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THE AGE OF ARTIFICIAL INTELLIGENCE: HIGHER EDUCATION, RESEARCH, AND SOCIAL TRANSFORMATION

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INTRODUCTION

The rapid, ubiquitous diffusion of Generative Artificial Intelligence (GenAI) across global higher education systems marks an unprecedented sociotechnical inflexion point. Far from representing a mere technological iteration or an isolated suite of productivity tools, GenAI is fundamentally reconfiguring knowledge production, academic governance, pedagogical models, and institutional equity (UNESCO 2023b; OECD 2023). As higher education institutions grapple with the velocity and complexity of these technological shifts, academic leaders and policymakers are increasingly compelled to move beyond reactive prohibitions towards proactive, strategic, and values-driven governance frameworks (Barus*et al.* 2025; Sánchez-Caballé and Santos 2025). This transition demands a critical departure from technology-centric determinism. International policy bodies have consistently highlighted that while GenAI offers transformative affordances for personalised learning, scientific discovery, and research synthesis, its uncritical deployment risks eroding human intellectual agency, amplifying algorithmic biases, and exacerbating structural inequalities (UNESCO 2023a; European Commission 2022). Consequently, as outlined in the Special Issue call for papers, the primary institutional challenge has shifted from managing technological adoption to fostering critical 'AI literacy', a holistic set of competencies encompassing technical comprehension, pedagogical integration, ethical

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discernment, and socio-epistemic responsibility (UNESCO 2023b; Zhou and Fang 2025).

At the core of this institutional evolution lies the imperative to establish a principled framework for research practices and scientific communication. As articulated in the foundational document Responsible Artificial Intelligence in Research Practice (Potes-Barbas *et al.* 2026), the integration of probabilistic large language models (LLM) into scholarly inquiry offers unprecedented analytical assistance, yet simultaneously introduces acute ethical, legal, and epistemological vulnerabilities, including factual hallucinations, fabricated citations, intellectual property risks, and data privacy breaches. Grounded in European legal standards and ethical research norms, this framework establishes that GenAI must operate strictly as a supportive instrument under continuous human oversight, never as an autonomous decision-maker or scientific author (Potes-Barbas *et al.* 2026).

Institutional policies and living guidelines must therefore mandate transparent disclosure, rigorous output verification, data protection compliance, and non-delegable human accountability across all stages of the research lifecycle (European Commission 2025; Santos 2024).

Parallel to research governance, the rapid integration of GenAI is radically reshaping educational evaluation and pedagogical interaction. As demonstrated by Santos, Viana, and Sánchez-Caballé (2026), automated feedback systems driven by large language models (such as ChatGPT and BERT) present immense potential for delivering real-time, highly structured, and motivationally engaging feedback at scale. However, the authors emphasise that the pedagogical effectiveness and validity of AI-generated feedback remain intimately contingent upon precise prompt engineering, rigorous content validation, and robust educator capacity building to counteract superficiality, inconsistency, and epistemic hallucination. Rather than replacing human educators, AI feedback tools must be embedded within human-in-the-loop assessment designs that foster critical thinking, dialogic reflection, and student agency (Perkins *et al.* 2024; Belkina *et al.* 2025; Peña-García, Jaime-de-Aza, and Feltrero 2026). This underscores the necessity of moving beyond punitive plagiarism detection towards designing authentic evaluation frameworks that validate future-proof competencies (Batista *et al.* 2024).

Directly aligned with the core editorial mission of Calitatea Vieții, this Special Issue positions technological transformation within a broader social policy and human-centred framework (Al-Emran *et al.* 2025). By examining the multidimensional impacts of GenAI through the lens of quality of life, subjective well-being, and social justice, this volume investigates how universities can lead an AI transition that advances the common good, dignifies human labour, and mitigates new forms of digital and algorithmic exclusion. To systematically examine these complex dynamics, this Special Issue brings together six empirical and theoretical contributions structured around three interrelated thematic axes:

- ***Ethical Governance and Responsible*****,** which examines moral agency, non-delegable responsibility, and epistemic integrity in academic writing;
- ***Pedagogical Innovation and Technological Upskilling***, which investigates human-AI cognitive collaboration, the AI-TPACK framework, and problem-solving in higher education; and
- ***Social Inclusion, Digital Competence****, and Risk Mitigation*, which interrogates algorithmic exclusion among marginalized communities and the mediating impact of AI on student mental health and well-being.

Collectively, these contributions provide an evidence-based, critical roadmap for navigating the 'Age of AI' with academic rigour, ethical accountability, and social equity.

THEMATIC AXIS 1–ETHICAL GOVERNANCE AND RESPONSIBLE

The first thematic axis of this Special Issue addresses the critical institutional imperative to transition from reactive prohibitions towards strategic, values-based governance frameworks. Generative AI governance cannot be reduced to technical compliance or software-level alignment. Instead, higher education institutions must operationalise living guidelines (UNESCO 2023a; Potes-Barbas *et al.* 2026; European Commission 2025) that enforce non-delegable human accountability, data protection standards, and institutional transparency. This axis examined how universities navigate this regulatory landscape, treating AI adoption not merely as a technical challenge, but as a fundamental 'test of academic integrity' and sociotechnical governance (Rughinis, Matei, and Corcaci 2025; Pellegrina and Helmy 2025).

The two accepted contributions in this axis directly interrogate the normative boundaries and epistemic structures of AI governance. In their theoretical contribution, "The Limits of Ethical Artificial Intelligence: Moral Agency, Non-Delegable Responsibility and Sociotechnical Governance", the authors critically deconstruct the conceptual legitimacy of the term "ethical AI". Drawing on discourse ethics and theories of moral agency, the article argues that while automated systems can generate normatively relevant outputs and simulate rule-compliant behaviour, they fundamentally lack moral consciousness, contextual discernment, and the capacity for normative justification. Consequently, the authors contend that ethics cannot be embedded into an artificial artefact; rather, ethical responsibility remains strictly non-delegable and must be anchored within the human and institutional arrangements that design, authorise, and supervise automated decision-making. Complementing this conceptual perspective, the empirical study "Generative artificial intelligence in medical academic writing: From text production to knowledge production" investigates how generative tools are reshaping scientific communication and research integrity. Through a

sequential mixed-methods design combining bibliometric mapping with narrative synthesis, the study demonstrates a paradigm shift: GenAI is evolving from a writing assistant for language refinement into a methodological component embedded within broader knowledge-production workflows. Crucially, however, the manuscript reveals that across the biomedical literature, epistemic responsibility, methodological judgement, and scientific validation remain consistently attributed to human researchers. This finding aligns directly with the mandatory authorship policies enforced by major international scientific publishers, which firmly reject AI authorship due to the machine's inability to accept legal and moral accountability.

Together, these two papers demonstrate that ethical governance in higher education is not a restrictive barrier, but an enabling framework. By establishing that moral agency and scientific authorship belong exclusively to human actors, "The Limits of Ethical Artificial Intelligence" and "Generative artificial intelligence in medical academic writing" provide higher education leaders with the conceptual clarity and empirical evidence needed to construct robust, human-centred governance ecosystems.

THEMATIC AXIS 2 – PEDAGOGICAL INNOVATION AND TECHNOLOGICAL UPSKILLING

The second thematic axis of this Special Issue addresses the imperative to reconfigure educational designs, curricula, and assessment methodologies in response to the ubiquity of GenAI. Rather than treating AI as a disruptive threat to be policed, this axis conceptualises technology as a cognitive partner within dynamic models of human-AI collaboration (Zhou and Fang 2025; UNESCO 2023a). Grounded in established theoretical frameworks such as GenAI-TPACK (Belkina *et al.* 2025) and automated assessment feedback models (Santos, Viana, andSánchez-Caballé 2026), the contributions in this section explore how higher education can move beyond traditional knowledge transmission to revitalise active learning, bridge competence gaps, and foster higher-order critical thinking.

The two accepted contributions in Axis 2 provide complementary empirical evidence across educator competencies and student learning dynamics. In their empirical study "The Competence-Technology Gap in Teaching: Empirical Evidence from an AI-TPACK Study in Portuguese Schools" the authors adapt and validate the AI-TPACK psychometric instrument across primary and secondary educators. Complementing this focus on educator readiness, the empirical investigation "LLMs in Higher Education: A Comparative Evaluation of Mathematical Problem-Solving Capabilities and a Bloom-Aligned Human-AI Collaboration Framework" evaluates the operational boundary of AI as a cognitive partner in STEM instruction. Through a comparative evaluation of freely

accessible LLMs (ChatGPT-4o, Gemini 2.5 Flash, and Claude 4.5 Sonnet) solving ordinary difference equations, the study demonstrates that while LLMs achieve high proficiency at lower cognitive levels of Bloom's Taxonomy, they frequently exhibit execution errors during arithmetic computation. To translate these empirical limits into a productive pedagogical resource, the authors formulate a 'Bloom-Inverted Human-AI Collaboration Framework'. This model reframes instructional design by initiating learning at the generative and evaluative apex where human cognitive contribution is indispensable, deploying LLMs as scaffolding infrastructure for lower-level procedural execution.

Together, "The Competence-Technology Gap in Teaching" and "LLMs in Higher Education" establish that pedagogical innovation requires a dual commitment: systematically upskilling educators through structured AI-TPACK interventions while re-engineering classroom tasks around human-led cognitive collaboration.

THEMATIC AXIS 3 – SOCIAL INCLUSION, DIGITAL COMPETENCE, AND RISK MITIGATION

The third thematic axis of this Special Issue, Social Inclusion, Digital Competence, and Risk Mitigation, critically examines the intersection of Generative AI deployment with social policy, digital equity, and population well-being. While AI tools offer unprecedented capabilities for personalized learning, uncritical implementation risks reinforcing systemic biases and generating novel mechanisms of automated exclusion. In line with the core editorial orientation of Calitatea Vieții, this axis frames digital transformation as a social policy imperative, evaluating how institutional arrangements, data poverty, and algorithmic governance directly impact human dignity, social stratification, and subjective quality of life.

The two accepted contributions in Axis 3 provide compelling empirical investigations into structural exclusion and student psychological well-being. In their qualitative investigation, "From Digital Divide to Emerging Algorithmic Exclusion: Barriers to Access to Higher Education among Roma Communities in Bulgaria", the author examines how historical socioeconomic disparities interact with increasingly digitalised academic procedures across 25 in-depth interviews with members of Roma communities. The study demonstrates a critical transition from first- and second-level digital divides (restricted to hardware access and basic digital literacy) towards "emerging algorithmic exclusion". As university admissions, information filtering, and administrative processes become algorithmically mediated, students relying solely on basic mobile connectivity face severe institutional barriers.

Shifting the analytical lens to student mental health and subjective quality of life, the empirical study "Generative Artificial Intelligence and Student Well-

Being: The Mediating Roles of Academic Anxiety and Self-Efficacy in Higher Education" reports findings from a survey of 627 higher education students across Portuguese university and polytechnic institutions. The study reveals a significant between GenAI use intensity and subjective well-being among daily users. The authors demonstrate that approximately 64% of negative relationship is statistically accounted for by two indirect psychological pathways: heightened AI-related academic anxiety (fear of evaluation against AI-augmented peers and ambiguity over usage rules) and diminished academic self-efficacy.

Together, "From Digital Divide to Emerging Algorithmic Exclusion" and "Generative Artificial Intelligence and Student Well-Being" illustrate that risk mitigation in the AI era requires a comprehensive social policy response, one that simultaneously dismantles structural barriers to algorithmic access and safeguards student mental health.

Taken together, the six contributions presented across these three thematic axes demonstrate that the integration of Generative AI into higher education cannot be addressed through isolated technical fixes or purely restrictive prohibitions. Instead, ethical governance, pedagogical innovation, and social inclusion constitute an interdependent framework for institutional transformation. Crucially, however, all empirical and theoretical findings concerning GenAI must be interpreted with methodological caution and epistemic humility. Given the very recent emergence of GenAI, the unprecedented velocity of their institutional adoption, and the continuous, rapid updates to their underlying algorithmic architectures, scholarly inquiry in this domain inevitably captures a highly dynamic temporal snapshot. As established throughout this Special Issue, navigating this rapidly evolving sociotechnical landscape requires higher education systems to pair technological adoption with non-delegable human responsibility.

Ultimately, as reflected in the foundational mission of Calitatea Vieții, the governance of artificial intelligence is fundamentally a question of social policy, human dignity, and societal well-being. Preserving academic integrity and epistemic authority is intrinsically linked to safeguarding student mental health, mitigating data poverty, and protecting equity for marginalised communities. Because the functionalities, performance parameters, and institutional integration of GenAI tools are in constant flux, institutional policies must remain adaptable and informed by continuous longitudinal evaluation. By bridging high-level policy guidelines with empirical insights from classroom practice and social research, this Special Issue provides a timely reference point for scholars, educators, and institutional decision-makers. It is our hope that this volume inspires continued critical inquiry and reinforces the imperative that technological advancement must relentlessly serve the common good and the enhancement of quality of life.

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