

Artificial Intelligence–Based Information Systems to Support Educational Decision-Making

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Abstract: This study explores the potential of artificial intelligence–based information systems in supporting educational processes within higher education institutions in Indonesia. The rapid adoption of digital platforms in academic administration and learning management has increased the need for intelligent systems that can enhance efficiency, transparency, and data-driven decision-making. This research aims to examine how artificial intelligence–based information systems are utilized in educational contexts, particularly in relation to curriculum implementation, academic management, and institutional readiness. A qualitative research design was employed using semi-structured interviews with academic stakeholders, complemented by document analysis. The findings indicate that artificial intelligence–based information systems contribute positively to improving administrative efficiency, supporting systematic curriculum evaluation, and facilitating evidence-based academic decision-making. However, challenges related to system transparency, interpretability, and user readiness were also identified as critical factors influencing system effectiveness. These findings highlight that the successful integration of artificial intelligence in education is not solely determined by technological capability but also by organizational support and human factors. This study contributes to the interdisciplinary integration of information systems and educational research by providing empirical insights into the role of artificial intelligence in higher education. The results offer practical implications for institutions seeking to adopt responsible and effective artificial intelligence–based information systems.

Keywords: Artificial intelligence; information systems; higher education; curriculum evaluation; educational technology.

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INTRODUCTION

Artificial Intelligence (AI) has increasingly been recognized as a transformative technology in the education sector, particularly in supporting learning processes, academic management, and institutional decision-making. Previous studies have emphasized the potential of AI to enhance educational effectiveness through intelligent tutoring systems, adaptive learning environments, and data-driven instructional strategies (Seters, 2020; Schiff, 2021; Razak et al., 2023). In higher education, AI-based information systems play a strategic role in managing complex educational processes while supporting innovation in teaching, learning, and evaluation practices (Huang et al., 2019; Crompton, 2021).

In the Indonesian context, the integration of AI into educational information systems has become increasingly relevant in line with national initiatives to improve educational quality and competitiveness. Higher education institutions are progressively adopting digital academic platforms and technology-enhanced learning models to support curriculum implementation, student engagement, and institutional accountability (Directorate General of Higher Education, 2020; UNESCO, 2019). Pedagogical innovations such as flipped classrooms, blended learning, and

adaptive curricula further highlight the need for intelligent information systems capable of supporting data-driven and evidence-based educational decision-making (Yulianti & Wulandari, 2021; Sandhu et al., 2019; Thaariq & Wedi, 2020).

Despite the growing adoption of AI-based technologies in education, existing research predominantly focuses on technological development and pedagogical innovation, with limited attention given to institutional-level evaluation and decision support. Many educational institutions continue to rely on fragmented data sources, subjective judgments, and manual analysis when assessing curriculum implementation and learning effectiveness, which may reduce consistency and objectivity in decision-making processes (Jaiswal & Arun, 2021; Joshi et al., 2021; Gocen, 2020).

Moreover, AI applications in education are often centered on learning personalization and student performance prediction, while their role as integrated information systems supporting evaluation, monitoring, and policy-oriented decision-making remains underexplored. Challenges related to data interpretation, transparency, and alignment with institutional objectives indicate the need for AI-based information systems that not only process educational data but also support structured reasoning and informed institutional decisions (Albuainain & Choe, 2023; Gregory et al., 2021; Clough, 2022).

Based on these gaps, this study addresses the following research question: How can artificial intelligence-based information systems support educational institutions in Indonesia in enhancing curriculum implementation and educational decision-making processes? Accordingly, the purpose of this study is to examine the potential role of AI-based information systems in education by synthesizing existing literature and contextualizing AI adoption within the Indonesian higher education landscape.

The significance of this research lies in its contribution to the interdisciplinary integration of information systems and education, positioning AI not merely as a pedagogical tool but as a strategic enabler for institutional decision support. The findings are expected to provide insights for educators, academic managers, and policymakers regarding how AI-based information systems can enhance transparency, effectiveness, and sustainability in educational practices, thereby supporting continuous improvement in Indonesian higher education (UNESCO, 2019; Crompton, 2021; Gocen, 2020).

METHOD

This study employed a qualitative exploratory approach informed by grounded theory principles to investigate the potential role of artificial intelligence-based information systems in supporting education in Indonesia. A qualitative design was selected to capture in-depth insights into participants' experiences, perceptions, and interpretations regarding the adoption of AI-based information systems, which are highly contextual and cannot be fully examined using quantitative methods alone (Schiff, 2021; Crompton, 2021; UNESCO, 2019).

Participants were selected using purposive sampling, focusing on individuals who were directly involved in teaching, curriculum implementation, or academic administration in higher education institutions. This sampling strategy was chosen to ensure that participants possessed relevant knowledge and experience related to educational technology and information systems adoption (Creswell & Poth, 2018; Jaiswal & Arun, 2021). The inclusion criteria required participants to have a minimum of three years of professional experience in higher education and familiarity with digital or AI-supported educational platforms. Participant recruitment continued until data saturation was achieved, as indicated by the repetition of themes and the absence of new conceptual insights (Charmaz, 2014; Lincoln & Guba, 1985).

Data collection was conducted through semi-structured interviews, which allowed flexibility in exploring participants' perspectives while maintaining consistency across interviews. The interview protocol was developed based on prior studies on artificial intelligence in education, educational information systems, and digital learning environments (Seters, 2020; Razak et al., 2023; Gocen, 2020). The interviews explored participants' perceptions of AI-based information

systems, perceived benefits and challenges, and expectations regarding their role in supporting educational decision-making. Each interview lasted approximately 45–60 minutes and was conducted either face-to-face or online, depending on participant availability. All interviews were audio-recorded with participants' consent and transcribed verbatim to ensure accuracy and completeness of the data.

Data analysis followed grounded theory-informed analytical procedures, **including** open coding, axial coding, and selective coding, to systematically construct categories and themes from the qualitative data (Charmaz, 2014; Strauss & Corbin, 1998). During the open coding stage, interview transcripts were examined line by line to identify initial concepts. These concepts were then grouped through axial coding to establish relationships and form broader categories. Finally, selective coding was applied to integrate the categories into core themes that explain the role of AI-based information systems in education. Constant comparative analysis and memo-writing were employed throughout the coding process to enhance analytical rigor and theoretical sensitivity (Schiff, 2021; Joshi et al., 2021).

To ensure the trustworthiness of the study, several strategies were applied, including triangulation, peer debriefing, and systematic documentation of analytical decisions. Triangulation was achieved by comparing perspectives across participants with different roles within higher education institutions. Peer debriefing involved discussions with colleagues experienced in qualitative and educational research to review coding decisions and theme development. An audit trail documenting analytical procedures was maintained to enhance transparency and credibility (Lincoln & Guba, 1985; Albuainain & Choe, 2023).

The analysis of interview data resulted in the emergence of several interconnected themes that explain how artificial intelligence-based information systems are perceived and utilized in educational contexts in Indonesia. These themes were constructed through iterative coding processes, moving from initial concepts to broader categories that reflect participants' shared experiences and interpretations.

AI-Based Information Systems as Enablers of Educational Efficiency

Participants consistently perceived AI-based information systems as tools that enhance efficiency in managing academic and educational processes. The use of digital platforms supported by intelligent features was reported to reduce administrative workload, streamline data management, and improve access to academic information. Lecturers and academic staff emphasized that AI-supported systems enable faster retrieval of student data, learning records, and curriculum-related information, which supports more timely and informed academic decisions. This finding aligns with prior studies highlighting the role of AI in improving operational efficiency and institutional effectiveness in education (Huang et al., 2019; Crompton, 2021; Razak et al., 2023).

Supporting Data-Driven Decision Making in Curriculum Implementation

Another prominent theme concerns the role of AI-based information systems in supporting data-driven decision making, particularly in curriculum implementation. Participants reported that educational information systems provide valuable data related to learning activities, student engagement, and academic performance. However, they also noted that the availability of data alone is insufficient without appropriate analytical support. AI-based systems were viewed as having the potential to transform raw educational data into meaningful insights that can inform curriculum evaluation and instructional improvement. This finding reflects existing literature emphasizing the importance of intelligent information systems in supporting evidence-based educational decision making (Seters, 2020; Jaiswal & Arun, 2021; Joshi et al., 2021).

Challenges of Transparency and Interpretability in AI Adoption

Despite acknowledging the benefits of AI-based information systems, participants expressed concerns regarding transparency and interpretability. Several participants indicated uncertainty about how AI-generated recommendations or system outputs are produced, which

may affect trust and acceptance among educators. This issue highlights the need for AI-based information systems that provide explainable and interpretable results, particularly in educational settings where accountability and professional judgment are essential. These concerns are consistent with previous research that identifies explainability and user trust as critical challenges in AI adoption within education and organizational contexts (Schiff, 2021; Gregory et al., 2021; Gocen, 2020).

Institutional Readiness and Human Factors

The findings also reveal that institutional readiness and human factors play a significant role in determining the effectiveness of AI-based information systems. Participants emphasized that successful adoption depends not only on technological availability but also on organizational support, digital literacy, and user acceptance. Limited understanding of AI concepts and resistance to change were identified as barriers to optimal system utilization. This theme underscores the importance of aligning technological innovation with institutional culture, capacity building, and professional development initiatives, as discussed in previous studies on educational technology adoption (UNESCO, 2019; Albuainain & Choe, 2023; Clough, 2022).

RESULT AND DISCUSSION

This section presents the empirical findings obtained from qualitative data analysis of interviews with participants involved in the use of information systems in higher education institutions. The findings are organized into thematic categories that emerged from the data, reflecting participants' experiences and perceptions regarding the role of artificial intelligence-based information systems in educational contexts.

AI-Based Information Systems for Academic and Administrative Efficiency

Participants consistently reported that AI-based information systems significantly improve efficiency in academic and administrative processes. These systems were perceived as reducing manual workloads, accelerating data access, and supporting routine academic tasks such as monitoring student performance and managing curriculum-related data.

One participant stated, *"With the academic information system, tasks that previously required manual checking can now be completed much faster, especially in monitoring student academic records."* Another participant emphasized system integration, explaining that *"the system helps integrate curriculum data, student progress, and reporting, which makes coordination across academic units more efficient."* These responses indicate that efficiency enhancement is a primary benefit experienced by users of AI-based information systems in higher education.

Support for Data-Driven Curriculum Evaluation

Another key finding relates to the role of AI-based information systems in supporting curriculum implementation evaluation. Participants highlighted that educational institutions generate large volumes of academic data, but AI enables more meaningful analysis of these data.

One participant noted, *"The data already exist in the system, but AI helps us identify patterns and trends that are difficult to see manually."* Another participant added, *"AI-based systems support curriculum evaluation by providing objective data to justify academic decisions."* This theme demonstrates that AI-based information systems are perceived as

tools that transform raw academic data into actionable insights for curriculum-related decision making.

Concerns Regarding Transparency and Interpretability

Despite acknowledging the benefits, participants expressed concerns regarding the transparency of AI-based system outputs. Several participants indicated uncertainty about how recommendations or analytical results were generated by the system. One participant remarked, *"Sometimes the system provides recommendations, but we do not clearly understand how the conclusions are produced."* Another stated, *"As educators, we need to understand the reasoning behind the system's output, not just accept the results."* These findings suggest that explainability and interpretability remain important challenges in the adoption of AI-based information systems in education.

Institutional Readiness and Human Factors

Participants also emphasized that the effectiveness of AI-based information systems depends on institutional readiness and human factors. Digital literacy, training, and organizational support were identified as critical determinants of successful implementation.

As one participant explained, *"The system is available, but not all lecturers are confident in using its advanced features."* Another participant highlighted the importance of institutional support, stating that *"without proper training and policy support, AI-based systems will not be used optimally."* This theme highlights the interaction between technology, users, and organizational context in shaping the outcomes of AI adoption in education.

The findings of this study reveal that artificial intelligence-based information systems play a significant role in supporting efficiency, data-driven decision making, and curriculum evaluation in higher education institutions. The emphasis on efficiency aligns with previous studies that identify AI as a key enabler of improved academic and administrative performance in educational organizations (Huang et al., 2019; Razak et al., 2023).

The ability of AI-based systems to support data-driven curriculum evaluation reflects the growing importance of evidence-based decision making in higher education. By analyzing academic data and identifying patterns related to student performance and curriculum implementation, AI-based information systems support more objective and accountable academic decisions. This finding is consistent with earlier research emphasizing the role of artificial intelligence in transforming educational data into actionable insights (Seters, 2020; Jaiswal & Arun, 2021).

However, the concerns expressed by participants regarding transparency and interpretability highlight a critical limitation in the practical adoption of AI-based information systems. These concerns echo existing literature that emphasizes explainability as a key requirement for AI applications in domains involving professional judgment, such as education (Schiff, 2021; Gregory et al., 2021). Without clear explanations of system outputs, educators may hesitate to fully trust or utilize AI-generated recommendations.

From an information systems perspective, the findings underscore that the effectiveness of artificial intelligence in education depends not only on technological capability but also on human and organizational factors. Institutional readiness, user

competence, and organizational support are essential for ensuring that AI-based information systems are effectively integrated into academic workflows. This perspective aligns with core information systems theory, which emphasizes the interaction between technology, people, and organizational processes.

In the context of the Faculty of Tarbiyah and Teacher Training, these findings suggest that AI-based information systems can support reflective academic practice, curriculum monitoring, and institutional quality assurance. At the same time, successful implementation requires attention to transparency, capacity building, and alignment with educational values. Thus, this study demonstrates a meaningful integration of artificial intelligence and information systems within educational settings, reinforcing the relevance of information systems scholarship in addressing contemporary challenges in education.

CONCLUSION

This study examined the role of artificial intelligence-based information systems in supporting educational processes within higher education institutions, particularly in enhancing academic efficiency, data-driven curriculum evaluation, and institutional readiness. The findings indicate that AI-based information systems contribute positively to improving administrative processes and enabling more systematic and objective curriculum evaluation; however, challenges related to transparency, interpretability, and human factors remain significant. From an information systems perspective, these results emphasize that the effectiveness of artificial intelligence in education depends not only on technological sophistication but also on user understanding, organizational support, and system explainability. This study contributes to the integration of artificial intelligence and information systems research within educational studies by providing empirical evidence from higher education institutions, especially in teacher education contexts. Practically, the findings suggest that higher education institutions should prioritize the development of explainable AI features, continuous user training, and governance frameworks that support responsible AI adoption. Future research may extend this work through comparative studies across institutions, longitudinal analyses, or mixed-method approaches to further investigate the long-term impact of artificial intelligence-based information systems on curriculum quality and educational decision-making.

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