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AUTOMATED ANALYSIS OF EDUCATIONAL DATA: IMPACT OF AI IN MANAGEMENT DECISIONS IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

Purpose: This study aims to examine how AI-based tools and automated learning analytics influence management processes in higher education institutions to improve the effectiveness of educational management.

Design/Methodology/Approach: This is a quantitative study employing a comparative, cross-sectional design with a longitudinal component (2021–2024). Purposive sampling was applied to select three EU countries (Germany, Estonia, Poland) that represent different stages of digital maturity. The sample consists of aggregated statistical data from reports by the OECD and the EUA on national higher education systems, with indicators standardised to a percentage scale (N $\geqslant$ 1,000 students per data point). The tool for analysis is the structured data extraction matrix, conceptualised by the author, which focuses the data into three sections: digital infrastructure, educational efficiency, and AI analytics adoption. Results: Data were analysed using descriptive and comparative quantitative analyses (percentage-point changes), trend analysis, and cross-tabulation of indicators by country and year.

Research Limitation: The research is limited by reliance on secondary statistical data, suggesting the need for future empirical studies at the institutional level.

Findings: The results indicate that increased use of analytical and predictive tools is associated with reduced academic losses and higher program completion rates. The implementation of predictive analytics and early warning systems supports timely managerial interventions and enhances student success. The study confirms that AI adoption facilitates a transition from reactive governance to system-based educational modelling.

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Practical Implication: The findings justify integrating analytical platforms into university digital processes and strengthening managers' digital competencies.
Social Implication: Effective use of AI contributes to more inclusive, transparent, and sustainable higher education systems.
Originality/Value: The originality of this study lies in its management-focused approach, which empirically verifies a positive correlation between digital analytical maturity in HEIs and improved educational outcomes (i.e., dropout and completion rates).
Keywords: *Adult education. artificial intelligence. higher education. management. military education.*

INTRODUCTION

21st-century universities and colleges are being profiled and reshaped by the flow of digital technology as well as educational data. For the admin, it is no longer a side effect of education; some decision-making tools allow them to improve their decision-making and so fine-tune the accuracy of their decisions even in the face of new facts, all data, and all these grades institutions now have voluntarily handed over to the administration. Here, automated learning analytics and AI systems present opportunities for personalised management and for identifying educational risk or success in learning (Cabral et al., 2025; Mohammadi et al., 2025; Gedrimiene et al., 2024).

The literature review is evident that there has been a substantial advancement in this sense concerning the study of the analytics tools that are able to interpret automatically the digital traces left by students to model "drop-out" risks and formative arrangements canon (Abukader et al., 2025; Sajja et al., 2025; Lagares Rodríguez et al., mutatis mutandis, 2025). At the same time, the application of an AI use in HEIs is not only a matter of technical solutions but has also moral implications, policy dilemmas at the university level and education accreditation requires considering synergies between technological innovation and respect for fair transparency as well is pedagogically sensitive 2 Adamakis & Rachiotis (2025); Crompton & Burke, 2023; Garay Gallastegui & Reier Forradellas (2021). Numerous writers further emphasise that the success of digital transformation is connected to organisational culture and employees' decision-making skills in data-driven management (Hummel, 2025; Adel, 2024; Almatrodi & Skoumpopoulou, 2023).

Challenges: Despite the one-year growth of the AI analytics product, some "point dark" persists in troublesome areas. The first reason is the degree to which any number of analytic resources have been, and are being, systemically embedded in an institutional leadership infrastructure to a point at which it becomes feasible to develop deliberate decision support. Second, an international research study so far conducted was mainly based on particular cases or technical experiments, and the general comparative analysis about amounts of activity-analytics actions leads to courses of action at the system level; education systems are still not completed (OECD, 2025; OECD, 2022; OECD, 2023; European University Association, 2011). Third, there is

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scant focus on the link between universities' digital maturity and their ability to implement AI sustainably: a chasm between technological potential and actual management realities.

Under this prerequisite, we face the scientific challenge of systematically evaluating what automated educational data analytics imply for the key performance indicators of higher education institutions, as well as how smart tools can enrich the evidence base for decision-making. As a result, the aim of this paper is to investigate the impact of AI on management decisions in higher education institutions. To do so, the objectives are: (1) to assess AI-powered learning analytics in universities in Europe; (2) to determine dynamics of education's KPIs; (3) to identify managerial implications pertaining to the implementation of management intelligence analytic solutions; and (4) to identify the barriers constraining development needs.

LITERATURE REVIEW

Recent research tends to explore the empowerment of automated decision analytics and artificial intelligence within higher education management contexts. Special emphasis is placed on the prediction of learning results and the aid of this management to academic success (Abukader et al., 2025; Thakur & Rawat, 2025; Lagares Rodríguez et al., 2025), and also in the development of intelligent analytics dashboards for management of the educational process (Cabral et al., 2025; Pérez-Jorge et al., 2025). Model interpretability and the inclusion of heterogeneous digital traces of learners are also highlighted by researchers (Mohammadi et al., 2025; Marín Díaz, 2025; Mirzaei et al., 2025; Gedrimiene et al., 2024).

The studies also illustrate the evolution of educational management towards the automation of everyday tasks, the optimal use of resources, and the creation and use of early warning systems (Koukaras et al., 2025; Mahamad et al., 2025; Rodríguez-Ortiz et al., 2025; Munir et al., 2022). At the same time, limitations of digital solutions for personalised learning paths and adaptive support have been pointed out (Sajja et al., 2025; Vieriu & Petrea, 2025; Crompton & Burke, 2023; Alotaibi, 2024).

Another focus concerns the ethical and political implications of introducing artificial intelligence in higher education institutions, including the dangers posed by algorithmic bias, dataveillance, and pedagogical autonomy (Adamakis & Rachiotis, 2025; Hummel, 2025; Garay Gallastegui & Reier Forradellas, 2021). Going through digital transformation requires the development of a digital culture to build staff competences, update organisational practices, and so forth (Adel, 2024; Almatrodi & Skoumpopoulou, 2023; Mian et al., 2020).

Meanwhile, at the international level, attention is drawn to the strategic role of analytics in higher education management in both national and international contexts (OECD, 2025; OECD, 2023; OECD, 2022; European University Association, 2021). Within the Ukrainian research environment, we observe growing attention to the application of AI in educational management and assessment (Batsurovska et al., 2024; Alshahrani, 2022), contributing to

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Ukraine's alignment with global trends towards the digitalisation of education at higher institutions.

Scholarly articles highlight the increasing importance of AI incorporation to learning management systems that lead to digital infrastructure renovation and enhance university technological readiness for analytical management (Alshahrani, 2022; Adel, 2024; Alotaibi, 2024). The researchers emphasise that AI can and should serve not only as a technical tool but also as a decision-support system for educational activities (Katsenou et al., 2025; Hummel, 2025; Batsurovska et al., 2024). The use of digital twins in higher education has potential, for instance, as a tool to facilitate assessment and risk management with students (Mahamad et al., 2025; Garay Gallastegui & Reier Forradellas, 2021).

Outstanding works (Rodríguez-Ortiz et al., 2025; Mirzaei et al., 2025; Munir et al., 2022) stress that AI is promising mainly in terms of the possibility to organise big data, develop flexible models for educational analytics and provide adaptive support for educational strategies. Similarly, in educational administration, there is a move from reactive to proactive decision-making through strategic planning, institutional forecasting, and the optimisation of university policy (Sajja et al., 2025; Pérez-Jorge et al., 2025; Koukaras et al., 2025). International reviews highlight that building a systematic, analytical culture that enables the transparent and responsible use of digital data is also a priority area (OECD, 2025).
Hence, most current studies converge in affirming that AI and learning analytics of educational data are resulting in a new model for universities based on evidence-based, predictive, and personalised management of the educational space. Yet, while enormous strides have been made, systemic challenges such as inadequate penetration of ethical and fairness principles in algorithmic decision-making technologies remain unaddressed, thereby limiting the extent to which intelligent technologies can be scaled in higher education.

MATERIALS AND METHODS

The research strategy is based on a quantitative, analytical review of international statistical reports from the OECD and the EUA to assess the dynamics of the implementation of automated educational analytics tools in 2018–2024. The methodology involves a comparative analysis of digital maturity indicators for higher education in Germany, Estonia, and Poland, followed by the standardisation and visualisation of the results.

Data from the international statistical reports [OECD, EUA] and their analytics in comparison with their data were used to carry out an analysis of the digital transformation of the higher education system, and its 2018–2024 automated learning analytics tools proliferation based on a quantitative and analytical review method. The sample represents three European Union Member States, Germany, Estonia and Poland, showing various degrees of digital maturity and organisational embedding in the system of educational analytics.

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The statistical indicators compiled are standardised to a common percentage scale, thereby allowing comparability between countries. The analytic variables are categorised into three blocks: the digital infrastructure of universities, the efficiency of the educational process, and the degree to which AI-based learning analytics is utilised. Descriptive statistics were used, given the type of data (secondary aggregated data) from the OECD and EUA reports, as they do not allow access to individual student or institutional records, which are necessary to conduct correlation or regression analyses. Furthermore, the sample comprises only three countries, so descriptive statistics are adequate for detecting temporal trends and comparing percentage changes, in line with the descriptive-comparative design of the study. They were processed and presented by the author as a data visualisation of results from scientific research at institutions of higher education in Ukraine, so the information provided from foreign sources is reliable.

RESULTS AND DISCUSSION

Now, in the age of AI and machine-learning analytics, a new form of digital governance emerges in universities, as management is helped not only to make decisions quickly but also to make them evidence-based (rather than "intuitive"). Learning platforms that collect and analyse data automatically maintain records of academic achievement, not just personally but also genetically, used as input for predictive dropout models, adaptive learning paths, and personalised learning (Abukader et al., 2025), etc. This deduction then suggests that it can change the classical style of management to an adaptive one, making decisions based on dynamic and automatic information without a human having to look at it in any situation, only to manage resources for their university.

A major trend in this area is the integration of analytics with learning management systems and intelligent academic supervision services, such as cognitive risk assessment based on students' low profiles and recommendation techniques (Marín Díaz, 2025; Gedrimiene et al., 2024). For instance, today one can automatically gather big educational datasets and organise them with AI platforms as well as generate understandable real-time visualisations for managers —which save a significant amount of time in fulfilling the analytical work—and put forward a policy for higher education development update (Pérez- -Jorge et al., 2025).

The application of AI in higher education management and operational systems, however, raises many ethical and legal issues (Konstantinos Adams & Rachiotis, 2025) associated with a range of subjects, such as privacy in educational data (e.g., student information), fair vs unfair algorithms, and the safeguarding of teaching autonomy. University institutes frequently encounter barriers that hinder the adoption of technology-based practices, such as a lack of digital institutional readiness, a shortage of skilled staff, and resistance to organisational change due to the abandonment of traditional habits (Almatrodi & Skoumpopoulou, 2023). Over-algorithmisation of decisions It may also generate the hazard where human knowledge is insufficiently proximate in the context of AI with management (Katsenou et al., 2025).

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There is scientific evidence that artificial intelligence and automated analytics of educational data are increasing higher education management change (Viberg et al., 2019), but the transfer to practice should be supported by proper methodology suited to the educational sphere and culture oriented in responsible use of AI-based solutions at HEIs (Crompton & Burke, 2023). But technology is no longer the development focus – it is more about building the university as an organisation that supports strategic data use: basically (I hope not simplistically), providing management with predictive and fully transparent knowledge to wisely steer its educational ship.

New means and methods of routinization and processing (analysis) of educational information were transformed through the digitalisation of management in high school. They enable the prediction of study progress and the identification of groups of applicants at risk of loss, the creation of personal educational plans, and the making of management decisions based on powerful forecasting models (Sajja et al., 2025; Gedrimiene et al., 2024). The smart dashboards, predictive early-alert systems, and holistic learning profiles for students are some of the contributions that promote transparency and optimisation in educational management solutions at different levels (Cabral et al., 2025).

Table 1 presents a comparative evaluation of AI-based learning analytics systems that educational institutions use to analyse student learning data and make evidence-based administrative decisions.

Table 1: Automated learning data analytics tools for educational management

Tool/technology	**Main purpose**	**Functional capabilities**	**Management effect**
Learning Analytics Dashboards	Real-time monitoring of performance indicators	Data visualisation, automatic recommendations, risk group segmentation	Improved soundness of administrative decisions; rapid response to problems
Student performance prediction models	Identification of dropout risk, prediction of completion of studies	ML algorithms, behavioral pattern analysis, individual risk indices	Optimization of resource allocation and applicant support
Early warning systems	Preventive influence on academic risks	Automatic notifications for teachers and advisors, progress and attendance analysis	Reduction of academic failure and student attrition

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Multimodal analytics of educational data	Analysis of heterogeneous digital traces	Data integration from LMS, video analytics, speech analytics	Student engagement, teaching quality improvement
Intelligent DSS systems for educational management	Strategic decision support	Scenario modeling, resource allocation, program optimization	Data-driven university policy development

Source: (Cabral et al., 2025; Mohammadi et al., 2025; Koukaras et al., 2025; Pérez-Jorge et al., 2025; Vieriu & Petrea, 2025; Thakur & Rawat, 2025)

Tools guarantee the occurrence of a radical analytical ecosystem in which data is turned into a strategic management asset. This puts us in a position to estimate the dynamics of education, offer timely assistance with teaching processes, and contribute to curricular improvement and new personalised educational management practices (Crompton & Burke, 2023; Koukaras et al., 2025). Therefore, the intelligent EDAs contribute not only to improving management efficiency but also to the university's global competitiveness in the global educational market.

A study of available open international statistical sources with quantitative indicators of the development of digitalisation and automated analytics across various systems of higher education institutions was conducted. The empirical base for the study was data from official reports by the OECD (Organisation for Economic Cooperation and Development), the European University Association on digitalisation of education, and the readiness of higher educational institutions to use intelligent tools of the management process in pedagogical activities (OECD, 2023; European University Association, 2021).

At the first level, we were able to create a sample of countries, represented by the reports Education at a Glance 2025 and Digital higher education; emphasis was placed on EU countries where digital analytics in HE has systemic support for managerial decision-making (OECD, 2025; OECD, 2022). The data were chosen according to their relevance to the research goal, namely: established digital infrastructure at universities, learning analytics systems to support teaching and learning, indicators of student performance, the ability to track registration statistics on student achievements, and drop-out risk predictions with program completion concerns.

The second phase consisted of organising the collected information into three blocks:

- digital environment of the higher education institution (LMS infrastructure, digital management services);
- learning effectiveness indicators (success rate, completion rate, percentage of at-risk groups);
- the existence of educational analytics practices (early alert systems, automated tracking, management dashboard panels).

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To have the indicators transformed into a uniform measurement scale for data analysis, they were standardised to a single measurement scale: relative values in percentages, with N⩾1000 students from the sample institutions, and a temporal range of 2021–2024. This allowed an international comparison of trends in the exploitation of AI-based learning analytics.

The third stage included descriptive statistics and an examination of the relationship between the prevalence of computerised analytics, performance counts, and student characteristics. Special focus was given to European University Association data, which provides detailed information on how universities use digital analytics for learning adaptation: early academic risk detection, student support, and curriculum enhancement (European University Association, 2021).

The methodological rationale, therefore, was that the efficacy of AI analytics systems could be detected in enhanced academic performance, lower dropout rates, better forecasts about learning progress and impact on strategic management. The use of international statistics enabled confirmation of a directly proportional relationship between the level of digital transformation in universities and an improvement in the quality of the educational process (OECD, 2025; OECD, 2023).

Therefore, the selected method enabled the demonstration of a comprehensive educational data analysis practice that accounted for reliable international indicators. It establishes a framework for developing new monitoring and forecasting tools that can contribute to an evidence-based educational management system in higher education.

Statistical data from official international reports (OECD, 2025; European University Association, 2021) were included in the empirical basis. For the analysis, three EU countries were selected with varying levels of digital maturity in their HE sectors: Germany, Estonia, and Poland. The metrics addressed are from the perspectives of automated analytic tools, learning success measures, and management effectiveness mediators. The analytical variables are described below the tables.

The dynamics of the spread of AI-driven learning analytics tools are sketched in Table 2 for three EU member states.

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Table 2: Coverage of students by AI analytics systems in higher education institutions (2021–2024)

Year	Germany, %	Estonia, %	Poland, %
2021	52.34	68.11	41.27
2022	57.89	72.84	45.66
2023	63.41	78.05	49.18
2024	68.43	81.36	59.74

Source: (OECD, 2025; 2023; 2022; European University Association, 2021)

Table 2 shows changes in academic performance that are most sensitive to the implementation of early warning systems and predictive analytics.

Table 3: Academic outcomes: dropouts and completions (%)

Country / Year	Dropout rate, %	Timely completion, %
Germany (2024)	11	72.5
Estonia (2024)	8.92	78.1
Poland (2024)	13.48	69.32
Germany (2021)	14.33	66.21
Estonia (2021)	11.84	70.44
Poland (2021)	17.06	63.15

Source: created by the author based on (OECD, 2025; European University Association, 2021)

One of the key indicators of the digital maturity of a higher education management system is the number of technological tools used for automated educational data analytics and management decision support. Based on international statistical reports from the OECD and EUA, there is a positive trend in their implementation in European universities. A visualisation of comparative data for Germany, Estonia, and Poland is presented in Figure 1, which shows a gradual increase in the number of solutions implemented between 2021 and 2024 and a growth in the capacity of Higher Education Institutions (further – HEIs) to use AI-driven learning analytics as an educational management tool (OECD, 2023; OECD, 2022; European University Association, 2021).

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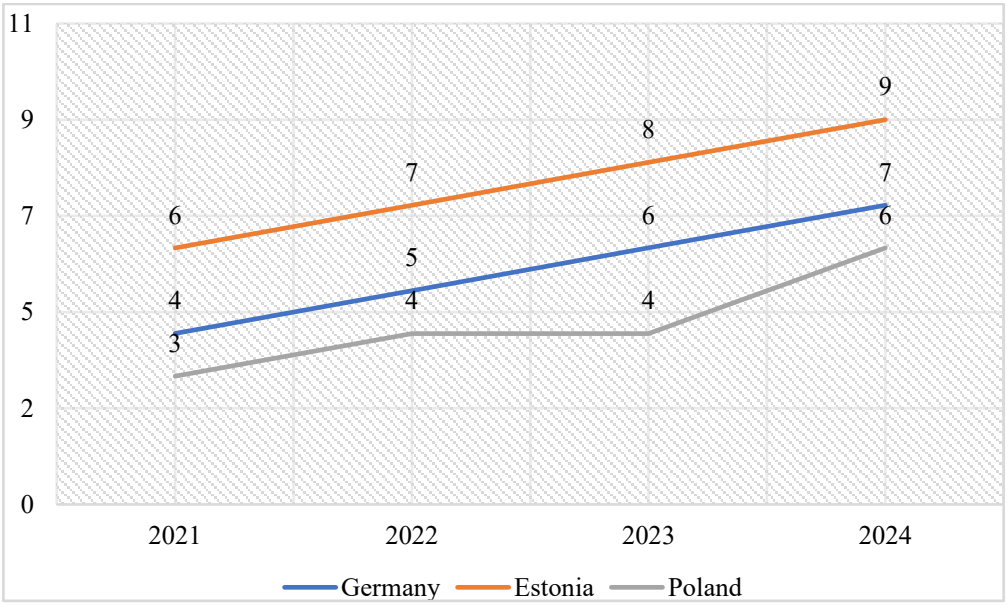


Figure 1: Dynamics of the implementation of automated learning data analytics tools in higher education institutions in EU countries (2021–2024)
Source: (OECD, 2023; OECD, 2022; European University Association, 2021)

These indicators suggest the degree to which universities are technologically prepared for DM. A quantitative comparison of the data in Tables 2–3 and Figure 1 demonstrates a clear pattern in terms of an increase in adoption rate for automated learning analytics tools at the institutional level and the resulting influence on educational management results. In the period from 2021 to 2024, Germany, Estonia and Poland increased the coverage of students with AI analytics systems differently – in Poland, it was the most significant (+18.47 percentage points), which shows active efforts to overcome digital gaps and speed up internal mechanisms for managing the educational process. In terms of the rate of increase in coverage, Germany and also Estonia figure among those countries that show remarkable increases (+16.09 and +13.25 percentage points), which relates to trends tied up with data-based management models, digital infrastructure being developed as the OECD prescribes it for answering questions on transforming educational institutions into a digitally transformed learning environment (OECD, 2022; OECD, 2023).

In parallel, as universities' digital capabilities grow in other areas, academic loss has decreased (in Poland by 3.58%, in Germany by 3.06%, and in Estonia by 2.92%), validating that intelligent systems are effective for early risk detection and operational support for students at risk. Positive trends are also evident by the indicators of study completion in due time: the highest increase is recorded in Estonia (+7.67 percentage points), which confirms its position as one of the leaders in digital management of education in Europe (as recognised by OECD Digital Education Outlook 2023 [OECD, 2023]). Germany: While Germany and Poland also

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see a substantial increase in completion rates – +6.33 and +6.17 percentage points, respectively- this demonstrates that effective use of data helps personalise student support.

These findings are supported by the quantitative dynamics of the development of technical tools for educational analytics: in each country studied, within four years, the number of relevant tools in use has gone up three positions, which eloquently speaks to systemic shifts in management practices and increasing digital infrastructure impact on innovation (European University Association, 2021). This progress is clearly evident in Figure 1, which shows that all countries in this sample are increasingly embracing AI-driven learning analytics as an input to management decision-making.

Therefore, a holistic juxtaposition of educational and analytical factors demonstrates a dependence in HEIs between digital analytics levels and effectiveness. The introduction of smart tools results in a decrease in the failure rate, a higher program completion rate and availability for individual support, as well as reinforcement of the strategic management component. The results are in line with international recommendations, which highlight the necessity of further developing digital transformation in education (OECD adopts it as an essential condition for the competitiveness of universities in the global market for education services (OECD, 2025).

The implementation of AI instruments in the management systems of higher education institutions fundamentally changes mechanisms for educational planning, resource allocation, individualisation of learning strategies, and monitoring academic achievements. Digital analytics tools enable decision-makers to monitor developments in academic paths effectively and in a timely manner, forecast potential threats, and adapt their interventions based on evidence, thereby making the governance model adaptive, transparent, and efficient (Koukaras et al., 2025; Pérez-Jorge et al., 2025). The impact of using such technologies in HEIs is summarised in Table 4, which we use to structure the key levels of concern regarding AI-driven learning analytics for university activities.

Table 4: The impact of AI tools on management processes in higher education institutions

Management area	**Manifestation of AI impact**	**Results/possible management effects**
Strategic planning	Modelling development scenarios, forecasting educational indicators	Adjustment of educational policy, program development planning; reduction of management risks
Resource provision	Optimisation of classroom space allocation, workload, IT infrastructure	Improving resource efficiency, budget rationalisation
Personalisation of learning	Early warning systems, recommendation platforms	Increasing student engagement and success, preventing dropouts

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Monitoring the quality of education	Analysis of digital footprints, assessment of learning outcomes	Operational improvement of educational practices, individualisation of teacher support
Management of educational processes	Automated control panels, cognitive profiles of students	Accelerated decision-making, minimisation of bureaucratic procedures

Source: (Cabral et al., 2025; Pérez-Jorge et al., 2025; Koukaras et al., 2025; Gedrimiene et al., 2024; Sajja et al., 2025; Vieriu & Petrea, 2025)

The results show that artificial intelligence tools create an intelligent administrative system that resolves educational problems quickly and, as a result, give universities greater independence in achieving quality education. Artificial intelligence systems help organisations identify issues as they arise and halt their progression, allowing management to evolve from reactive to predictive. The system relies on artificial intelligence to enhance the competitiveness of tertiary education institutions and maintain sustainability by responding to social transformation (Crompton & Burke, 2023; OECD, 2025).

Current approaches in higher and professional education are increasingly relying on educational data analytics (EDA) and AI technologies, through which institutions can make decisions based on knowledge-based systems and predictive analytics models (Sajja et al., 2025; Cabral et al., 2025). Institutions need to develop strategic digital transformation plans to adopt systems that uphold academic integrity and treat students' data ethically (Gedrimiene et al., 2024; Crompton & Burke, 2013). Given the recommendations, Table 5 presents generalised recommendations on how AI-based learning Analytics should be used in higher education and adult/military education.

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Table 5: Recommendations for managers of higher education institutions, adult education systems, military education, and educational analysts

Target group of managers	**Strategic recommendations for the implementation of AI analytics**	**Managed results and expected effects**
Higher education institution managers	Develop an institutional policy for digital transformation and integrate AI into education quality management	Increase the competitiveness of the university and the efficiency of management decisions
Adult education organizers	Ensure the availability of personalised learning paths and identify the needs of adult learners	Improve the effectiveness of reskilling/upskilling programs, expand public participation in education
Administration of military educational institutions	Use performance analytics to optimise training programs and psychophysical preparation	Increase personnel readiness, reduce the risk of dropouts and training disruptions
Higher education analytics	Improve training data processing methods, ensure transparency of AI algorithms	Improve forecast accuracy, strengthen confidence in analytical decisions
IT and education quality departments	Ensure cybersecurity, infrastructure integration, system compatibility, and data protection	Minimise the risk of information leaks, stable technical functioning

Source: (Cabral et al., 2025; Koukaras et al., 2025; Pérez-Jorge et al., 2025; Gedrimiene et al., 2024; Sajja et al., 2025; Vieriu & Petrea, 2025; Crompton & Burke, 2023)

Summing up the discussion on the recommendations above, it can be stated that the success of implementing intelligent learning management systems is mainly determined by the strategic relevance of the institution's digital policy, the level of specialisation of its research departments, and the readiness of the whole educational community for a data-driven management culture. The advanced human imagination is squarely focused on the possibilities of AI; beyond a technical module and fashionable novelty, it should be considered as a methodology capable of enhancing the quality of management decision-making, individualising learning, and providing an answer to the requirements of academic integrity towards significant modern global transformations in education (OECD, 2025).

Discussion

Results additionally support further adoption of learning analytics automation tools in universities, as increased usage was associated with reduced dropouts and greater completion

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rates (similar to the functioning of early warning systems and predictive models; Abukader et al., 2025; Sajja et al., 2025). This improvement in the quality of educational management practices in some EU member states suggests a step toward higher-level, evidence-based intelligent management, as reflected in the digital footprints left by actual students (Cabral et al., 2025; Koukaras et al., 2025). Others have warned, however, that unless universities also develop digital routines and staff competences, technological sophistication will not automatically lead to better quality of management decision-making (Almatrodi & Skoumpopoulou, 2023; Munir et al., 2012). This point of view on human-factor values contrasts with a few technocentric studies, which lean toward algorithmic management with greater emphasis on the deep use of AI models (Rodríguez-Ortiz et al., 2025; Mohammadi et al., 2025).

The ethical-regulatory point is still a matter of discussion; on one hand, authors point out the need that the algorithm must be clear and protect privacy (Adamakis & Rachiotis, 2025; Garay Gallastegui & Reier Forradellas, 2021); on the other hand, models where only technological endpoints are in mind but not any risks (Lagares Rodríguez et al., 2025; Thakur & Rawat, 2025A). This results in a dissonance associated with the requirements for the development and maintenance of the content of intensive creative activity in independent education, as noted by domestic scientists (Batsurovska et al., 2024). The dispersion of the results between what was found and authors' positions indicates they not only converge with strategic AI to management decision-making practice (Pérez-Jorge et al., 2025; Crompton & Burke, 2023) as well as bring the confirmation of Left-concept theory concerning disproportionate readiness universities display towards digitalisation, until now formulated by OECD (2022; 2023; 2025) and EUA (2021). But also, in “best practice” countries, the level of technical/logic sophistication is not met by an equally high level of maturity (# hashtags) of the data (sub-) culture strongly dependent on social-organisational factors as well: Hummel in Pettersson & Ekel et al., 2025; Adel van Gelder for (Eurostat, 2024).

Even if this frequently confirms the hypothesis on positive AI-facilitated learning analytics impact on university management performance, we have to admit that the analysis only dealt with official intergovernmental statistics and not institutional case studies, and local organisational data access was not available, so generalisation is imprecise. The introduced methods should be adjusted to each particular education system, and the management staff, in turn, have to be taught how to cooperate with intelligent analytic tools.

In this sense, the result highlights the great promise of AI to arrangements of evidence-based policy making in HEIs since the enhancement could only be stuck to reality if technology (i), data ethical policies (ii) and staff digital competence (iii) are evolving at the same time. The perspectives of research are related to the examination of cultural, organisational, and legal determinants of integration of AI analytics in the educational process, which will enable us (1) to identify obstacles to its practical implementation; and (2) to adjust models under consideration to the real academic process.

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CONCLUSION

The study clarified the extent to which automated educational data analytics and AI tooling could improve the quality of management decision-making in higher education institutions by moving beyond a priority of supporting students when they request help or require interventions, to early identification through predictive modelling. The innovation of the study consists in defining a fixed relationship between the level of digital analytical competency of universities and improvements in key educational indicators, such as the number and share of program completions and a decrease in academic losses, which demonstrates that the introduction of data-driven management is effective.

The scientific novelty lies in substantiating the shift from reactive student support to proactive management, grounded in predictive modelling and AI analytics. The study is the first to establish a direct relationship between a university's level of digital competence and improved success rates, in particular, an increase in the percentage of program completion and a reduction in academic losses. Practical implications of the obtained results include the justification for the necessity of institutions of higher education to support digital transformations, to upskill administrators through the use of AI tools, and to develop an organisational culture and build responsible, data-use-based decision-making. The study also has some limitations, such as a focus on macro-level indicators and a lack of consideration of the details of each university, which will require further study at the institutional case level. For more effective implementation of intelligent management systems, it is suggested to strengthen the integration of analytical platforms into universities' digital infrastructure, intensify regulatory and ethical oversight of data processing by MBA administrators, and promote the development of digital competencies among faculty.

The prospects for further research are associated with the creation of adaptive models of educational management, which take into account cultural and organisational aspects of AI implementation; long-term forecasting of the consequences of the transition to evidence-based university management, inhibiting or increasing the competitive ability of higher education institutions in the context of deep digital drift.

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