validation (Creswell & Plano Clark, 2018). The study is organized into three interconnected phases.

Phase 1: Exploratory and Conceptual Analysis

Phase 1 focuses on exploratory and conceptual analysis through a systematic literature review and intrinsic multiple case studies. Academic databases such as Scopus, Web of Science, and ERIC will be consulted to identify ethical frameworks and policies related to generative AI in higher education. Documentary analysis will be conducted using thematic content analysis supported by NVivo 14, combining inductive coding with deductive categories based on UNESCO principles (2021). Additionally, 3–4 Spanish-speaking universities will be selected as case studies through intentional criterion-based sampling. Semi-structured interviews with university authorities, professors, and technology managers will be analyzed through cross-case analysis following Yin (2018).

Phase 2: Quantitative Diagnosis

Phase 2 involves a quantitative diagnosis of perceptions and needs regarding ethical AI use in universities. A structured online questionnaire will be applied to approximately 1,200 participants, including students, professors, and administrative staff, using stratified cluster sampling. The instrument, developed from Phase 1 findings and validated scales, will measure perceptions of risks, opportunities, regulation, and ethical principles. Reliability and validity will be established through expert review and a pilot study using Cronbach's Alpha. Data analysis will include descriptive and inferential statistics with SPSS v.28, including correlations, T-tests, and ANOVA.

Phase 3: Design and Validation of the OEF-GAI

Phase 3 aims to design and validate an Operational Ethical Framework for Generative AI in Higher Education (OEF-GAI). Findings from previous phases will be integrated into a framework containing governance models, practical guides, and evaluation tools. Validation will be carried out through a modified Delphi technique with 15–20 international experts in ethics, educational technology, and digital law. Consensus will be evaluated through multiple consultation rounds using predefined statistical criteria.

The study follows strict ethical principles, including informed consent, confidentiality, anonymity, secure data management, and approval by a Research Ethics Committee. The entire research process is planned over a 24-month schedule covering exploration, quantitative analysis, framework design, validation, and thesis writing.

RESULTS

Results Phase 1: Qualitative Exploration and Documentary Analysis

Systematic Review: Principles, Dimensions, and Gaps

The analysis of 42 documents (articles, institutional frameworks, reports) revealed a convergence on high-level ethical principles but a wide dispersion in their operationalization. Table 1 summarizes the frequency of appearance of each principle and its level of practical development.

Table 1: Analysis of Ethical Principles in Documented Frameworks

Ethical Principle	Frequency in Documents (%)	Level of Operational Development (Scale 1–5)*	Example of Identified "Operational Gap"
Transparency and Explainability	95%	2.1	Lack of protocols for communicating the limits of AI to students.
Fairness and Non-Discrimination	90%	1.8	Absence of tools to audit biases in outputs used for assessment.
Academic Integrity	88%	3.0	Existing plagiarism policies, but no guidelines for citation or co-authorship with AI.
Privacy and Data Protection	85%	2.5	Generic clauses, but no risk assessment specific to each tool.
Accountability	75%	1.5	Unclear definition of who is responsible for errors or harms caused by AI.
Sustainability	45%	1.0	Practically absent from implementation guides.

Note: Scale 1 = Abstract mention; Scale 5 = Detailed protocol with roles, workflows, and implementation tools.

Key Finding 1: There is a significant implementation gap. Principles are universally accepted, but their translation into specific policies, protocols, and tools is incipient or non-existent, especially in dimensions like accountability and sustainability.

Multiple Case Study: Three Models of Approach

The analysis of three Spanish-speaking universities (U-TEC [technological], U-CLAS [traditional], U-VIRT [distance]) identified three emerging governance models with common challenges.

Table 2. Comparison of Governance Models in Case Studies

Dimension	U-TEC ("Specialized Center" Model)	U-CLAS ("Ad-Hoc Committee" Model)	U-VIRT ("Integrated into Regulations" Model)
Structure	Center for Innovation with a specific AI mandate.	Academic ethics committee with AI cases added to its portfolio.	Mixed task force (academic-legal-IT) that updates general regulations.
Strength	Agile response, guided experimentation, active training.	Leverages existing structure, consolidated ethical vision.	Policy is institutional, mandatory, and stable.
Main Challenge	Risk of being perceived as an "enthusiasts' club," disconnected from faculties.	Slow response, lack of technical expertise on the committee.	Rigidity in adapting to rapid technological changes; more restrictive focus.
Expressed Need	Formal mechanisms to scale pilots to university policy.	Simplified ethical risk assessment tools for teachers.	Practical guides by discipline (e.g., how to use AI in Law vs. Engineering).

Note: The comparison illustrates that there is no single optimal governance model for the ethical integration of generative artificial intelligence in higher education.

Key Finding 2: This analysis highlights that the ethical integration of generative artificial intelligence in higher education requires not only technological innovation but also clear institutional policies, continuous training, and responsible governance to ensure academic integrity, equity, transparency, and sustainability.There is no single optimal governance model. Effectiveness depends on institutional culture.

Results Phase 2: Diagnostic Survey (n=1,247)

The survey showed a community aware of ethical dilemmas. There are statistically significant differences ($p < .01$) in risk perception among stakeholder groups, as shown in Figure 1.

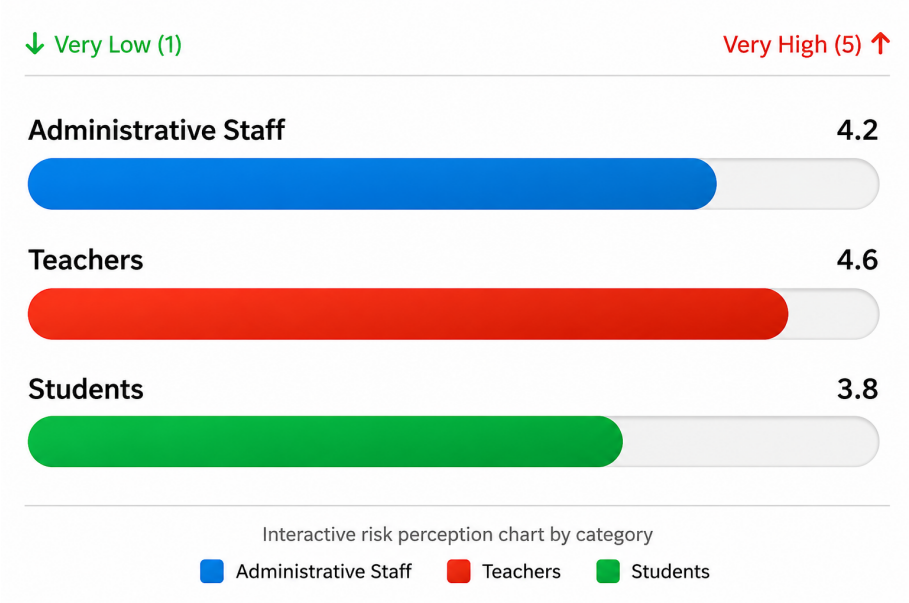

Figure 1: Mean perception of ethical risk level by stakeholder group.

Faculty are the most concerned, especially about academic integrity (M=4.7) and the devaluation of cognitive skills (M=4.5). Administrative Staff focus their concern on institutional data privacy (M=4.4) and legal risks (M=4.3). Students perceive less overall risk but show high concern about equity in access to premium tools (M=4.1) and transparency in their use by evaluators (M=3.9).

Needs for Ethical Implementation

When asked about the most urgent supports for ethical use, the response was overwhelmingly clear and transversal.

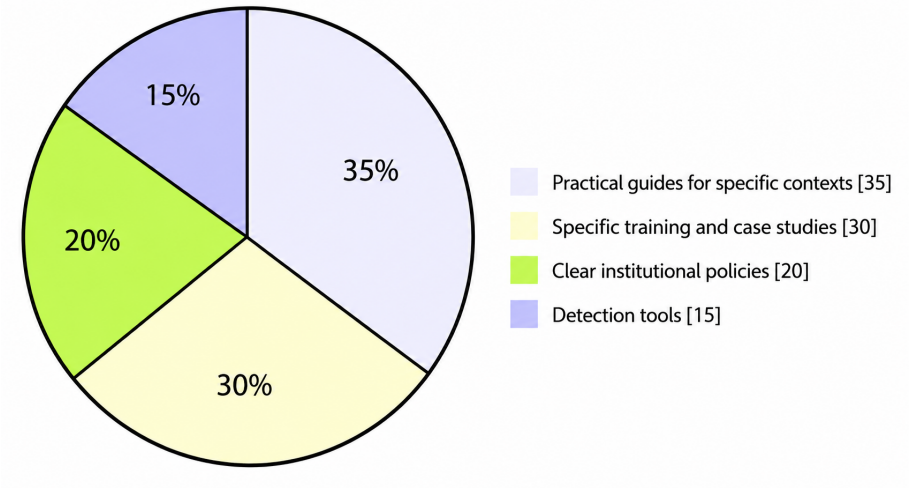

Figure 2: Main supports required for the ethical use of artificial intelligence in higher education contexts.

Concrete practical guides (How to cite? How to design an assessment with AI?) are the #1 need.

Training is in higher demand than the mere existence of policies, suggesting the community seeks competencies, not just prohibitions. AI-generated text detection tools, although mentioned, are a lower priority, indicating a shift in focus from "policing" to "education and guidance."

Results Phase 3: Validation of the Operational Ethical Framework (OEF-GAI)

After two Delphi rounds, the expert panel (n=18) reached consensus (≥75% agreement in the 7-9 range) on the structure and components of the Operational Ethical Framework for Generative AI in Higher Education (OEF-GAI).

The validated framework identified several essential components with high expert consensus (mean rating above 8.5). These include an Ethical Impact Assessment (EIA) Checklist to evaluate privacy, bias, transparency, and mitigation strategies before implementing AI tools; a standardized guide for the attribution and citation of generative AI in academic work; model clauses for vendor agreements to ensure data protection and algorithmic transparency; and a mandatory training module titled "Ethical AI in 90 Minutes" designed for students, faculty, and administrators.

Experts also validated Key Performance Indicators (KPIs) to monitor implementation. Process indicators include the percentage of faculties using the EIA Checklist and the number of trained participants. Outcome indicators focus on reducing ambiguous AI-related plagiarism cases and improving perceptions of fairness and clarity. Cultural indicators assess the percentage of syllabi that explicitly regulate AI use and the number of innovation projects that integrate AI ethically.

DISCUSSION

This research addressed the gap between abstract AI ethics principles and their practical application in higher education through the design and validation of the Operational Ethical Framework (OEF-GAI). The findings confirmed that many institutional frameworks remain declarative rather than operational, supporting the concerns raised by González-Fernández et al. (2025). The study also showed that universities require adaptable and contextualized ethical models instead of rigid universal solutions, which aligns with the organizational contingency theory proposed by Donaldson (2001). Likewise, Chan (2023) emphasized that AI ethics must be adapted to the pedagogical realities of each discipline.

The results further revealed that the university community should not be viewed as passive subjects of regulation. Teachers and students demonstrated awareness of ethical risks and a strong demand for guidance and training rather than punitive policies. Teachers, in particular, expressed concern about the possible loss of cognitive and epistemic agency, supporting the reflections of Bostrom & Yudkowsky (2014). These findings reinforce García-Peñalvo et al. (2024), who highlighted ethical-digital literacy as a key component of institutional AI policies.

The validation of the OEF-GAI demonstrated the importance of transforming ethical principles into practical tools. Its structure integrates global ethical principles based on UNESCO (2021),

operational instruments, governance mechanisms, and continuous review processes. The Ethical Impact Assessment Checklist was especially relevant because it institutionalizes ethical reflection before technological implementation, consistent with ethics-by-design approaches proposed by Floridi et al. (2018). The strong support for practical instruments such as citation guides and provider agreement clauses confirmed that ethical frameworks must offer concrete and immediately applicable solutions.

Finally, the study acknowledged important limitations. The research was limited to Spanish-speaking contexts, reducing the generalizability of findings to other regions. In addition, the study focused on framework design and validation rather than long-term implementation and impact. Future research should evaluate the effectiveness of the OEF-GAI in real educational environments and analyze how emerging AI technologies, such as autonomous agents and multimodal models, may generate new ethical challenges requiring continuous adaptation of institutional policies.

CONCLUSIONS

This doctoral research addressed the urgent need to transform abstract ethical principles about Generative Artificial Intelligence (GenAI) into practical and effective implementation within higher education institutions. Using a sequential mixed-methods approach, the study designed and validated the Operational Ethical Framework for Generative AI in Higher Education (OEF-GAI), providing a concrete solution for responsible AI integration.

The findings revealed that the main challenge is not the lack of ethical awareness, but the implementation gap between ethical principles and institutional practice. University communities recognize the risks of GenAI and demand clear guidelines, training, and practical support tools rather than restrictive or surveillance-based policies.

The validated OEF-GAI represents the principal contribution of the study. Its structure combines global ethical principles, participatory governance, operational instruments such as the Ethical Impact Assessment Checklist and Citation Guide, mandatory training programs, and continuous review mechanisms. In this way, the framework functions as a living governance process that promotes innovation while protecting academic integrity, critical thinking, equity, and learner autonomy.

The study also provides practical and theoretical contributions. For universities, it offers an adaptable model for developing ethical AI policies, while for researchers it highlights the importance of studying implementation processes and the long-term impact of AI governance in education.

Overall, the research concludes that the future relationship between higher education and generative AI depends not only on technological development but mainly on institutional decisions and ethical governance. Therefore, ethics must become operational and continuously

adaptable to ensure a human-centered and socially responsible digital future.

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CONFLICT OF INTEREST

The author declare that there is no conflict of interest.

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