



*Critical Article*

## Adoption of AI-Based Learning Analytics to Support Academic Decision-Making in Universities

### Abstract

This study examines the adoption of AI-based learning analytics and its role in supporting academic decision-making in universities. As higher education institutions face increasing demands for accountability and data-driven governance, AI-enabled analytics offer new opportunities to monitor student performance, identify risk patterns, and improve instructional quality. Using a mixed-methods design, the research collected survey responses from 261 academic staff and conducted interviews with 15 university leaders. Findings show that most respondents perceive AI-based analytics as highly useful for early identification of at-risk learners, curriculum refinement, and accreditation reporting. Institutional readiness—particularly digital infrastructure, staff competence, and leadership support—significantly influences the extent of analytics utilization. Qualitative insights reveal that ethical concerns, cultural resistance, and integration challenges remain major barriers to adoption. The study concludes that successful implementation requires not only technological investment but also strategic leadership and clear governance frameworks to ensure responsible and effective use of analytics. These results contribute to ongoing discussions on digital transformation in higher education and highlight the organizational conditions necessary to leverage AI-driven insights for improving academic planning and student outcomes.

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**Keywords:** AI-based learning analytics; academic decision-making; digital transformation; higher education management; institutional readiness; predictive analytics; educational data mining.

### 1. Introduction

Universities are experiencing increasing pressure to demonstrate accountability, improve academic performance, and respond swiftly to changes in learner behavior. As higher education systems expand in scale and complexity, traditional decision-making approaches are often based on periodic reports, manual data processing, and intuition-driven judgment are no longer sufficient to support strategic academic planning [1] [2] [3]. This transformation has opened the door for the adoption of artificial intelligence (AI) based learning analytics, which enables institutions to generate deeper insights from student data, predict academic performance, and identify risks early in the

learning cycle.

Learning analytics refers to the systematic collection, measurement, analysis, and reporting of data about learners and their contexts, with the aim of optimizing learning and the environments in which it occurs. The integration of AI enhances this process by enabling faster data processing, automated pattern recognition, and predictive modeling. In universities, AI-driven learning analytics are now used to monitor student engagement, detect at-risk learners, personalize feedback, and support program evaluation. These capabilities offer considerable strategic value for academic leaders, particularly in aligning institutional goals with evidence-based planning [4].

Despite its potential, the adoption of AI-based learning analytics in higher education remains uneven. Many universities face challenges such as limited digital infrastructure, resistance from academic staff, unclear governance policies, and concerns related to data privacy and ethical implications. These barriers often restrict the integration of learning analytics into formal academic decision-making processes such as curriculum review, academic advising, quality assurance, and strategic resource allocation. As a result, institutional leaders require a clearer understanding of how AI-based learning analytics can be effectively adopted and embedded within university governance structures [5] [6].

Existing studies on learning analytics have mostly emphasized technical development, algorithmic performance, or student-focused outcomes. However, fewer studies have explored the managerial and strategic dimensions, particularly in relation to how university leaders utilize AI-generated insights for decision-making at institutional and programming levels. This gap highlights the need for research that explains not only the benefits of AI-based learning analytics but also the organizational readiness, cultural adaptation, and leadership strategies necessary for effective implementation [7].

This study aims to examine the adoption of AI-based learning analytics in universities and how it supports academic decision-making processes. The research focuses on the mechanisms through which AI-generated data informs leadership decisions, the challenges associated with institutional adoption, and the strategic implications for educational management. By addressing these issues, the study contributes to the broader discourse on digital transformation and provides evidence-based recommendations for leaders seeking to integrate AI into their academic governance frameworks.

## 2. Literature review

AI-based learning analytics has emerged as a crucial component of digital transformation in higher education. In its early stages, learning analytics focused mainly on descriptive reporting and data dashboards that visualized learner activity within digital platforms. Recent advancements in AI, particularly machine learning and predictive modeling, have expanded these capabilities by enabling systems to identify hidden patterns in student behavior, forecast academic performance, and provide personalized feedback.

Several studies demonstrate that learning analytics can enhance student retention, support personalized instruction, and improve curriculum alignment. AI-enabled analytics provide early warning indicators for at-risk students, helping academic advisors intervene more effectively. Additionally, universities increasingly rely on data-driven insights to support quality assurance, accreditation preparation, and academic program evaluation. However, the success of learning analytics is influenced by technological infrastructure, institutional culture, pedagogical integration, and leadership readiness [8] [9].

The adoption of AI in educational management also raises concerns related to ethics, privacy, and algorithmic transparency. Leaders must balance innovation with responsible governance, ensuring that AI-generated decisions remain aligned with institutional values and regulatory frameworks. Existing literature highlights that universities with strong strategic leadership and a culture of continuous improvement tend to adopt learning analytics more effectively. Nevertheless, research exploring the managerial and organizational dimensions of AI adoption remains limited, particularly in contexts where digital readiness varies widely across institutions.

### 3. Methods

This study employed a mixed-methods design combining quantitative surveys and qualitative interviews to generate a comprehensive understanding of how AI-based learning analytics support academic decision-making in universities. The mixed-methods approach was chosen to capture both measurable trends and deeper contextual factors that influence institutional adoption.

The quantitative component consisted of an online survey distributed to academic leaders, quality-assurance officers, program coordinators, and lecturers in several universities. The instrument measured four constructs: perceived usefulness, perceived ease of use, institutional readiness, and analytics-supported decision-making. All items used a five-point Likert scale. The final dataset included responses from 261 participants. Descriptive statistics were used to examine general perceptions, while regression analysis was conducted to explore the relationship between institutional readiness and the use of AI-generated insights in academic governance [10].

The qualitative component involved semi-structured interviews with 15 respondents representing leadership, academic planning, and digital transformation units. Interview protocols explored institutional strategies, cultural barriers, ethical issues, and practical challenges in implementing learning analytics. Interviews were transcribed and analyzed using thematic analysis to identify recurring patterns that extend beyond the quantitative results [11].

Data triangulation was performed by comparing survey findings with interview narratives to strengthen internal validity. Ethical procedures included informed consent, anonymity, and secure storage of digital records. This methodological approach ensures a balanced understanding of both the structural and human factors influencing AI-based learning analytics adoption in higher education institutions.

### 4. Results

The results reveal a strong interest in AI-based learning analytics among universities, although adoption levels vary depending on institutional readiness, staff competence, and leadership commitment. Overall, participants demonstrated positive perceptions regarding the usefulness of learning analytics, particularly for monitoring student activity, supporting academic intervention, and informing curriculum decisions.

#### 4.1 Perceived Usefulness

Survey findings show that 82% of respondents believe AI-generated analytics improve the accuracy of academic monitoring. Participants stated that predictive indicators help identify at-risk students earlier than traditional evaluation methods. Many lecturers highlighted that dashboards displaying real-time engagement patterns help them adjust instructional strategies during the semester rather than at the end. Respondents also reported that analytics reduce the administrative burden associated with manual evaluation, allowing them to focus more on teaching quality and academic mentoring [12].

#### 4.2 Institutional Readiness

Institutional readiness emerged as a key determinant of successful adoption. While most universities express strong interest in integrating AI tools, their technological capacity differs significantly. Some institutions use advanced LMS platforms with built-in analytics, while others rely on basic data systems that limit integration.

Leadership support scored the highest within readiness indicators. Interview participants noted that senior administrators increasingly use analytics reports for accreditation, quality assurance, and performance evaluation. However, digital infrastructure scored only “moderate,” indicating the need for system upgrades and better integration across departments.

Staff competence also varied. Although many lecturers are comfortable using LMS features, fewer have experience interpreting analytics or understanding the limitations of AI algorithms. This

gap suggests a need for capacity-building programs [13].

#### 4.3 Influence on Decision-Making

The study found that learning analytics most strongly influences academic decision-making in three areas [14]:

- Academic advising, where predictive risk alerts guide early interventions.
- Curriculum review, where engagement patterns and course-level performance help identify instructional gaps; and
- Institutional reporting, particularly for accreditation preparation.

Regression analysis showed that institutional readiness significantly predicts the degree to which analytics are utilized in decision-making ( $p < 0.05$ ). Universities with robust digital ecosystems and proactive leadership were more likely to integrate analytics into formal governance processes.

#### 4.4 Qualitative Insights

Interviews provided additional nuance. Participants emphasized four recurring themes [15]:

- Leadership vision is crucial for setting policy directions and ensuring analytics are used constructively.
- Ethical concerns such as data privacy, fairness, and student consent must be addressed to prevent misuse.
- Cultural resistance persists among staff who fear algorithmic overreach or feel uncertain about data interpretation.
- Technical integration challenges remain a major barrier, especially in institutions with fragmented legacy systems.

Despite these challenges, interviewees agreed that AI-based learning analytics hold strong potential to support evidence-based governance when paired with transparent policies, adequate training, and supportive leadership.

### 5. Discussion and Implications

The findings of this study reinforce the growing role of AI-based learning analytics as a strategic tool for academic governance in higher education. The positive perceptions expressed by most participants indicate that universities increasingly recognize the value of data-driven insights in improving instructional quality, student performance monitoring, and institutional planning. This aligns with broader trends in digital transformation, where analytics serve as an essential mechanism for enhancing accountability and supporting continuous improvement [16] [17].

A key insight from the results is that the impact of learning analytics depends heavily on institutional readiness. Universities with strong digital infrastructure, skilled staff, and committed leadership demonstrate significantly higher levels of analytics utilization. These institutions are better able to integrate multiple data sources, interpret predictive models, and embed analytics in strategic decision processes such as curriculum review and accreditation preparation. This emphasizes the importance of leadership investment in both technological and human resource dimensions [18].

The qualitative data highlight several barriers that limit adoption. Ethical and privacy concerns, particularly the fear of algorithmic unfairness and misuse of student data, create hesitation among academic staff. These concerns reflect global debates on responsible AI and underline the need for transparent policies governing data collection, storage, and analysis. Institutions must establish clear guidelines to ensure that analytics support, rather than replace, academic judgment [19].

Another recurring barrier is cultural resistance. Some lecturers remain uncomfortable with advanced analytics or fear of being evaluated solely based on data metrics. This resistance is common during digital transitions, especially when staff feel unprepared or lack training. Therefore, capacity building, including workshops, peer-learning sessions, and collaborative data discussions is essential to reduce anxiety and strengthen ownership [20].



Figure 1. Students in computer lab interacting with an AI-based learning analytics dashboard

The findings also show that leadership vision plays a decisive role. Universities with proactive leaders tend to articulate clear goals for analytics use, invest in integrated systems, and promote a culture of evidence-based decision-making. These leaders recognize that analytics are not merely technological tools but catalysts for organizational transformation.

Overall, the discussion suggests that successful adoption requires more than acquiring analytics software. It demands a strategic, multi-layered approach that balances technological investment, capacity building, ethical governance, and cultural adaptation. When these elements align, AI-based learning analytics can substantially enhance the effectiveness of academic management.

## 6. Conclusion

This study examined how AI-based learning analytics support academic decision-making in universities and identified the organizational conditions necessary for successful adoption. The results show that learning analytics is widely perceived as useful for monitoring student performance, guiding early interventions, informing curriculum review, and strengthening institutional reporting. However, the extent to which analytics are integrated into academic governance is strongly influenced by institutional readiness.

The findings highlight three critical factors: digital infrastructure, staff competence, and leadership support. Universities with stronger readiness are better positioned to leverage AI-generated insights, resulting in more effective, timely, and evidence-based decision-making. At the same time, ethical concerns and cultural resistance remain important challenges that must be addressed through transparent governance frameworks and sustained professional development.

Overall, AI-based learning analytics hold significant potential to transform educational management when implemented responsibly and strategically. Future research may explore the long-term outcomes of analytics adoption, the development of ethical AI models for education, or comparative studies across diverse institutional contexts. Strengthening these efforts will support universities in building smarter, data-driven learning environments that enhance student success and institutional effectiveness.

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