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AI and Digital Education Policy in Hungary, Poland, and Slovakia: A Bounded Document Analysis

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ABSTRACT **Original Research Article**

AI-related governance in higher education is expressed through instruments with varying authority and scope. This qualitative comparative document analysis examines four national instruments and one university guideline relevant to Hungary, Poland, and Slovakia: a Hungarian higher-education amendment and national AI strategy, Poland's education digital-transformation policy, Slovakia's responsible-use education plan, and the University of Debrecen guideline. Five categories structure the analysis: governance and ethics, pedagogical integration, faculty support, infrastructure and access, and policy framing. Digital governance and policy-enactment perspectives inform interpretation; TAM and UTAUT serve only as sensitizing concepts. The documents demonstrate varied levels of specificity. Hungary's law establishes a higher-education review duty, national strategies and plans articulate broader priorities, and Debrecen's guideline allocates responsibilities to faculties and instructors. The comparison identifies formal commitments and framing, not implementation, faculty acceptance, or educational outcomes. It is a purposive, bounded sample and does not represent national policy systems.

Keywords: Artificial Intelligence, Higher Education Policy, AI Governance, Digital Transformation, East-Central Europe.

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Introduction

Artificial intelligence (AI), particularly generative AI (GenAI), is transforming teaching, assessment, research, and administration in higher education. Its use raises policy questions concerning academic integrity, data protection, transparency, human responsibility, educational quality, and access. These questions are institutional and educational as well as technical. European Union documents provide the regulatory and strategic context for this study. The Ethics Guidelines for Trustworthy AI, the Digital Education Action Plan 2021–2027, and the Artificial Intelligence Act address responsible AI, digital education, and risk-based obligations, respectively (European Commission, 2019, 2020; European Parliament & Council of the European Union, 2024). They inform the background discussion but are not coded in the comparative corpus.

Hungary, Poland, and Slovakia share an EU policy context, while the selected national instruments differ in authority and educational scope. The analysis compares documents rather than national systems: Hungary contributes a statutory amendment and a national AI strategy, Poland a broad digital-education policy that discusses AI, and Slovakia a plan for responsible AI in education. One University of Debrecen guideline provides a bounded institutional example. Research on AI in higher education has examined applications in assessment, prediction, adaptive learning, and intelligent tutoring, while noting limited attention to educators and pedagogical perspectives (Zawacki-Richter et al., 2019; Crompton & Burke, 2023). Work on large language models has further identified opportunities and risks involving feedback, academic integrity, accuracy, and educational practice (Kasneci et al., 2023; Tlili et al., 2023).

A related strand examines formal institutional responses. Dabis and Csáki (2024) analyzed early ethical responses at 30 universities; Humble (2025) examined Swedish university guidelines; McDonald et al. (2025) analyzed documents from 116 US universities; and Parker et al. (2025) compared university policies across five countries. This literature establishes document analysis as relevant, while demonstrating why the present small corpus must be framed as purposive rather than representative. Digital governance directs attention to responsibility, transparency, oversight, access, and institutional capacity. Policy enactment scholarship draws attention to how policy is interpreted in organizational settings (Ball et al., 2012). Because this study analyzes documents only, policy enactment is used as a sensitizing perspective on formal policy translation across texts; it is not evidence of organizational practice or implementation.

The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) are used more narrowly. Their concepts help identify policy provisions concerning anticipated educational benefits, support, and access (Davis, 1989; Venkatesh et al., 2003). They are not operationalized as measures of individual perceptions, intentions, or use, which documentary evidence cannot establish. This study offers a bounded comparison of selected national instruments in Hungary, Poland, and Slovakia, together with one institutional guideline read alongside the Hungarian statutory context. It asks what the texts state, how directly they address higher education, and how the university guideline assigns responsibilities. It does not claim an exhaustive regional inventory or a comparison of three universities. The analysis examines four national instruments and one university guideline through five categories: AI governance and ethics, pedagogical integration, faculty support and professional development, infrastructure and access, and policy framing.

The analysis addresses two research questions:

RQ1. How do selected national instruments in Hungary, Poland, and Slovakia frame AI and digital education across the five categories, and how directly do their provisions address higher education?

RQ2. How does the University of Debrecen guideline formalize responsibility, support, and pedagogical discretion in relation to Hungary's statutory review obligation?

AI Policy in Higher Education

AI-related policy documents can establish formal expectations about acceptable use, assessment, responsibility, privacy, and professional support. Their value for comparison lies in the commitments and roles they specify, not in what they prove about staff awareness, practice, or outcomes. Policy instruments vary in legal force, audience, and detail. Legislation may impose review duties; strategies and plans express priorities and proposed actions; institutional guidance can specify responsibilities within a university. Comparisons must preserve these differences rather than treat unlike instruments as equivalent. This study builds on recent analyses of institutional AI policy but uses a different unit of comparison: selected national instruments in Hungary, Poland, and Slovakia, together with one university-level document. The design supports comparison of formal policy content while preserving the limits of a purposive, documentary sample.

Analytical Perspectives

Digital governance is the primary interpretive lens for examining who is assigned responsibility, what safeguards are stated, and how access and support are framed. The analysis records explicit provisions and proposed actions separately from broad policy aspirations.

Policy enactment theory is relevant because policy texts may describe how general expectations are to be interpreted locally (Ball et al., 2012). Here it is applied only to textual relationships between a national instrument and the Debrecen guideline. Interviews, internal rules, and observations would be required to establish enactment in practice.

TAM and UTAUT provide secondary sensitizing concepts for identifying statements about anticipated benefits and facilitating conditions, such as training or access to tools. A policy statement that AI may be useful is not evidence that faculty perceive it as useful; a training commitment is not evidence that training has been delivered or is effective.

The five coding categories connect these perspectives to the documentary material. Governance and ethics, pedagogical integration, faculty support, infrastructure and access, and policy framing organize the analysis. Policy framing refers to the text's discursive positioning of AI, not to faculty attitudes.

The framework therefore distinguishes textual evidence from theoretical interpretation. TAM and UTAUT are not tested, and individual-level constructs are not inferred from documents. Digital governance and policy translation guide interpretation of formal responsibilities, safeguards, and institutional discretion.

Bounded Comparative Scope

The three countries form a bounded comparison within a shared EU governance environment. Their selected national instruments provide different documentary forms and levels of educational specificity, supporting comparison of formal priorities while requiring caution about equivalence. The national corpus includes Hungary's 2024 higher-education legislative amendment and 2025 AI Strategy, Poland's 2024 Policy for Digital Transformation of Education, and Slovakia's 2025–2027 Plan for Responsible Use of AI in Education. Poland's policy is broad and discusses AI within digital transformation; it is not treated as a university-specific AI rule. The institutional component is limited to the

University of Debrecen's public guidelines. It was selected as a bounded example because it addresses AI in teaching and research and can be read alongside Hungary's statutory review requirement. It is not intended to represent Hungarian universities or create a three-country university comparison.

Potentially relevant institutional documents at the University of Białystok and J. Selye University are outside this one-university component and are not coded. Their exclusion is a scope boundary, not a claim that university-level AI provisions are absent (Rector of the University of Białystok, 2025; J. Selye University, 2025).

European Union instruments are used only to describe the shared policy context. They are not part of the five-document coding corpus, and the study makes no comparative findings about EU-level policy. The findings concern four selected national instruments and one institutional guideline. They do not establish the comprehensiveness of national policy, university uptake, faculty experience, or policy effects.

Table 1. Coding categories and analytical indicators

Coding category	Analytical focus	Illustrative indicators	Theoretical connection
AI Governance and Ethics	Governance responsibilities and oversight	Data protection, academic integrity, transparency, accountability, human oversight, risk management	Digital governance and policy enactment
Pedagogical Integration	AI in teaching and learning	Curriculum development, assessment, feedback, educational design, AI-supported teaching	TAM perceived usefulness; UTAUT performance expectancy
Faculty Support and Professional Development	Institutional support for academic staff	Training, professional development, technical assistance, guidance, incentives, workload	UTAUT facilitating conditions; social influence where explicitly addressed
Infrastructure and Access	Technological resources and institutional capacity	Access to AI platforms, digital infrastructure, technical support, funding	UTAUT facilitating conditions
Policy Framing	Discursive representation of AI	Innovation, opportunity, risk, threat, educational empowerment, oversight	Policy framing and digital governance

Methodology

The study uses qualitative comparative document analysis to examine a purposive, bounded corpus of five public policy documents (Bowen, 2009; Mayring, 2014). The national instruments are a Hungarian legislative amendment (C01), Hungary's AI Strategy 2025–2030 (C02), Poland's Policy for Digital Transformation of Education (C03), and Slovakia's Plan for Responsible Use of AI in Education 2025–2027 (C04). The institutional document is the University of Debrecen guideline (C05). The corpus is not an exhaustive census of policy in the three countries.

National instruments were selected because they are official texts issued in 2024–2025 and address AI or digital education relevant to the research questions. They differ in legal status and scope: C01 is legislation; C02 is a national strategy; C03 is a broad national digital-education policy; and C04 is a ministerial education plan. Those differences are part of the analysis. The institutional document was selected purposively as a single, bounded case. Debrecen's public guideline addresses teaching and research, faculty and course-level discretion, responsibility, transparency, and training. It can be read alongside the Hungarian statutory review obligation. It is not intended to represent Hungarian universities or create a three-country university comparison.

Other potentially relevant institutional texts are not included because the institutional component is restricted to Debrecen. The official University of Białystok Rector's Order No. 31 of 11 April 2025 addresses AI use in education; the 2025 J. Selye University Code of Ethics includes AI-disclosure provisions for research. They are listed as outside-scope documents, not as evidence of policy absence (Rector of the University of Białystok, 2025; J. Selye University, 2025). Three European instruments—the Ethics Guidelines for Trustworthy AI, the Digital Education Action Plan 2021–2027, and Regulation (EU) 2024/1689—provide context only. They are listed separately in the supplementary register and are not coded or included in cross-case findings.

Four national texts in the analytic corpus are dated 2024 or 2025. The University of Debrecen guideline does not state an issue date; it is recorded as "n.d." and is not assigned to a dated policy sequence. Date and status are reported in Supplementary Table S1.

Sources were collected from official legislation, government, ministry, and university repositories on 12 April 2026. Source copies and bibliographic metadata were rechecked against those repositories on the same date. Supplementary Table S1 lists document identifiers, source language, issuing body, status, analytic role, and pinpoint locations.

The Hungarian Act and strategy are in Hungarian; the Polish policy is in Polish; the Slovak plan is in Slovak; and the Debrecen guideline is available in English. The comparison is presented in English. Independent backtranslation or bilingual validation was not reported, so cross-language interpretation is treated cautiously.

The coding unit was a passage or discrete policy provision expressing priority, responsibility, proposed action, safeguard, or policy characterization. Documents were read repeatedly, and passages were coded under the five categories in Table 1. Subcodes were refined when a passage did not fit the initial indicators. Supplementary Table S2 traces one Debrecen provision through the coding process.

Governance and ethics covered responsibility, transparency, privacy, integrity, and oversight; pedagogical integration covered teaching, curriculum, assessment, and feedback; faculty support covered training and guidance; infrastructure and access covered tools, resources, capacity, and equity; and policy framing covered textual representations of AI as opportunity, innovation, risk, or an object of oversight.

The analysis used theory-informed deductive coding, with inductive refinement of subcodes where a passage did not fit the initial indicators. The synthesis remains organized by the five categories and does not report a frequency ranking. NVivo was used to organize documents, manage coding, and retrieve passages; it supported data management but did not determine interpretation

For each passage, the analysis recorded the document, level, scope, audience, assigned responsibility, and specificity. Comparison focused on what was explicit, what was stated as a goal or proposed action, and what was not established. Implementation was not inferred from policy language.

Digital governance and policy translation informed interpretation of responsibility, oversight, and relationships between national and institutional texts. TAM and UTAUT were used only to identify provisions concerning expected benefits, training, access, and facilitating conditions; individual-level constructs were not operationalized or tested.

The European materials served as contextual references and were not subject to the five-category coding. The comparison is limited to C01–C05 in Supplementary Table S1.

Table 2. Analytic corpus included in the document analysis

Doc. ID	Document and citation	Issuing level and form
C01	Act LXXVI of 2024, 102, amending the National Higher Education Act (Government of Hungary, 2024)	National legislation; higher-education review duty
C02	Hungary’s Artificial Intelligence Strategy 2025–2030 (Government of Hungary, 2025)	National strategy; AI education and capacity
C03	Policy for Digital Transformation of Education (Council of Ministers of the Republic of Poland, 2024)	National education policy; AI within digital transformation
C04	Plan for Responsible Use of AI in Education 2025–2027 (Ministry of Education, Research, Development and Youth of the Slovak Republic, 2025)	National education plan; cross-sector priorities
C05	Guidelines for the Use of Artificial Intelligence-Based Systems (University of Debrecen, n.d.)	University-wide guideline; teaching and research

Results

Hungary

Hungary's national framework includes a statutory amendment and a renewed AI strategy. Section 102 of Act LXXVI of 2024 inserts a higher-education provision requiring institutions, by 1 September 2025, to review relevant internal rules—particularly study and examination regulations—to govern AI use, and curricula so that AI knowledge appropriate to each program becomes part of study programs (Act LXXVI of 2024, 102, inserting Act CCIV of 2011, 114/P(1)–(2); C01). This creates a formal review duty; the text does not demonstrate institutional compliance.

Hungary's AI Strategy 2025–2030 places education and competency development among the conditions for AI development and use. Its measures include strengthening AI and data-science education and developing higher-education infrastructure and human capacity for practice-oriented programs on generative AI and data management (Government of Hungary, 2025, Section 4.1 and education and training measures; C02). These are strategic aims and proposed actions, not evidence of delivery.

Poland

Poland's national instrument is Resolution No. 98 of the Council of Ministers, which adopted the Policy for Digital Transformation of Education on 12 September 2024 (Council of Ministers of the Republic of Poland, 2024; C03). The policy addresses digital transformation across education and includes a discussion of AI as an educational technology (Council of Ministers of the Republic of Poland, 2024, p. 18; C03).

The policy supplies national digital-education context; it is not a university-level AI rule. Findings are confined to its stated AI framing and do not describe the full Polish policy environment or specific university teaching, assessment, or faculty-support rules.

Slovakia

Slovakia's Ministry of Education presented the Plan for Responsible Use of AI in Education 2025–2027 on 5

September 2025 (Ministry of Education, Research, Development and Youth of the Slovak Republic, 2025; C04). The plan aims to support learning about AI and safe use of AI tools in education; it identifies access, equality, and reducing the digital divide among its concerns (C04, PDF pp. 1–2).

The plan proposes school-focused curricular measures, teacher support and methodological resources, and AI competency centers at selected public universities (Ministry of Education, Research, Development and Youth of the Slovak Republic, 2025; C04).

Cross-Document Synthesis

Table 3 compares the four national instruments (C01–C04) across the five coding categories. The University of Debrecen guideline (C05) is presented separately in Section 3.5.

Table 3. National policy instruments by analytical category

Category	Hungary (C01–C02)	Poland (C03)	Slovakia (C04)
AI governance and ethics	C01 requires higher-education institutions to review rules for AI use. C02 sets national AI priorities but does not replace institution-level rules.	C03 discusses AI within digital education; the selected policy is not a university-level AI rule.	C04 foregrounds responsible and safe use, access, equality, and reducing the digital divide.
Pedagogical integration	C01 requires curriculum review for program-appropriate AI knowledge; C02 identifies AI and data-science education as priorities.	C03 situates AI in education-wide digital transformation but does not specify university teaching or assessment rules.	C04 proposes school curriculum measures and university competency centers; it does not set course-level university rules.
Faculty support	C02 identifies higher education capacity and training priorities.	C03 sets broad digital-education priorities; the selected text does not specify AI-focused university faculty training.	C04 proposes teacher support and methodological resources across education; these provisions are not university-faculty specific.
Infrastructure and access	C02 includes higher-education infrastructure and human-capacity measures.	C03 frames digital capacity as a national priority; the selected text does not specify university AI-resource commitments.	C04 identifies access and equity as priorities and proposes improved access to AI tools.
Policy framing	C01 frames AI as a matter for institutional regulation and curriculum review; C02 links AI to education, skills, and development.	C03 frames AI within digital transformation and educational technology.	C04 frames educational AI through responsible use, safety, access, and educational capacity.

Note. C01–C04 are national instruments. Hungary is represented by two instruments (C01–C02); Poland and Slovakia are each represented by one (C03 and C04). C05 is treated separately. The table summarizes selected texts and does not rank countries or establish implementation.

The national instruments differ in authority and purpose. Hungary combines a statutory duty and national strategy; Poland's instrument is a broad public policy for digital transformation of education; and Slovakia's instrument is a ministerial plan for responsible AI in education.

The documents also differ in how directly they address higher education. The Hungarian law specifies institutional review and curriculum duties. Poland's policy supplies broad digital-education context. Slovakia's plan includes school initiatives alongside proposed university competency centers.

At the national level, Hungary's strategy includes higher-education capacity measures, Slovakia's plan proposes teacher support and equitable access, and Poland situates digital capacity within a wider transformation agenda. These priorities differ in scope and do not establish provision or delivery.

These are differences among selected national documents, not evidence that one national system is more mature or better implemented. Assessing policy maturity would require consistent institutional coverage and evidence about resources, monitoring, uptake, and outcomes.

University of Debrecen Institutional Case

The University of Debrecen guideline encourages AI use in teaching and research subject to responsible, ethical, and transparent use. It identifies guidance and training, competency development, communication with teachers and students, and access to reliable technologies as institutional priorities (University of Debrecen, n.d., p. 1; C05).

The guideline assigns detailed rulemaking to faculty regulations and permits instructors, within those regulations, to allow, support, or prohibit use of AI in courses. It also assigns responsibility for AI-assisted content to its author and addresses privacy, disclosure, and system limitations

(University of Debrecen, n.d., pp. 2–3; C05).

Read alongside Hungary's statutory review duty, the guideline shows how national and institutional texts address related issues at different levels of specificity. This is a document-level relationship; the corpus does not establish that the law caused the guideline, that the university complied with the law, or that other universities followed the same approach.

Discussion

The findings support a bounded comparison of selected national instruments and one university guideline. They show how documents with different authorities and audiences articulate AI-related priorities; they do not establish implementation or faculty acceptance.

National Instruments and Scope

The national texts should be compared as different instruments rather than equivalent national AI policies. Hungary's Act creates a review duty for higher-education institutions, while its strategy places AI education and capacity within a wider development program. Poland's policy addresses digital transformation of education and situates AI within that agenda. Slovakia's plan makes responsible use, access, teacher support, and selected university initiatives visible within an education-wide program.

These differences are meaningful as differences in scope and specificity. They do not establish differences in national commitment, institutional readiness, or outcomes. The breadth of Poland's policy and the cross-sector scope of Slovakia's plan limit direct comparison with Hungary's higher-education-specific legal provision.

The EU frameworks cited in the Introduction provide shared background but were not coded. The study therefore does not test how national or institutional texts align with particular EU provisions; that would require an explicit legal and policy mapping beyond this corpus.

Institutional Guidance as Formal Policy Translation

Debrecen's guideline illustrates one way an institution can articulate responsibilities. It sets general principles and assigns faculties responsibility for discipline-specific rules, while leaving instructors discretion within those rules. This allocation of decision rights is visible in the text (University of Debrecen, n.d., pp. 1–2; C05).

Read alongside Hungary's statutory review duty, the guideline demonstrates that national and institutional documents can address related issues at different levels of specificity. The comparison does not establish a causal link, statutory compliance, or how course-level decisions are made.

Policy enactment theory remains useful as a question for future empirical work: how do institutional actors interpret and resource formal expectations? This documentary corpus cannot answer that question. Interviews, internal rules, and implementation records would be needed to examine enactment in practice.

Acceptance Models as Sensitizing Concepts

TAM and UTAUT help identify policy provisions that may relate to conditions for technology use, such as anticipated educational benefits, access, training, and technical support (Davis, 1989; Venkatesh et al., 2003). Here those concepts organize attention to policy language; they do not explain individual acceptance from documentary evidence.

Debrecen’s references to guidance and training can be coded as formal support provisions. They cannot establish perceived usefulness, effort expectancy, social influence, or actual use. A policy target or statement expresses an institutional or governmental aim, not a faculty member’s belief.

A recent synthesis identifies institutional support, resources, AI literacy, transparency, and ethical concerns as relevant to educators’ adoption, while noting limits in established acceptance models for AI-specific contexts (Taheri et al., 2025). The present study complements that literature by examining how such conditions are represented in formal policy documents; it does not infer educator adoption.

Ethics, Responsibility, and Access

Across the coded documents, governance and ethics appear through different instruments. Hungary’s statute establishes a duty to regulate AI use in higher education; Debrecen’s guideline addresses author responsibility, transparency, privacy, and faculty discretion; Slovakia’s plan frames responsible, safe use alongside access and support (C01, C04, C05). Debrecen’s allocation of course-level discretion is a formal arrangement, not evidence that it produces consistent or equitable practice.

Limitations

The corpus is purposive and small: four national instruments and one university guideline. It is not exhaustive and cannot represent national policy systems. The national texts differ in legal status, audience, and education-sector focus, limiting direct equivalence. The manuscript does not report a systematic search protocol or full screening log, so corpus retrieval should not be read as a comprehensive search.

The Debrecen guideline is undated, so its place in a dated policy sequence cannot be established. The national texts are in Hungarian, Polish, and Slovak, while the university guideline is in English; independent translation validation is not reported. The study analyzes formal text only and cannot establish implementation, compliance, faculty perceptions, intentions, or outcomes. It also does not report independent double-coding or coding-agreement statistics; the worked

example supports traceability but not reliability. The University of Białystok order and J. Selye University ethics code are outside scope, not absent (Rector of the University of Białystok, 2025; J. Selye University, 2025). Future work could expand institutional coverage and combine document analysis with interviews or implementation evidence.

Conclusion

This study compared four national policy instruments and one institutional guideline concerning AI and digital education in Hungary, Poland, and Slovakia. The documents differ in legal force, audience, and specificity, which limits the conclusions available from comparison.

Hungary's statute establishes a higher-education review duty, its AI strategy identifies education and capacity as priorities, and Debrecen's guideline specifies faculty and instructor responsibilities. Poland's policy situates AI within broad digital transformation of education, while Slovakia's plan combines responsible-use priorities with proposed support and university initiatives.

The findings concern formal provisions and policy framing; they do not show implementation, faculty acceptance, or educational effects. The contribution is a bounded documentary comparison, not a ranking of countries or an assessment of national systems.

A fuller account of institutional AI governance in the region would require broader university coverage and evidence about how written expectations are communicated, resourced, and used.

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