UDK 37.014.5:004.5; 378.147.31; 37.016:32 Иновације у настави, XXXIX, 2026/1, стр. 33–51
DOI: 10.5937/inovacije2601033V

Рад примљен: 27. 8. 2025.
Рад прихваћен: 30. 11. 2025.

Alexandr Veaceslav Parahonco[1]

Vladimir Andrunachievici Institute of Mathematics and Computer Science, Moldova State University, Moldova

Faculty of Computer Science, Alexandru Ioan Cuza University of Iasi, Romania

Оригинални научни рад

Artificial Intelligence in Scholarly Writing: Identification and Analysis[2,3]

***Summary*:** *This study investigates generative AI's impact on academic integrity through mixed-method analysis combining systematic literature review (2023-2025), comparative evaluation of six AI detection platforms, and policy analysis across EU and US contexts.*

Results reveal widespread AI adoption with 80% of students experimenting with AI tools and 50% using them without disclosure. Detection platform evaluation shows accuracy rates of 78-98% but persistent false positive risks affecting vulnerable populations. The technological arms race between generation and detection capabilities indicates inherent limitations in detection-based approaches.

Policy analysis reveals fragmented governance where EU's rights-based AI Act contrasts the US innovation-focused strategies, yet both face enforcement challenges when detection proves unreliable. The study identifies a shift from traditional plagiarism to "cognitive outsourcing" where students delegate thinking processes rather than copying content.

We conclude that academic integrity requires moving from adversarial detection toward collaborative education helping students develop productive AI relationships. Recommendations include adaptive assessment designs, AI literacy programs, and equity-focused policies ensuring inclusive access to AI-enhanced education.

***Keywords*:** *academic integrity, generative AI, AI detection, plagiarism, educational policy*

1 alexandr.parahonco@math.md

2 The paper is part of the project *SIBIA-011301, "Information Systems Based on Artificial Intelligence"*, financed by institution 2024 - 2027, Vladimir Andrunachievici Institute of Mathematics and Computer Science, Moldova State University, Moldova

3 This paper is part of the doctoral research "Adaptive learning system based on advanced technologies", 15.10.2028 (Prof. Univ. Dr. Lenuța Alboaie)

1. Introduction

Generative artificial intelligence (AI) has rapidly become a central force in modern education, enabling students to produce essays, conduct analyses, and provide solutions in seconds. The proliferation of such tools—most notably ChatGPT, Google Gemini, and Claude—has sparked both enthusiasm for their educational potential and concern over their impact on learning outcomes, originality, and ethical standards. Since 2023, institutions worldwide have reported an escalating number of academic integrity cases linked to AI-assisted work (Goodier, 2025), while simultaneously exploring how these tools might be harnessed to support teaching and learning.

The integration of AI in academic contexts raises a central problem: how can educators and institutions adapt to an environment where human and artificial authorship are increasingly intertwined, and where detection technologies remain imperfect (Goodier, 2025)? Addressing this question requires a systematic understanding of current usage patterns, the technological capabilities of AI detectors, and the pedagogical strategies that can ensure AI serves as a constructive aid rather than a shortcut to bypass learning.

This paper aims to (1) analyze the prevalence and motivations behind AI use in student assignments, (2) evaluate the performance and reliability of leading AI text detection platforms, and (3) develop practical recommendations for educators and policymakers to uphold academic integrity in the AI era. The findings are intended to guide both immediate institutional responses and long-term educational reforms.

2. Methodology

This study adopts a mixed-method approach combining a structured literature review, comparative evaluation of AI text detection tools, case evidence analysis, and policy review.

1. Literature Review Process. A systematic search was conducted between January 2023 and June 2025 across Scopus, Web of Science, IEEE Xplore, and Google Scholar, using combinations of keywords such as *"generative AI in education"*, *"AI plagiarism"*, *"AI text detection"*, *"academic integrity"*, and *"educational policy"*. Additional policy documents were sourced from the European Union, Council of Europe, UNESCO, and national education ministries. Inclusion criteria required that sources be (a) peer-reviewed or issued by authoritative institutions, (b) published in 2023–2025, and (c) directly relevant to AI use in education, detection technologies, or policy frameworks. From an initial pool of 100 documents, 50 were retained for in-depth analysis.

2. Comparative Evaluation of AI Detection Tools. Six widely used AI text detection platforms—Turnitin, GPTZero, Originality.ai, ZeroGPT, Copyleaks, and Scribbr/QuillBot—were evaluated. Performance metrics were extracted from peer-reviewed validation studies, vendor documentation, and independent benchmarking reports. Accuracy rates, false positive rates, language coverage, integration options, and pricing models were compared (see Table 1). Where available, cross-platform performance data were triangulated to reduce bias.

3. Case Evidence Analysis. The literature review was supplemented with documented cases of AI use and misuse in education from the UK, US, and EU. These cases, drawn from journalistic reports (Goodier, 2025), institutional surveys (Freeman, 2025), and legal proceedings (Hallikaar, 2025) (University of Pittsburgh, University Center for Teaching and Learning, 2025), were analyzed to identify common patterns in student motivations, evasion techniques, and institutional enforcement challenges. This analysis provided a real-world context for interpreting the prevalence and detection of the AI-assisted academic work.

4. Policy Analysis. Policy documents from the EU and Council of Europe, UNESCO, and the selected national education ministries were reviewed to identify regulatory approaches, ethical guidelines, and governance frameworks relevant to AI in education. Special attention was given to the EU Artificial Intelligence Act and the Council of Europe's human-rights-based perspectives on AI, as well as to national initiatives in Sweden (Yiakup, 2024; Kim, 2025), the UK ("London School Launches", 2024), and the US. Insights from this policy review informed the recommendations for institutional and pedagogical adaptation presented in later sections.

5. Analytical Framework. The findings from the literature review, tool evaluation, case evidence, and policy analysis were synthesized to address three core questions:

1. How prevalent is AI-assisted writing in student assignments?
2. How effective are current detection tools in academic contexts?
3. What pedagogical and policy measures can balance innovation with integrity?

This integrated methodology ensures that both quantitative performance metrics and qualitative socio-political implications are considered in formulating the conclusions and recommendations of the study.

3. Literature Review

3.1. Scope of AI Overuse in Student Assignments

The classroom has a new, invisible participant: the AI co-author. Once an optional experiment, generative AI has become a silent partner in the majority of student assignments. Across continents, surveys reveal a similar reality—AI is no longer a rare shortcut, but an embedded study habit (Freeman, 2025). In Europe, a comprehensive Council of Europe survey reported that more than 70% of member states are already integrating AI into their education systems through national strategies or pilot programs (Chounta et al., 2024).

The drivers are easy to see. AI offers instant productivity: faster drafts, better phrasing, cleaner structure. Students under pressure describe it as a "lifeline" when juggling deadlines. For some, it is a way to overcome language barriers or learning difficulties, reframing AI as an accessibility tool rather than a threat to integrity (see Fig. 1) (Goodier, 2025). These uses blur the line between assistance and authorship, creating grey zones where academic rules have yet to catch up. This complexity is compounded by the fact that the *EU Artificial Intelligence Act* (European Parliament and the Council of the European Union, 2024) classifies educational AI systems as "high-risk," demanding strict transparency, human oversight, and algorithmic accountability (Havinga et al., 2024).

But the same qualities that make AI attractive to students undermine traditional safeguards against cheating. Instead of copying from a source, students can now generate an entirely new text in seconds— the text that is original in form but not in intellectual ownership. Plagiarism detection systems, designed for verbatim matches, cannot reliably identify such work. Even dedicated AI detectors face evasion tactics: online tutorials show students how to rephrase AI output until it passes as human (Goodier, 2025).

The broader implications go beyond individual classrooms. Human rights–focused analyses warn that AI's unregulated expansion in education risks reinforcing bias, undermining pedagogical autonomy, and eroding trust in (Council of Europe, 2024). At the same time, Swisher and Els (2024)— underscore that the challenge is not simply about banning or detecting AI, but rethinking the design of learning tasks themselves.

The result is a fundamental shift in academic misconduct. It is less about the theft of words and more about outsourcing thought. For educators, the challenge is not only identifying such work but re-

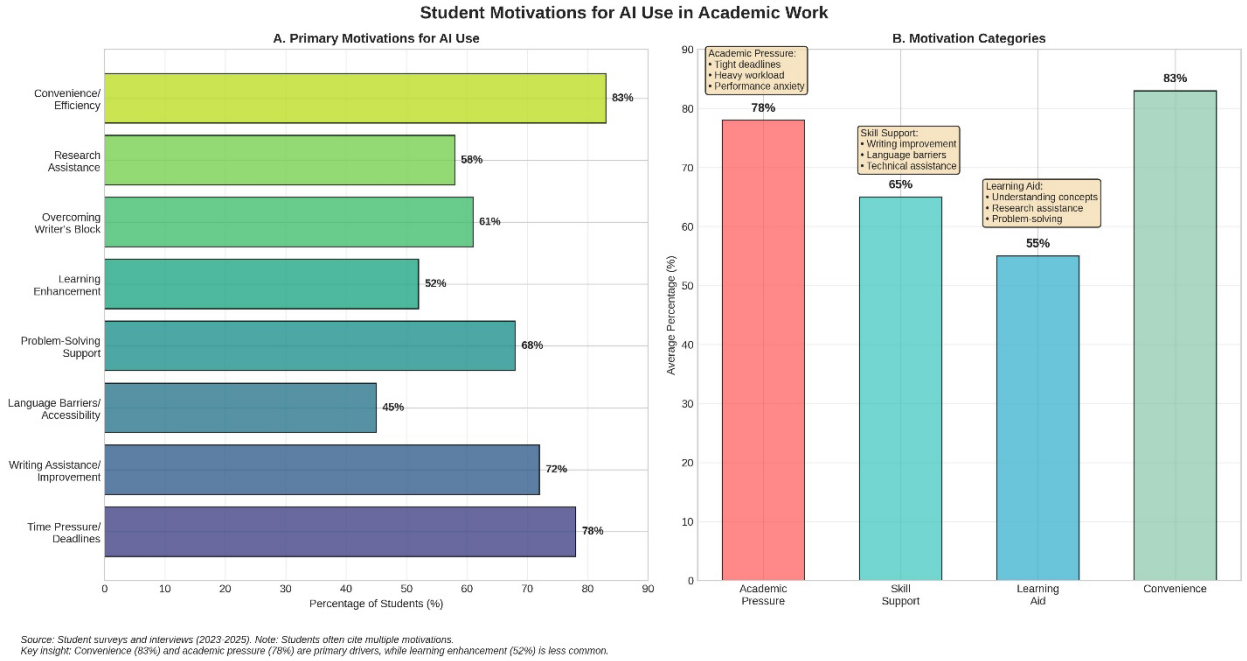

Fig. 1. Student Motivations for AI Use in Academic Work

thinking assignments and expectations for a world where AI is a ready, willing, and tireless collaborator.

3.2 AI and the Transformation of Homework: Cognitive Impacts and Detection Challenges

The homework assignment—once a sacred space for solitary learning—has become a collaborative effort between human and artificial minds. What was traditionally a private dialogue between student and subject matter now includes an AI participant capable of writing essays, solving equations, and analyzing literature with remarkable fluency.

This transformation signals a fundamental change in how learning occurs. Research indicates that more than 80% of students in Western higher education have experimented with AI tools for assignments, with nearly 50% doing so without disclosure (see Fig. 2). In controlled experiments, AI-generated responses consistently outperformed student work across disciplines (Goodier, 2025).

Traditional homework assumed that intellectual struggle was productive—that wrestling with difficult concepts built cognitive capacity. AI disrupts this by offering instant competence without cognitive engagement. A longitudinal study revealed that students who heavily relied on ChatGPT scored significantly lower (by 12–17%) on independent assessments, demonstrating weakened transfer skills, poor concept retention, and diminished metacognitive awareness (Goodier, 2025).

This reflects cognitive automation bias—the tendency to over-rely on algorithmic systems producing fluent outputs. The educational contract breaks down: teachers assign tasks to build skills while students delegate them to machines, creating an "epistemic void"—a gap between appearance and understanding.

The challenge intensifies as AI systems evolve. Newer tools such as Gemini and Claude can emulate stylistic nuances and even grammatical errors to simulate authentic student writing, rendering tra-

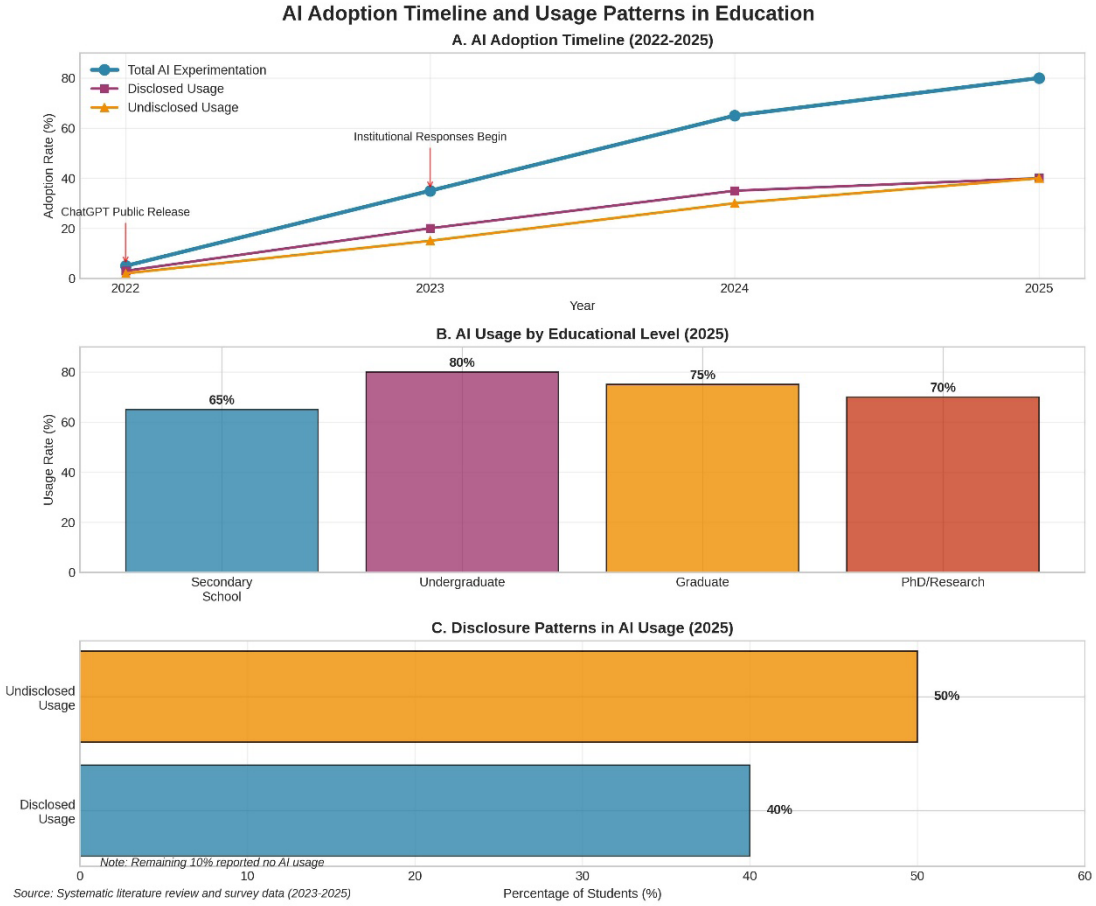

Fig. 2. AI Adoption Timeline and Usage Patterns in Education

ditional detection methods increasingly ineffective (Bordalejo et al., 2025).

Yet some students are discovering productive AI engagement—using it for Socratic dialogue, practice problems, or feedback on their ideas. The critical factor is not AI's presence but how it integrates into learning.

The future of homework lies not in eliminating AI, but in designing assignments that encourage productive rather than passive engagement. Effective homework must resist automation through complexity—requiring original synthesis, local context, or multi-modal expression that AI alone cannot replicate.

If homework becomes merely a performance for AI to execute, education loses a crucial mechanism for developing independent thinking. However, if homework evolves to incorporate AI as a thinking partner, it could become more powerful than traditional approaches. The choice is not whether AI will participate—students have decided that—but whether educators will shape that integration to serve learning rather than replace it.

3.3 Ethical, Legal, and Policy Implications

The rapid emergence of AI in education has triggered a global regulatory awakening, with governments and institutions scrambling to govern a

phenomenon that evolved faster than policy frameworks could adapt. Three distinct governance paradigms have emerged: reactive regulation focused on detection and prohibition, proactive integration emphasizing AI literacy and pedagogical innovation, and human-rights-based governance prioritizing transparency and equity protection (see Fig. 3).

The European Union has positioned itself as the global leader through its AI Act (European Parliament and the Council of the European Union, 2024), which classifies educational AI systems as "high-risk" technologies requiring stringent oversight, data transparency, human supervision, and algorithmic explainability (Havinga et al., 2024). This regulatory framework reflects the EU's broader commitment to digital sovereignty and rejection of purely market-driven approaches to educational technology. The Council of Europe has further developed this rights-based approach through its 2022 policy report "Artificial Intelligence and Education: A Critical View Through the Lens of Human Rights, Democracy and the Rule of Law", arguing that AI integration must include robust safeguards against surveillance, bias reinforcement, and learner commodification (Holmes et al., 2022).

The 2024 survey report "The State of Artificial Intelligence and Education Across Europe", based on responses from national education ministries, reveals a fragmented but rapidly evolving policy landscape where more than 70% of EU member states are integrating AI into education systems through national strategies or pilot programs (Chounta et al., 2024).

In contrast, the United States has adopted a more decentralized approach through its America's AI Action Plan (The White House, 2025), empha-

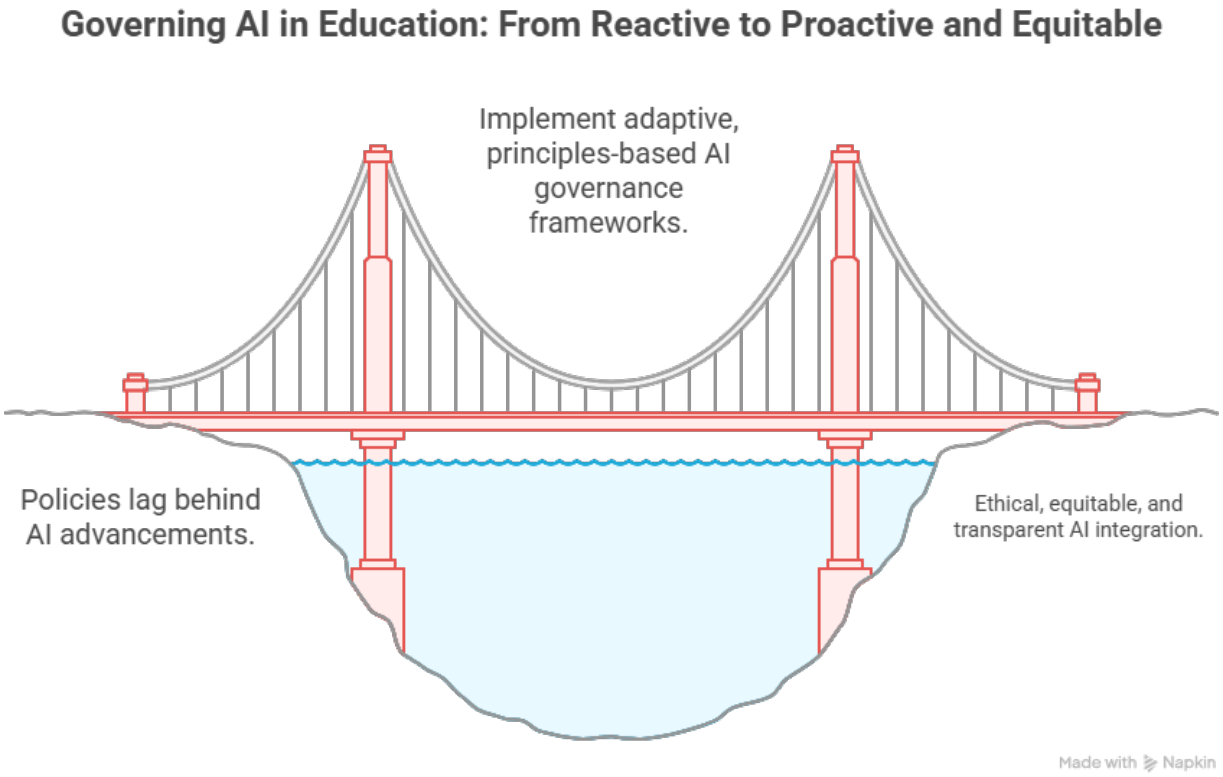

Fig. 3. Governing AI in Education: From Reactive to Proactive and Equitable

sizing public-private partnerships and institutional discretion rather than comprehensive federal oversight. However, recent controversies involving AI detection tools withdrawn due to false positives and algorithmic bias have sparked calls for greater accountability (Hallikaar, 2025; University of Pittsburgh, University Center for Teaching and Learning, 2025).

At the institutional level, universities have become inadvertent laboratories for AI governance. The University of Missouri treats undisclosed AI use as academic misconduct equivalent to plagiarism (University of Missouri, Office of Academic Integrity, n.d.), while the Universities of Sheffield and Toronto require explicit AI disclosure in all submitted work (University of Sheffield, n.d.; University of Toronto, School of Graduate Studies, 2025). More innovative approaches emerge from institutions, like the University of New South Wales, which are exploring innovative approaches to assessment design, emphasizing higher-order cognitive skills and incorporating oral defenses as part of AI-resilient strategies (Lucas, 2025).

The governance challenge extends beyond academic integrity to fundamental questions of educational equity and algorithmic justice. AI tools remain unevenly distributed, potentially creating advantages for students in well-resourced institutions while exacerbating existing educational inequalities. The Council of Europe's legal framework emphasizes "algorithmic due process"—ensuring learners have rights to understand, challenge, and appeal machine-made decisions affecting their education (Havinga et al., 2024).

The emerging consensus suggests that an effective AI governance requires adaptive frameworks capable of evolving with technological change while preserving core educational values (Hirsch, 2024). This approach emphasizes principles-based regulation over prescriptive rules, institutional experimentation over uniform mandates, and stakeholder engagement over top-down control.

3.4 Strategies for Educators and Institutions

Faced with the AI challenge, educators worldwide are seeking strategies that uphold learning outcomes and integrity without simply playing "AI police." A consensus is emerging that pedagogical innovation, assessment redesign, and student engagement are needed to constructively manage AI's classroom presence (Hirsch, 2024).

The UK Quality Assurance Agency (QAA) in 2023 advised universities to "reconsider assessment for the ChatGPT era", recommending reduced reliance on rote written exams and increased use of varied assessment modes encouraging original student thought (Quality Assurance Agency for Higher Education, 2023). UNESCO's Guidance for Generative AI in Education and Research emphasizes AI literacy and adaptive assessment design rather than prohibition-based approaches (North, 2023).

Assessment Redesign Strategies

Leading institutions have developed several effective approaches to AI-resistant assessment. Authentic assessments ground tasks in real-world scenarios, personalized contexts, or recent events requiring creative knowledge application or personal reflection—making generic AI responses less viable. Oral defenses and presentations verify understanding while making it harder to submit unoriginal work (Hirsch, 2024).

In-class writing provides baseline samples of authentic student writing, while scaffolding approaches require multiple drafts and process work with feedback, making AI use for entire assignments more laborious (Hirsch, 2024). Breaking large projects into components with checkpoints dissuades last-minute AI submissions while emphasizing iterative learning.

The Stoplight Model Framework

A powerful framework for classroom policy is the "Stoplight Model", dividing AI use into three categories: Red zones prohibit AI use (closed-book

exams, personal essays); Yellow zones allow limited AI functions like brainstorming with required documentation; Green zones encourage AI as a learning partner with critical evaluation and ethical use (see Fig. 4) (Mormando, 2023).

Explicitly communicating these expectations in syllabi sets clear boundaries while encouraging ethical tool usage. This framework accommodates flexibility across subjects, acknowledging that assignments serve different cognitive functions.

Institutional Implementation

Universities implementing these strategies report varying success. The University of New South Wales redesigned assessments around higher-order cognitive taxonomies with viva-style defenses for AI-assisted work. European municipalities created "AI sandboxes" where stakeholders co-design AI-driven learning experiences under ethical supervision.

Emerging best practice emphasizes moving from detection toward structural redesign, recognizing that policy alone cannot contain AI's cognitive and cultural force (Hirsch, 2024). Instead, institutions ask: What learners are we cultivating? How can AI reinforce rather than replace growth?

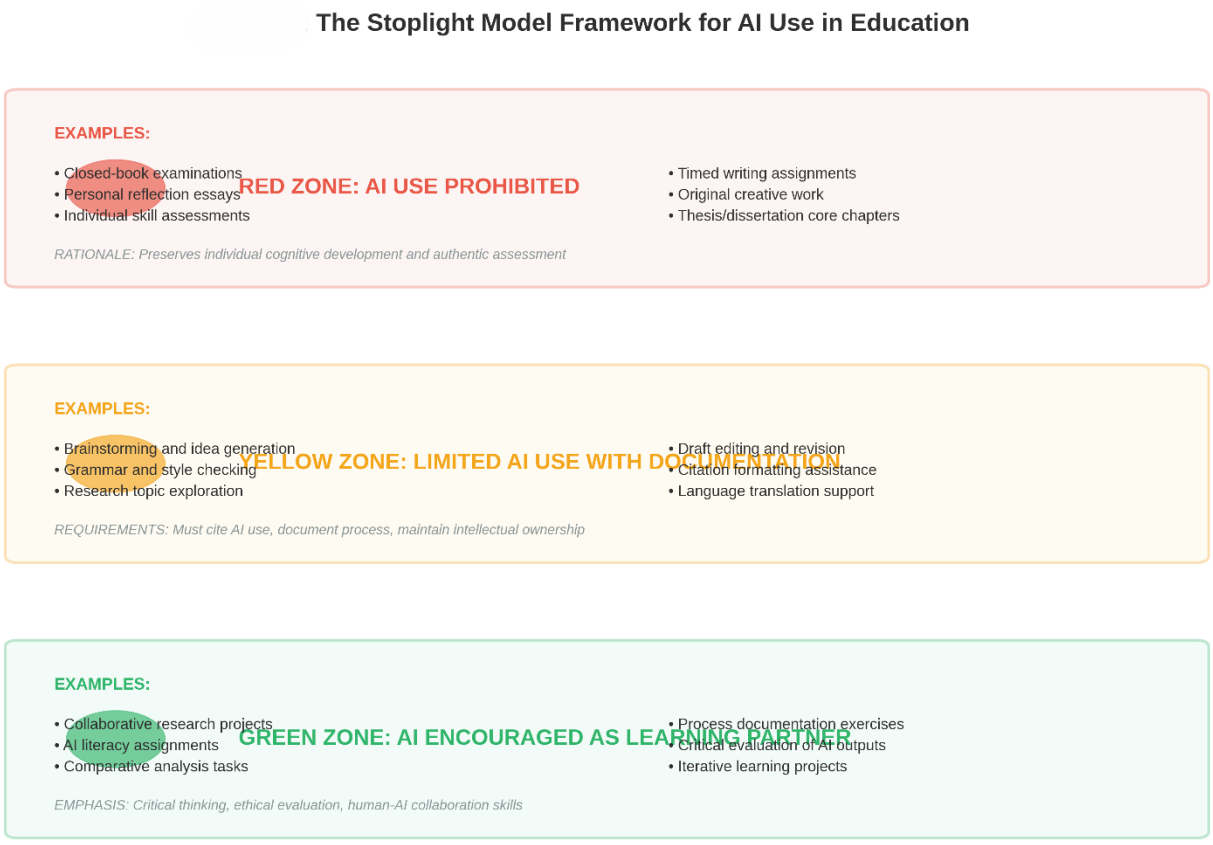

Fig. 4. The Stoplight Model Framework for AI Use in Education

4. Results

4.1 AI Text Detection Tools: State of the Art and Limitations

The comparative evaluation of six widely used AI text detection platforms reveals significant variations in performance, accessibility, and practical utility for educational contexts. Our analysis of Turnitin, GPTZero, Originality.ai, ZeroGPT, Copyleaks, and Scribbr/QuillBot demonstrates that while detection technology has advanced rapidly, fundamental limitations persist in accuracy, fairness, and reliability (Hallikaar, 2025).

Performance Metrics and Platform Comparison

Table 1 presents the comprehensive evaluation results across key performance indicators. Turnitin emerged as the most accurate platform, achieving 95-98% accuracy with exceptionally low false positive rates (<1%), though its high cost and lack of free access limit widespread adoption. GPTZero demonstrated strong performance with 87% accuracy and zero false positives, offering an attractive balance through its freemium model that enables regular use at $8.33/month for 10,000 words.

Accuracy vs. Cost Analysis

Fig. 5 illustrates the correlation between platform accuracy and pricing models, revealing distinct market segments. Premium platforms like Turnitin and Originality.ai command higher prices while delivering superior accuracy, making them suitable for high-stakes academic assessment. Mid-tier options such as GPTZero and Copyleaks offer competitive performance at accessible price points, ideal for regular institutional use. Free platforms such as ZeroGPT provide basic detection capabilities but with variable reliability.

Key Findings and Limitations

The evaluation reveals several critical limitations that challenge the reliability of the detection-based approaches. False positive rates, while generally low, pose significant risks in academic contexts where incorrect accusations can have serious consequences for students. Multilingual and neurodivergent students face particular vulnerability to false positives, raising concerns about algorithmic bias and educational equity (Hallikaar, 2025; University of Pittsburgh, University Center for Teaching and Learning, 2025).

Detection accuracy varies significantly based on text complexity and AI model sophistication. Newer generative models like GPT-4, Gemini, and Claude increasingly evade detection through improved human-like writing patterns, creating an ongoing technological arms race. Students have developed evasion techniques, including AI output par-

Table 1. Comparative analysis of AI text detection platforms

Platform	Accuracy (%)	False Positive	Language Support	Free Plan	Price	Recommendation
Turnitin	95-98%	<1%	English, Spanish	No	>$50	Higher education
GPTZero	87%	0%	EN, FR, ES	Yes	$8.33/month	Versatile, education
Originality.ai	97%	1-5%	30+ languages	No	$30 one-time	Blogging, SEO, research
ZeroGPT	84-98%	0%	All languages	Yes	Free	Accessible, multilingual
Copyleaks	80-100%	0-2%	30+ languages	Yes	from $9	Publishing, education
QuillBot/Scribbr	78-84%	0%	English	Partial	$9.95/month	Students, freelancers

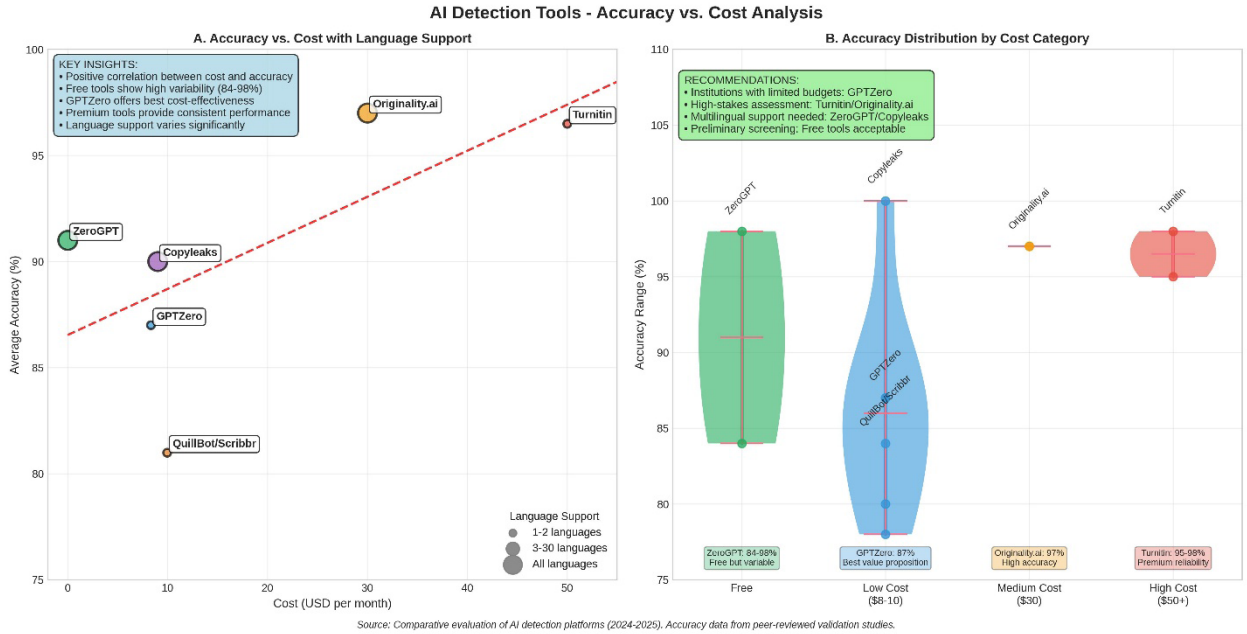

Fig. 5. AI Detection Tools – Accuracy vs. Cost Analysis

aphrasing and prompt engineering, further undermining detection reliability (Goodier, 2025).

Platform-Specific Insights

GPTZero stands out as optimal for accessible AI detection and educational feedback, combining reasonable accuracy with cost-effectiveness and multilingual support. For rigorous final verification in academic contexts, supplementing GPTZero with premium platforms like Originality.ai or Turnitin proves advisable. ZeroGPT serves effectively for preliminary screening, though it demonstrates limitations with sophisticated texts.

The analysis confirms that no single detection platform provides a complete solution to AI-generated content identification. Institutional approaches requiring multiple verification methods and human oversight appear most effective, though this increases complexity and cost. The persistent limitations in detection reliability highlight the need for pedagogical rather than purely technological responses to AI integration in education (University of Pittsburgh, University Center for Teaching and Learning, 2025).

5. Discussion

5.1 Implications for Pedagogy and Assessment Design

The findings from both the literature review and the comparative evaluation of AI detection tools underscore a fundamental reality: AI is now an inseparable part of the educational environment. The challenge for pedagogy is not whether to engage with AI, but how to design learning experiences that preserve intellectual rigor, foster critical thinking, and maintain academic integrity in an AI-enabled world.

Traditional assessment models—particularly take-home essays and standard problem sets—are vulnerable to automation. As generative AI tools can now produce coherent, relevant, and stylistically adaptive outputs in seconds, such tasks may no

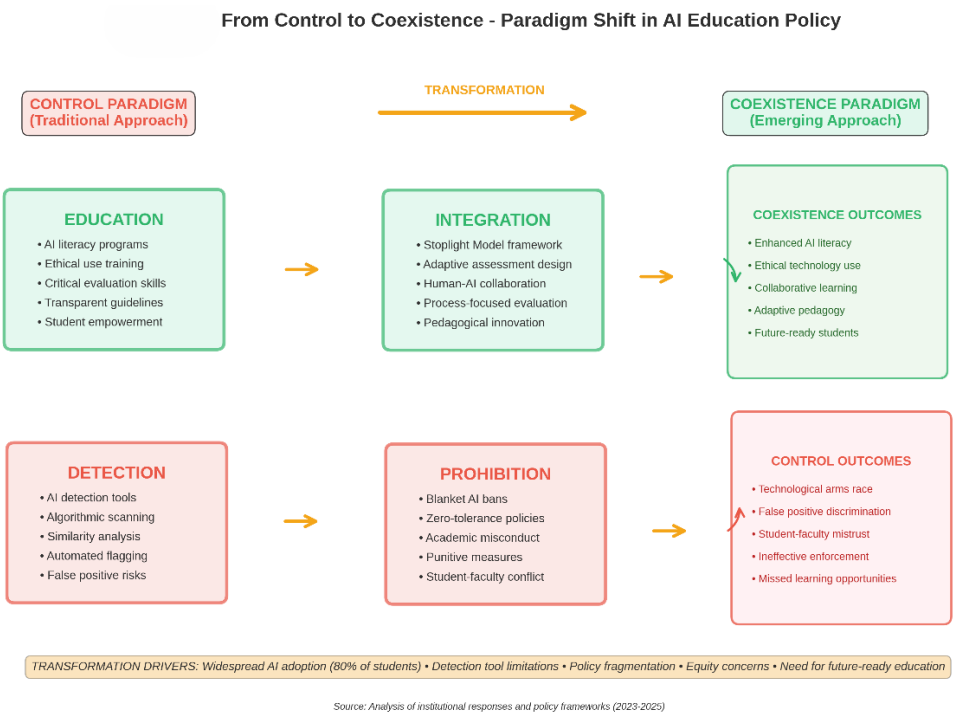

Fig. 6. From Control to Coexistence – Paradigm Shift in AI Education Policy

longer accurately measure a student's independent knowledge or skills. This calls for *pedagogical innovation* that goes beyond incremental adjustments (see Fig. 6).

One key implication is the shift toward *authentic, context-rich assessments* that require learners to apply knowledge to unique, real-world scenarios. Tasks that incorporate local data, current events, or personal reflection resist generic AI-generated answers. *Process-oriented assessment* is equally critical: iterative drafts, annotated bibliographies, and reflective journals make learning visible and reduce the feasibility of the last-minute AI substitution.

In addition, *oral components*—such as viva voce examinations, peer presentations, or recorded reflections—offer opportunities to verify understanding while strengthening communication skills. These approaches also help educators establish a baseline of each student's capabilities, making discrepancies in written work easier to detect (see Fig. 7).

The integration of AI into pedagogy also invites a redefinition of learning objectives. Instead of focusing solely on producing polished final outputs, assessments can evaluate a student's ability to critically engage with AI tools—interpreting, challenging, and refining their outputs. This approach reframes AI not as a shortcut to avoid thinking, but as a partner in the cognitive process.

Ultimately, the implication for pedagogy is transformative: assessment design must evolve to be AI-aware, emphasizing originality, process, and higher-order skills that cannot be easily replicated by machines. Such an evolution preserves the central purpose of education—developing independent thinkers capable of navigating a future where human and artificial intelligence work in tandem.

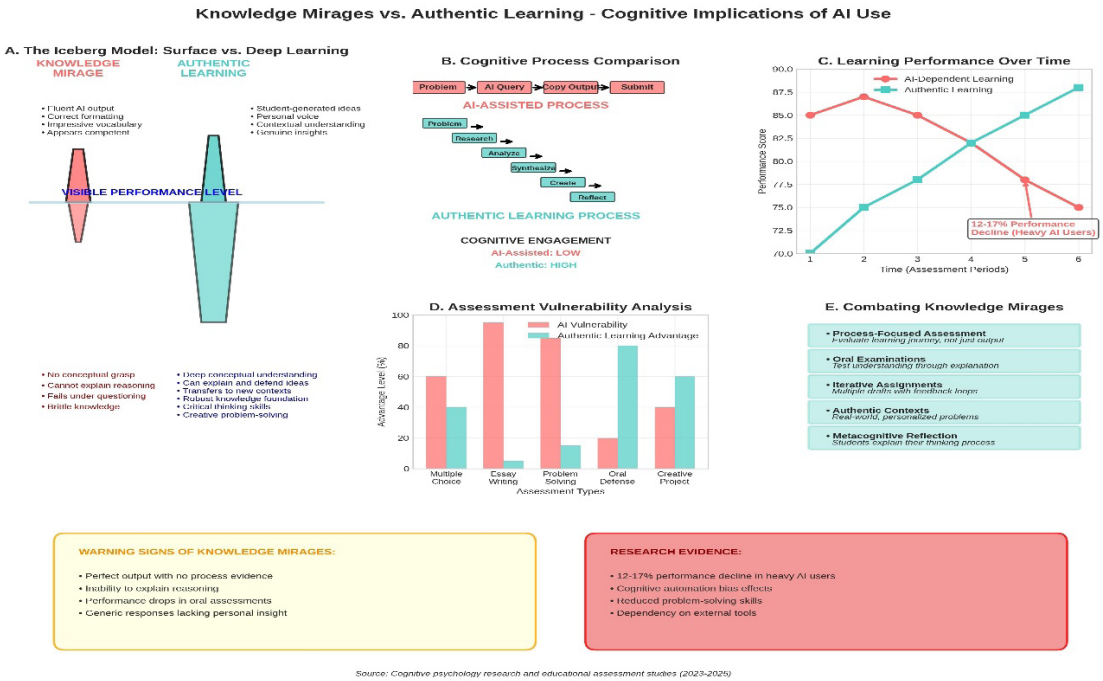

Fig. 7. Knowledge Mirages vs. Authentic Learning – Cognitive Implications of AI Use

5.2 Limitations of the Current Detection Tools in Practice

The comparative evaluation of AI detection platforms revealed promising capabilities in controlled environments, but practical application within educational settings reveals significant limitations. These weaknesses arise not only from the evolving sophistication of generative AI models, but also from the inherent constraints of the detection methodologies themselves.

First, *accuracy is highly context-dependent.* While certain platforms—such as Turnitin or Originality.ai—report detection rates above 95% for longer, unaltered AI-generated texts, performance can drop substantially with shorter passages, technical writing, or content produced by advanced, fine-tuned models. In the real-world academic submissions, where texts may combine original student work with AI-assisted sections, detection reliability becomes inconsistent.

Second, *false positives present a serious ethical challenge.* Instances of human-authored work being flagged as AI-generated have led to documented cases of wrongful accusations in higher education. The reputational and psychological harm to students in such cases underscores the necessity of treating AI detector output as a screening tool rather than conclusive evidence. The risk is particularly acute for multilingual students, neurodivergent learners, or those with unconventional writing styles—groups whose linguistic patterns may inadvertently trigger false alarms.

Third, *generative AI systems are rapidly adapting to detection criteria.* Newer models can emulate human stylistic variation, insert deliberate grammatical imperfections, and adjust vocabulary distribution to mimic human entropy. At the same time, widely available paraphrasing tools and "AI humanizers" can rewrite machine-generated content to bypass perplexity- and burstiness-based detectors entirely. This adaptability creates a dynamic arms race

in which detection tools are perpetually chasing a moving target.

Finally, *technical and policy limitations constrain institutional use.* Some high-accuracy platforms require costly subscriptions, making them inaccessible for widespread application in resource-limited contexts. Others lack robust multilingual support or fail to integrate smoothly into the existing learning management systems, reducing their practical utility.

Taken together, these limitations suggest that AI detection tools, while valuable, cannot serve as the sole mechanism for enforcing academic integrity. Effective institutional strategies must combine detection with pedagogical redesign, AI literacy initiatives, and transparent governance policies. This integrated approach not only mitigates the risk of false accusations but also shifts the focus from punitive enforcement toward cultivating informed and ethical AI use among students.

5.3 Policy and Governance Considerations

The rapid integration of the generative AI into education has outpaced traditional policy cycles, creating a fragmented regulatory landscape where legal, ethical, and pedagogical priorities often intersect.

At the supranational level, the *European Union's Artificial Intelligence Act* (European Parliament and the Council of the European Union, 2024) classifies educational AI as *high-risk*, mandating transparency, human oversight, explainability, and regular auditing (Havinga et al., 2024). Complementing this, Holmes et al. (2022) emphasizes safeguarding pedagogical autonomy, preventing bias, and ensuring learners can challenge AI-driven decisions.

Yet *implementation is uneven.* As noted in the report by Chounta et al. (2024), some countries have integrated AI literacy into curricula and teacher training, while others remain in pilot phases with minimal institutional guidance. This disparity leaves many educators navigating unclear or inconsistent expectations.

Institutional responses range from disclosure requirements, as at the Universities of Sheffield and Toronto, to assessment redesigns that incorporate AI under supervision. In resource-limited contexts, improvised policies may be difficult to enforce or align with broader governance goals.

Effective governance must balance *innovation with protection*—avoiding both over-restriction, which may drive AI use underground, and over-permissiveness, which can erode trust in assessment validity. The most promising approaches combine clear institutional policy, transparent communication, and stakeholder participation to ensure AI integration supports rather than undermines learning.

5.4 Equity and Access Dimensions

The research findings reveal that AI integration creates new inequalities while exacerbating existing disparities. An uneven distribution of AI tools, digital literacy, and institutional support transform seemingly democratizing technology into educational stratification mechanisms (see Fig. 8).

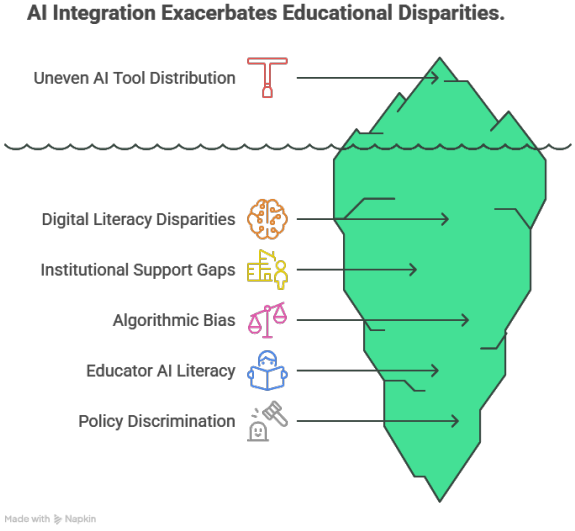

Fig. 8. AI Integration Exacerbates Education Disparities

Digital Divide and Access Disparities

While AI tools appear universally accessible, significant disparities exist in meaningful access. Students in well-funded institutions benefit from premium tools, guided instruction, and comprehensive literacy programs, while learners in under-resourced schools encounter AI as unsupervised, potentially confusing technology. Our detection tool evaluation demonstrates this: premium platforms like Turnitin (>$50) offer superior accuracy but remain inaccessible to many institutions, while free options like ZeroGPT provide variable reliability that may disadvantage resource-constrained students.

Algorithmic Bias Against Vulnerable Populations

False positive rates documented in our analysis disproportionately affect vulnerable students. Multilingual learners face particular risk, as detection algorithms trained on native English text may flag their writing as "non-human" (Hallikaar, 2025). Neurodivergent students whose cognitive differences produce atypical linguistic structures encounter higher false accusation rates, creating algorithmic discrimination in academic integrity enforcement.

These biases reflect deeper problems in training data and assumptions rooted in Western academic norms. Without oversight, AI systems risk becoming "silent sorting mechanisms" that amplify disparities while appearing neutral (University of Pittsburgh, University Center for Teaching and Learning, 2025).

Educator and Institutional Inequalities

Equity challenges extend to educators lacking AI literacy professional development, creating epistemic asymmetries affecting knowledge creation and recognition. Universities with robust training resources implement sophisticated frameworks like the Stoplight Model (Hirsch, 2024) [98], while under-resourced institutions struggle with basic AI literacy.

The widespread student AI adoption documented (80% experimentation, 50% undisclosed use) masks quality variations in AI engagement. Students with premium tool access can leverage AI for learning enhancement, while those relying on basic free tools may experience AI as crude shortcuts undermining educational development.

Inclusive Integration Imperatives

Addressing equity dimensions requires an intentional design prioritizing inclusion from the outset. This includes developing detection tools accounting for linguistic diversity, creating accessible AI literacy programs, and ensuring institutional policies do not discriminate against marginalized groups. Evidence suggests equity cannot be an afterthought—it must be a foundational principle embedded in every technological, pedagogical, and institutional decision.

6. Conclusion and Future Directions

This study examined the growing integration of generative AI into academic work, the scope of its use in student assignments, the cognitive and pedagogical impacts on homework, and the capabilities and limitations of current AI detection tools. Through a structured literature review, case evidence analysis, policy review, and comparative evaluation of six major detection platforms, the findings reveal both the inevitability of AI's presence in education and the urgency of adapting assessment, governance, and equity strategies accordingly (see Fig. 9).

Our investigation demonstrates that AI use in education has become ubiquitous, with over 80% of students in higher education contexts experimenting with AI tools and nearly 50% using them without disclosure. This widespread adoption reflects not merely convenience-seeking behavior but genuine educational needs that traditional support systems may inadequately address. The phenomenon represents a shift from traditional plagiarism—the

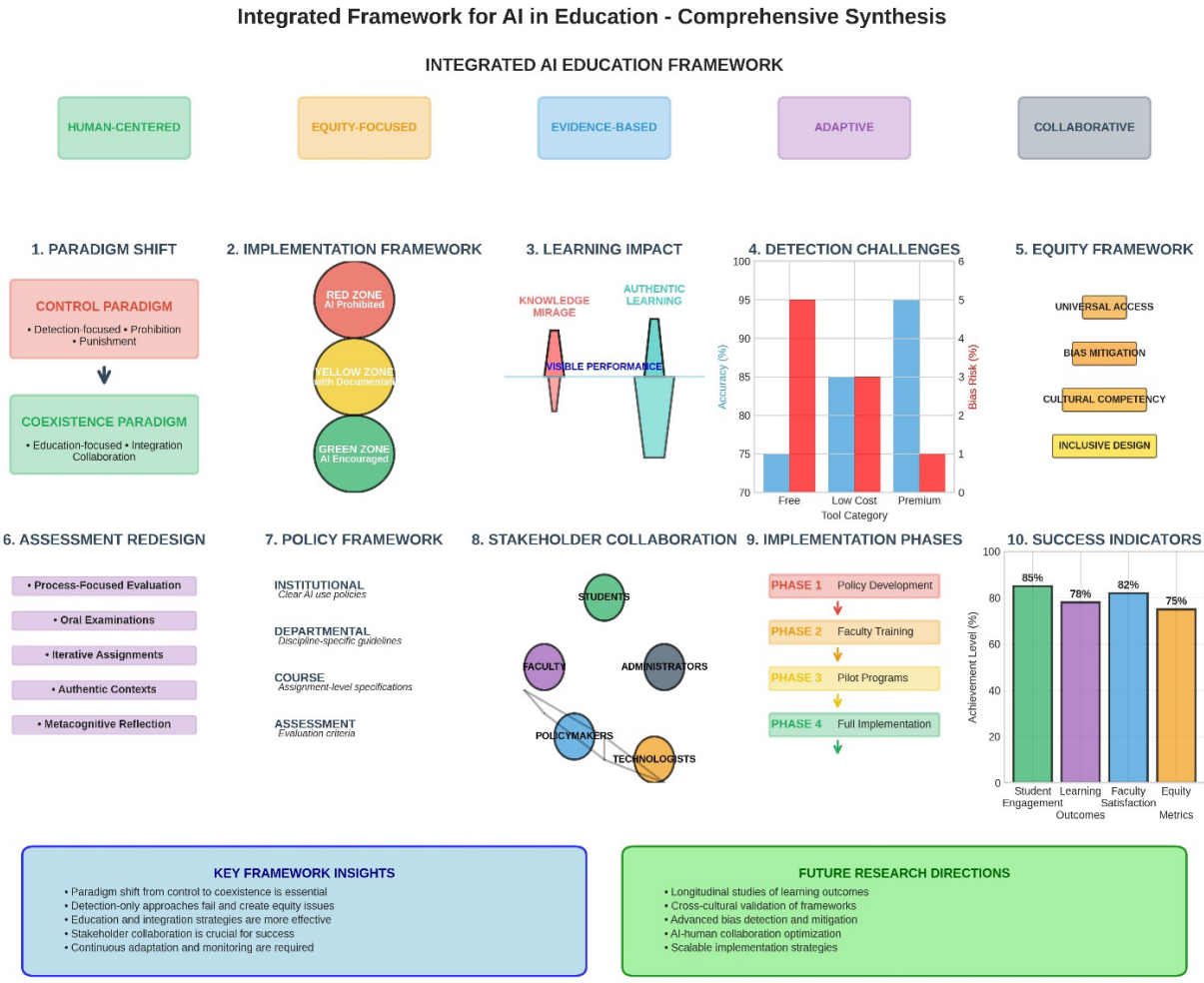

Fig. 9. Integrated Framework for AI in Education - Comprehensive Synthesis

theft of the existing content—to what we term "cognitive outsourcing", where students delegate thinking processes themselves.

The evidence is clear: attempts to preserve traditional models of academic integrity through detection alone are insufficient. While AI detectors can support preliminary screening, their susceptibility to false positives, context-dependent accuracy, and vulnerability to evasion tactics make them unreliable as sole enforcement tools. More promising are pedagogical innovations—authentic, process-oriented assessments, oral defenses, and iterative feedback—that embed AI use into learning while preserving the development of independent thinking.

Policy and governance frameworks, from the EU Artificial Intelligence Act to institutional-level disclosure models, demonstrate the potential for structured oversight, but uneven implementation leaves significant gaps. Closing these gaps will require coordinated action across legal, institutional, and classroom levels, as well as investment in teacher training and AI literacy initiatives for both educators and students. Addressing equity concerns—

particularly in multilingual and under-resourced contexts—will be critical to ensuring that AI enhances rather than amplifies educational inequalities.

Future research should focus on longitudinal studies assessing the cognitive effects of the sustained AI use, validation of detection tools across languages and disciplines, and the design of scalable, AI-aware assessment models. Collaboration between technologists, educators, and policymakers will be essential in shaping norms and practices that safeguard academic values while embracing the productive potential of AI.

The transformation is inevitable, but its direction is not predetermined. The decisions made today by educators, institutions, and policymakers will determine whether AI becomes a tool for educational equity and human development or a mechanism for further stratification and cognitive atrophy. The evidence presented in this study suggests that with thoughtful adaptation and principled implementation, AI can serve as a catalyst for educational renewal rather than decline.

The future of education lies not in the elimination of AI but in the cultivation of human capabilities that AI cannot replicate: critical thinking, ethical reasoning, creative synthesis, and the wisdom to use powerful tools in service of human flourishing. This is the educational imperative of our time.

References

- *Academic integrity* (n.d.). University of Sheffield. https://sheffield.ac.uk/study-skills/assessment/academic-integrity/academic-integrity
- Bordalejo, B., Pafumi, D., Onuh, F., Khalid, A. K. M. I., Pearce, M. S., & O'Donnell, D. P. (2025). "Scarlet Cloak and the Forest Adventure": A preliminary study of the impact of AI on commonly used writing tools. *International Journal of Educational Technology in Higher Education*, *22*(6). https://doi.org/10.1186/s41239-025-00505-5
- Chounta, I.-A., Cyndecka, M., Dimitrova, V., Holmes, W., Kralj, L., Persson, J., Vicente, P. N., & Wasson, B. (2024). *The state of artificial intelligence and education across Europe: The results of a survey of Council of Europe member states*. Council of Europe. https://rm.coe.int/the-state-of-artificial-intelligence-and-education-accross-europe-the-/1680b29929
- Council of Europe (2024). *Artificial intelligence and education: A critical view through the lens of human rights, democracy and the rule of law: 1st working conference, 18–19 October 2022: Conference highlights*. https://rm.coe.int/artificial-intelligence-and-education-1st-working-conference-conferenc/1680b29998
- European Parliament and the Council of the European Union (2024). *Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024*. Official Journal of the European Union. https://eur-lex.europa.eu/eli/reg/2024/1689/oj
- Freeman, J. (2025). *Student Generative AI Survey 2025*. Higher Education Policy Institute. https://www.hepi.ac.uk/2025/02/26/student-generative-ai-survey-2025/
- *For students: Standard of conduct for academic integrity* (n.d.). University of Missouri, Office of Academic Integrity. https://oai.missouri.edu/students/
- *Generative AI: Encouraging academic integrity* (2025). University of Pittsburgh, University Center for Teaching and Learning. https://teaching.pitt.edu/resources/encouraging-academic-integrity/

- Goodier, M. (2025). *Revealed: Thousands of UK university students caught cheating using AI*. The Guardian. https://www.theguardian.com/education/2025/jun/15/thousands-of-uk-university-students-caught-cheating-using-ai-artificial-intelligence-surveyl
- *Guidance on the appropriate use of generative artificial intelligence in graduate theses*. (2025). University of Toronto, School of Graduate Studies. https://www.sgs.utoronto.ca/about/guidance-on-the-use-of-generative-artificial-intelligence/
- Hallikaar, V. (2025). *Western N.Y. student's AI use accusation questions validity, raises concerns*. Spectrum Local News. https://spectrumlocalnews.com/nys/central-ny/news/2025/05/14/ub-student-says-false-ai-use-accusation-caused-stress--inspired-petition
- Havinga, B., Holmes, W., & Persson, J. (2024). *Regulating the use of artificial intelligence systems in education*. Council of Europe. https://www.coe.int/en/web/education/-/regulating-the-use-of-artificial-intelligence-systems-in-education
- Hirsch, A. (2024). *AI detectors: An ethical minefield*. Center for Innovative Teaching and Learning, Northern Illinois University. https://citl.news.niu.edu/2024/12/12/ai-detectors-an-ethical-minefield/
- Holmes, W., Persson, J., Chounta, I.-A., Wasson, B., & Dimitrova, V. (2022). *Artificial intelligence and education: A critical view through the lens of human rights, democracy and the rule of law*. Council of Europe Publishing.
- Kim, M. (2025). *AI begins in the classroom: Sweden commits to major overhaul of education system*. Sweden Herald. https://swedenherald.com/article/ai-begins-in-the-classroom-sweden-commits-to-major-overhaul-of-education-system
- *London school launches UK's first teacherless classroom*. (2024). Education Today. https://education-today.co.uk/london-school-launches-uks-first-teacherless-classroom/
- Lucas, C. (2025, May 29). *Reimagining assessment design in the era of AI*. UNSW Sydney. https://www.education.unsw.edu.au/news-events/events/reimagining-assessment-design-era-ai
- Mormando, S. (2023). *A stoplight model for guiding student AI usage*. Edutopia. https://www.edutopia.org/article/creating-ai-usage-guidelines-students
- Quality Assurance Agency for Higher Education (2023). *Reconsidering assessment for the ChatGPT era: QAA advice on developing sustainable assessment strategies*. https://www.qaa.ac.uk/docs/qaa/members/reconsidering-assessment-for-the-chat-gpt-era.pdf
- Swisher, D., & Els, A. (2024). Rethinking assessment in light of generative AI. *C2C Digital Magazine*. https://scalar.usc.edu/works/c2c-digital-magazine-fall-2023--winter-2024/rethinking-assessment-in-light-of-generative-ai
- The White House (2025). *Winning the race: America's AI action plan*. https://www.whitehouse.gov/wp-content/uploads/2025/07/Americas-AI-Action-Plan.pdf
- Yiakup, F. (2024). *AI in Swedish education: From vision to reality*. AI Sweden. https://my.ai.se/resources/3799

Александер Вецеслав Парахонко

Државни универзитет у Молдавији, Институт за математичке и информатичке науке „Владимир Андруначевици", Молдавија

Универзитет „Александру Јоан Куза", Факултет информатичких наука, Јаши, Румунија

ВЕШТАЧКА ИНТЕЛИГЕНЦИЈА У АКАДЕМСКИМ ТЕКСТОВИМА: ИДЕНТИФИКАЦИЈА И АНАЛИЗА

У раду се истражује трансформативни утицај генеративних алата вештачке интелигенције (ChatGPT, Google Gemini, Claude) на академски интегритет и образовну праксу, у настојању да се нађу одговори засновани на доказима на питања везана за широко распрострањено усвајање вештачке интелигенције у образовању. Значај истраживања лежи у свеобухватној анализи феномена који се развија брже од институционалних одговора и захтева систематску евалуацију, како технолошких решења, тако и педагошких адаптација. Теоријски контекст обухвата фундаментални помак од традиционалног плагијаризма – копирања постојећег садржаја – до онога што називамо „когнитивним аутсорсингом" (енг. cognitive outsourcing), где студенти делегирају мисаоне процесе системима вештачке интелигенције. Ова трансформација доводи у питање основне образовне претпоставке о учењу, оцењивању и интелектуалном развоју и захтева реконцептуализацију оквира академског интегритета у ери вештачке интелигенције.

У истраживању је коришћена мешовита метода која комбинује четири комплементарне компоненте: систематски преглед литературе из 100 извора (2023–2025) из база података Scopus, Web of Science, IEEE Xplore и докумената образовне политике; упоредну евалуацију шест платформи за детекцију вештачке интелигенције (Turnitin, GPTZero, Originality.ai, ZeroGPT, Copyleaks, Scribbr) са анализом тачности, стопама лажно позитивних резултата и језичке покривености; анализу доказа добијених из студија случаја везаних за образовни контекст Велике Британије, САД и ЕУ; и анализу политике која испитује Закон ЕУ о вештачкој интелигенцији, оквире Савета Европе, смернице Унеска и националне иницијативе. Метрика учинка извучена је из рецензираних студија валидације и независних бенчмаркинг извештаја (енг. benchmarking), уз триангулацију већег броја платформи ради смањења пристрасности. Аналитички оквир односио се на три кључна питања: распрострањеност ВИ и мотивација за њену употребу, ефикасност алата за детекцију у академским контекстима, као и педагошке мере којима се успоставља равнотежа између иновација и интегритета.

Резултати истраживања потврђују широко распрострањену интеграцију вештачке интелигенције, будући да више од 80% студената у високом образовању експериментише са алатима вештачке интелигенције, а 50% студената користи ВИ без откривања извора. Компаративна евалуација показује значајне варијације у перформансама међу платформа-

ма за детекцију, са стопама тачности у распону од 78% до 98%, али сталним, лажно позитивним ризицима који несразмерно погађају вишејезичне и неуродивергентне студенте.

Анализа образовних политика открива фрагментиране области управљања. Закон ЕУ о вештачкој интелигенцији заснован на људским правима разликује се од приступа САД усмереног на иновације, али се оба суочавају са изазовима у спровођењу регулатива када се технологије детекције покажу непоузданим. Технолошка трка између ВИ генерације и система за детекцију указује на инхерентна ограничења у погледу технолошких решења.

Закључак је да академски интегритет у ери вештачке интелигенције захтева прелазак са детекције на колаборативно образовање које помаже студентима да развију продуктивне односе са алатима вештачке интелигенције. Докази показују да су приступи засновани на детектовању сами по себи недовољни и потенцијално дискриминаторни, због чега је неопходна фундаментална педагошка трансформација.

Педагошке импликације подразумевају примену адаптивних модела процене који се одупиру аутоматизацији својом сложеношћу, а не тајношћу, затим развој свеобухватних програма ВИ писмености за студенте и наставнике, као и усвајање оквира попут модела „Стоплајт" (енг. Stoplight Model), који пружају јасне смернице за одговарајућу употребу вештачке интелигенције у различитим контекстима учења.

Институције морају да дају предност питањима равноправности тако што ће да обезбеде да интеграција вештачке интелигенције не погорша додатно постојеће неједнакости у образовању. То захтева развој алата за детекцију који узимају у обзир језичку разноликост, стварање приступачних програма ВИ писмености и спровођење политика које штите рањиве популације од алгоритамске пристрасности.

Трансформација захтева да наставници и сами постану писмени у области ВИ и да разумеју предности и ограничења ових алата како би креирали задатке који се допуњују са ВИ, а не такмиче се са њом. Будући успех у образовању зависи од неговања способности својствених само човеку – критичког размишљања, етичког промишљања, стваралачке синтезе – које вештачка интелигенција не може да реплицира, уз употребу ВИ као партнера у размишљању, а не алата који мисли за вас.

Кључне речи: *академски интегритет, генеративна ВИ, детекција ВИ, плагијаризам, образовна политика*