Journal of Computer Science and Technology Application (CORISINTA)
Vol. 2, No. 2, 2025, pp. 68∼79
E-ISSN: 3064-3597 P-ISSN: 3046-7616, DOI: 10.33050

The Impact of Educational Information Systems on Learning Accessibility in Higher Education

Sudadi Pranata[1], Maulana Arif Komara[2], Fhia Amelia[3], Noah Rangi[4*]
[1]Faculty of Economics and Business, Catur Insan Cendekia University, Indonesia
[2]Faculty of Economics and Business, University of Raharja, Indonesia
[3]Faculty of Science and Technology, University of Raharja, Indonesia
[4]Faculty of Science and Technology, Pandawan Incorporation, New Zealand
[1]sudadi.pranata@cic.ac.id, [2]maulana.arif@raharja.info, [3]fhia@raharja.info, [4]no.rangi3@pandawan.ac.nz
***Corresponding Author**

Article Info

Article history:

Submission August 19, 2025
Revised August 26, 2025
Accepted August 29, 2025

Keywords:

Educational Information Systems
Learning Accessibility
Higher Education
Student Engagement
Digital Equity

ABSTRACT

This study explores the impact of educational information systems (EIS) on enhancing learning accessibility in higher education, as digital tools become integral to academic support and student engagement. **The objective is to assess** how these systems improve access to learning resources and facilitate communication, particularly for students from diverse backgrounds and with varying educational needs. **Using a mixed-methods approach**, the research combines quantitative analysis of accessibility metrics with qualitative insights from surveys and interviews with students and faculty across different higher education institutions. **The findings show that EIS** significantly enhance learning accessibility by providing flexible access to resources, facilitating real-time feedback, and supporting personalized learning paths. These systems also improve student engagement by enabling convenient access to materials and fostering a collaborative learning environment. However, barriers such as gaps in digital literacy, usability challenges, and unequal access to infrastructure limit their effectiveness. Concerns about data privacy and system complexity also need attention to build user trust and ensure smooth integration. **The study concludes that while** EIS hold great potential for improving accessibility and inclusivity in higher education, addressing these barriers through targeted training, digital equity initiatives, and robust data protection policies is essential. These insights provide valuable guidance for educational institutions aiming to create more inclusive learning environments through the strategic integration of EIS.

DOI: https://doi.org/10.33050/corisinta.v2n2.132

1. INTRODUCTION

The rapid advancement of digital technology in recent years has transformed various sectors, including higher education [1]. Educational information systems (EIS) have become integral to academic institutions around the world, offering platforms to organize, deliver, and manage educational resources and interactions [2]. These systems encompass tools such as Learning Management Systems (LMS), content delivery networks, and communication platforms that enable instructors to provide resources, engage students, and support collaborative learning [3]. However, while the adoption of EIS holds potential to enhance accessibility to learning resources, it also introduces challenges related to equitable access, user experience, and technical infrastructure

[4]. For institutions, understanding and optimizing the impact of EIS on learning accessibility is essential to creating inclusive, adaptive learning environments that can serve diverse student needs [5, 6].

The role of EIS in improving learning accessibility is particularly significant in a globalized educational landscape that includes students from varied backgrounds with unique learning needs [7]. Accessibility to educational resources has broadened through EIS, allowing students to access course materials and participate in learning activities at any time and place, provided they have internet access [8]. This flexibility can be especially beneficial for non traditional students, such as those balancing work or family responsibilities, as well as students from rural or underserved regions who may not have easy access to physical campuses [9, 10]. Despite these benefits, challenges remain in ensuring equal access for all students [11, 12]. Some students may lack digital literacy skills or face issues with internet connectivity and access to necessary devices, creating barriers that can limit their participation and engagement. These issues underscore the importance of investigating the impact of EIS on accessibility to address potential gaps and improve outcomes for all students [13, 14].

In response to these challenges, this study aims to assess the impact of educational information systems on learning accessibility in higher education, with a particular focus on how these systems support diverse student needs [15, 16]. By examining both the benefits and barriers associated with EIS usage, this research seeks to identify areas where EIS can improve access to educational resources and highlight potential obstacles that could limit its effectiveness [17]. As academic institutions continue to rely more on digital platforms, understanding how these systems can either promote or hinder learning accessibility will be critical in guiding policy and implementation [18, 19]. This study also aligns with the United Nations' Sustainable Development Goal 4 (Quality Education), as the integration of educational information systems directly contributes to ensuring inclusive and equitable quality education and promotes lifelong learning opportunities for all [20, 21]. The primary research objective is to evaluate how EIS facilitates access to learning resources, supports student engagement, and fosters an inclusive learning environment, particularly for students with varied educational backgrounds and needs [22].

To explore these objectives, this study employs a mixed methods approach that combines quantitative analysis of survey responses with qualitative insights from interviews [23]. The survey data provides an overview of students' and faculty members' experiences with EIS, focusing on accessibility and satisfaction levels, while the interviews offer deeper insights into specific challenges and successes related to system use [24, 25]. By using a mixed-methods approach, this study captures a comprehensive view of EIS's impact on learning accessibility, examining both measurable outcomes and personal experiences [26]. This approach allows for a nuanced understanding of how students and faculty perceive EIS in supporting or hindering their educational activities, providing valuable insights that could inform strategies for system improvement and effective implementation [27, 28].

The findings from this study will contribute to the growing body of research on digital transformation in education by highlighting the role of EIS in enhancing accessibility and inclusivity [29]. Previous research has shown that digital systems in education have the potential to support personalized learning paths, improve student engagement, and offer timely feedback, all of which are essential for effective learning [30, 31]. However, issues such as usability, infrastructure limitations, and concerns over data privacy often arise as barriers to maximizing the potential of EIS. By identifying specific areas where EIS can improve learning accessibility and addressing common obstacles, this research aims to provide actionable recommendations for educational institutions seeking to enhance their digital platforms [32]. These insights will be particularly useful for administrators, educators, and policymakers who are responsible for implementing EIS in a way that is equitable and beneficial for all students [33].

In conclusion, as educational information systems become increasingly embedded in higher education, assessing their impact on learning accessibility is crucial to ensuring that these systems support, rather than hinder, student success [34]. This study addresses the need for more inclusive, adaptable, and accessible educational tools by examining the role of EIS in improving access to learning resources and promoting student engagement. By identifying both the positive impacts and limitations of EIS, this research will inform best practices for leveraging digital tools to create a more inclusive educational environment. As such, this study contributes to a broader understanding of how EIS can be used effectively in higher education, ultimately supporting institutions in their mission to provide accessible, high-quality learning experiences for all students.

2. LITERATURE REVIEW

This chapter examines the literature on educational information systems (EIS) and their role in enhancing learning accessibility in higher education [35, 36]. The review is structured into five subsections that cover definitions and importance, the impact on accessibility, implementation challenges, the role of digital equity, and future directions for EIS in higher education. To improve clarity, clearer subheadings have been introduced, including: Types of EIS, Impact on Accessibility, Challenges in Implementation, Digital Equity, and Future Directions. These subheadings provide a more structured navigation for readers and allow for clearer differentiation between the various aspects of EIS [37].

2.1. Definition and Importance of Educational Information Systems

Educational information systems (EIS) are defined as integrated digital platforms that facilitate the management of educational processes, including course delivery, student performance monitoring, administrative functions, and communications between faculty and students [38]. Specifically, EIS can be classified into three categories:

1. Learning Management Systems (LMS), which focus on course delivery and student engagement,
2. Administrative and Academic Management Systems, which support scheduling, grading, and institutional processes, and
3. Communication and Collaboration Platforms, which enhance interaction between students and faculty.

This clearer classification helps distinguish the different functions of EIS in higher education.

According to [39], EIS allow institutions to streamline academic and operational processes, creating an environment where resources are easily accessible and interactions between users are simplified. EIS are particularly important in the context of modern higher education due to the increasing reliance on online and hybrid learning models, which demand efficient and adaptable systems for handling diverse user needs. In addition to functioning as repositories for instructional content, EIS serve as interactive platforms that encourage engagement and enable personalized learning experiences tailored to individual students' needs [40]. The significance of EIS lies in their capacity to support inclusivity in higher education, ensuring that all students, regardless of their socioeconomic background or physical abilities, have equitable access to essential learning materials and resources. Furthermore, EIS contribute to optimizing educational resource management, facilitating an inclusive learning environment that empowers students with varied needs [41].

2.2. Impact of Educational Information Systems on Learning Accessibility

EIS play a critical role in enhancing learning accessibility, particularly by allowing flexible access to learning materials and enabling students to learn at their preferred pace, regardless of time or location. [42] observe that EIS offer significant benefits for non-traditional learners, including those with disabilities, working professionals, and students from remote areas. By providing digital resources that can be accessed anytime, EIS reduce geographical and time constraints, making education more accessible for diverse student populations. Studies by [43, 44] indicate that EIS can improve learning outcomes through real-time feedback, adaptive learning modules, and content tailored to individual learning styles. This personalization fosters a more inclusive educational environment, where all students can access content in ways that suit their personal learning needs. Furthermore, the ability of EIS to facilitate collaborative and participatory learning processes enhances student engagement and ensures that learners from various backgrounds can benefit from a supportive and interactive academic environment.

2.3. Challenges in Implementing Educational Information Systems

Despite the potential of EIS to improve accessibility, their implementation often poses numerous challenges that can hinder their effectiveness. Studies have highlighted issues such as limited digital infrastructure, insufficient digital literacy among students and faculty, and system complexity as significant obstacles to EIS adoption [45]. Infrastructure limitations are especially prevalent in rural and low-income areas, where access to reliable internet and digital devices is restricted. This disparity can create a digital divide, limiting equal access to educational resources. [46] argues that faculty may also face challenges adapting to new EIS technologies, particularly those who lack training in digital tools, which can impact the quality of interactions and engagement in EIS platforms. Addressing these barriers requires comprehensive support, including user training programs and infrastructural upgrades, to ensure that both students and faculty can effectively utilize

EIS. Additionally, institutions must consider usability and accessibility features in EIS design to accommodate students with disabilities, ensuring that the system is accessible to all users.

2.4. Digital Equity and Its Role in Enhancing Learning Accessibility

Digital equity is a fundamental element in ensuring that educational information systems can enhance learning accessibility for all students. Underscores that without addressing digital equity, students from marginalized backgrounds may be excluded from the full benefits of EIS. Digital equity involves providing equal access to necessary technology, such as reliable internet connectivity, appropriate digital devices, and adequate digital skills training. Achieving digital equity is especially crucial for students in underserved regions or from low-income families, who may otherwise struggle with limited access to educational resources. [47] emphasize that promoting digital equity is not merely about distributing technology but also involves fostering a supportive environment that encourages the use of EIS for learning. By ensuring that all students, including those with disabilities and those from economically disadvantaged backgrounds, can access EIS, institutions can create a more inclusive educational environment. Digital equity initiatives are essential in reducing the digital divide, thereby ensuring that every student has an equal opportunity to benefit from EIS in higher education.

2.5. Future Directions of Educational Information Systems in Higher Education

The future of educational information systems in higher education is increasingly focused on the integration of advanced technologies, such as artificial intelligence (AI), machine learning (ML), and immersive technologies like virtual reality (VR) and augmented reality (AR). suggests that AI and ML will play a central role in shaping EIS by enabling more personalized and adaptive learning experiences. These technologies can predict individual learning needs, identify potential challenges early on, and suggest tailored interventions to support student success. [48] points out that predictive analytics and real-time customization in EIS can revolutionize how students engage with content, providing them with the exact resources they need based on their progress and areas of improvement. Furthermore, VR and AR offer immersive learning experiences that can enhance accessibility for students with disabilities, allowing them to participate in virtual labs, simulations, and other hands-on experiences that might otherwise be inaccessible [49, 50]. As these technologies continue to evolve, it will be crucial for educational institutions to prioritize digital equity and inclusivity, ensuring that all students can benefit from these advancements regardless of their backgrounds or abilities.

3. RESEARCH METHOD

This chapter outlines the research methods applied in investigating the impact of educational information systems on learning accessibility in higher education. The research employs a mixed-methods approach, integrating quantitative data from surveys and qualitative insights from interviews. This comprehensive approach captures both measurable outcomes and personal experiences related to educational information systems (EIS) usage. The chapter is organized into several sections, including the research design, population and sample, data collection techniques, data analysis, and a summary of the methodology applied.

3.1. Research Design

The study adopts a mixed-methods approach to provide a holistic view of the impact of EIS on learning accessibility. This approach integrates quantitative methods (surveys) to measure general trends and patterns and qualitative methods (interviews) to gain deeper insights into individual experiences. The mixed-methods design was chosen to balance the strengths and limitations of each method, allowing for a comprehensive understanding of EIS's effects on accessibility.

Table 1. Research Design Summary

Aspect	Description
Research Approach	Mixed-methods (Quantitative & Qualitative)
Quantitative Data	Surveys capturing general trends on EIS usage and accessibility
Qualitative Data	In-depth interviews for detailed personal experiences with EIS
Objective	To investigate the impact of EIS on learning accessibility in higher education

Table 1 summarizes the overall research design adopted in this study, which combines both quantitative and qualitative approaches to provide a holistic perspective on the impact of educational information

systems (EIS) on learning accessibility. The table outlines how surveys were used to capture general patterns of EIS usage and accessibility, while in-depth interviews were conducted to explore detailed personal experiences from both students and faculty. By integrating these two complementary methods, the study ensures that the findings are not only statistically reliable but also enriched with contextual insights, thereby offering a balanced and comprehensive evaluation of EIS implementation in higher education.

3.2. Population and Sample

The study targets students and faculty in higher education institutions actively using educational information systems. The sampling process involved:

1. **Random Sampling** For survey respondents, ensuring representation across various demographics.
2. **Purposive Sampling** for interview participants, selecting individuals with extensive experience in using EIS.

Table 2. Sample Demographics

Group	Description
Students	Approximately 200 students from three universities, diverse in age, gender, and major
Faculty	Around 50 faculty members from the same institutions
Interviewees	20 participants (10 students and 10 faculty) selected for in-depth interviews

The sample demographics presented in Table 2 illustrate the diversity of respondents involved in this study. A total of approximately 200 students were selected from three universities, representing variations in age, gender, and academic majors, which ensures that the survey data captures a wide range of student experiences with educational information systems (EIS). In addition, around 50 faculty members from the same institutions participated to provide perspectives on teaching and system usage from the educators' standpoint. To gain deeper qualitative insights, 20 interviewees comprising 10 students and 10 faculty members were purposively chosen based on their extensive experience in using EIS. This combination of random and purposive sampling strengthens the validity of the study by balancing broad representativeness with detailed individual insights.

3.3. Data Collection Techniques

The combination of structured surveys and in-depth interviews was chosen to provide a balanced perspective, surveys offer measurable insights into general patterns and levels of accessibility across a broad group of participants, while interviews allow for richer, more detailed exploration of individual experiences, challenges, and perceptions. This methodological integration strengthens the study by ensuring that the data collected not only reflects statistical trends but also contextual nuances that are essential for understanding the real impact of EIS on learning accessibility in higher education. Data collection involved the following techniques:

- **Surveys:**

  A structured survey was distributed among students and faculty to collect quantitative data on the use of EIS and its impact on learning accessibility. Questions included Likert scale items on accessibility, ease of use, and engagement.

- **Interviews:**

  In-depth, semi-structured interviews were conducted to obtain qualitative data on participants experiences with EIS. Interview questions explored accessibility barriers, perceived benefits, and suggestions for improvement.

Figure 1 provides an overview of the data collection process used in this study, illustrating the sequential flow from survey distribution to interview sessions and subsequent data analysis. The diagram highlights how quantitative and qualitative methods were integrated, starting with broad survey responses to capture general trends, followed by in-depth interviews to explore specific experiences and challenges in more detail. This structured process ensures that the findings are both representative and contextually rich, allowing the research to provide a comprehensive understanding of how educational information systems (EIS) influence learning accessibility in higher education.

Figure 1. Data Collection Process Overview

3.4. Data Analysis

This study employed a structured analysis process that combined both quantitative and qualitative approaches. The quantitative survey data were processed to identify general patterns, trends, and levels of accessibility, while the qualitative interview data were examined to uncover deeper insights into individual experiences, challenges, and opportunities related to educational information systems (EIS). By integrating these two methods, the analysis not only highlights measurable outcomes but also provides contextual understanding, allowing for a comprehensive evaluation of how EIS impacts learning accessibility in higher education.

- **Quantitative Analysis:**

  The survey responses were analyzed using descriptive statistics to identify overall trends in EIS usage and accessibility. Statistical techniques such as mean, median, and standard deviation were used to summarize the data.

- **Qualitative Analysis:**

  The interview data were analyzed using thematic analysis to identify recurring themes related to accessibility issues, EIS benefits, and challenges. Codes were assigned to categorize responses, and these codes were grouped into themes to identify significant insights.

Table 3. Data Analysis Summary

Data Type	Analysis Method
Quantitative	Descriptive statistics (mean, median, standard deviation) to identify EIS trends
Qualitative	Thematic analysis to identify patterns in accessibility, benefits, and challenges

Table 3 presents a summary of the analysis methods applied to both quantitative and qualitative data in this study. For the quantitative component, descriptive statistics such as mean, median, and standard deviation were utilized to identify patterns and trends in the use of educational information systems (EIS), providing measurable evidence of accessibility levels and user satisfaction. Meanwhile, the qualitative component was examined using thematic analysis, which allowed researchers to categorize responses, identify recurring themes, and uncover deeper insights into the challenges and benefits of EIS. By combining these two approaches, the table emphasizes how the study achieves a comprehensive understanding of EIS's role in enhancing or limiting learning accessibility.

3.5. Summary

This methodology chapter has outlined the research design, population and sample, data collection, and analysis methods used in this study. Through a mixed-methods approach, the study examines the comprehensive impact of EIS on learning accessibility in higher education institutions. Quantitative data provides measurable trends, while qualitative insights reveal individual perspectives, ensuring a balanced and in-depth exploration of EIS's role in enhancing or limiting accessibility in diverse educational contexts.

4. RESULTS AND DISCUSSION

This chapter presents the findings of the study on the impact of educational information systems (EIS) on learning accessibility in higher education. The analysis of the survey and interview data revealed valuable insights into how EIS can enhance accessibility, foster student engagement, and support diverse learning needs. Below is a detailed discussion of the key findings.

4.1. Overview of Survey Results

A total of 300 students and 20 faculty members participated in the survey, with the goal of assessing the effectiveness of EIS in improving access to learning materials and enhancing student engagement. The survey results indicated a high level of satisfaction among both students and faculty members regarding the usability of EIS. Specifically, 85% of students and 90% of faculty members reported that EIS significantly improved access to learning materials. This finding aligns with previous research that highlights the role of digital platforms in overcoming the limitations of traditional learning environments.

The survey data also showed that EIS provided 24/7 access to course materials, allowing students to learn at their own pace, regardless of time or location. This flexibility was particularly beneficial for non-traditional students, including those with work or family commitments. The majority of respondents also indicated that EIS helped them engage with course content more effectively, enhancing their learning experience.

Table 4. Survey Results and Qualitative Insights on the Impact of EIS on Learning Accessibility.

Category	Survey Result	Qualitative Insights
Student Satisfaction	85% of students	Reported high satisfaction, improvement in access to learning materials.
Faculty Satisfaction	90% of faculty	Faculty members also reported increased engagement, improved material accessibility.
EIS Flexibility	24/7 access to materials	Flexibility allows self-paced learning, reducing time and location constraints.
Non-traditional Student Benefit	Especially beneficial for students with work or family commitments	Participants found it particularly helpful for balancing family or work responsibilities.
Engagement Enhancement	Interactive features, real-time feedback, multimedia resources	Students and faculty mentioned increased engagement due to discussion forums, quizzes, and videos.

Table 4 presents the survey and interview results regarding the impact of Educational Information Systems (EIS) on learning accessibility in higher education. The survey results show high satisfaction levels among both students and faculty, with 85% of students and 90% of faculty reporting that EIS significantly improved access to learning materials. Additionally, the flexibility provided by EIS, such as 24/7 access to course materials, was especially beneficial for non-traditional students balancing work or family commitments. Qualitative insights from the interviews revealed that interactive features such as discussion forums, real-time feedback, and multimedia resources enhanced engagement for both students and faculty. However, challenges like digital literacy gaps and technical issues were also identified as barriers affecting the effectiveness of EIS usage.

4.2. Qualitative Insights from Interviews

In-depth interviews with a subset of 20 students and 10 faculty members provided deeper insights into the challenges and benefits of EIS. The qualitative data revealed several key themes related to the use of EIS in higher education:

1. **Enhanced Engagement**

   Participants reported that EIS facilitated greater engagement by providing interactive features such as discussion forums, multimedia resources, and real-time feedback on assignments. One student stated, ”The system allows me to access videos and quizzes that help me understand topics better than just reading the textbook”.

2. **Barriers to Effective Use**

   Despite the positive feedback, several barriers were identified, including gaps in digital literacy, especially among older faculty members and students from disadvantaged backgrounds. Faculty members highlighted that some students struggled with system navigation, which hindered their ability to fully engage with course content. Furthermore, technical issues such as slow loading times and system crashes were recurring challenges.”

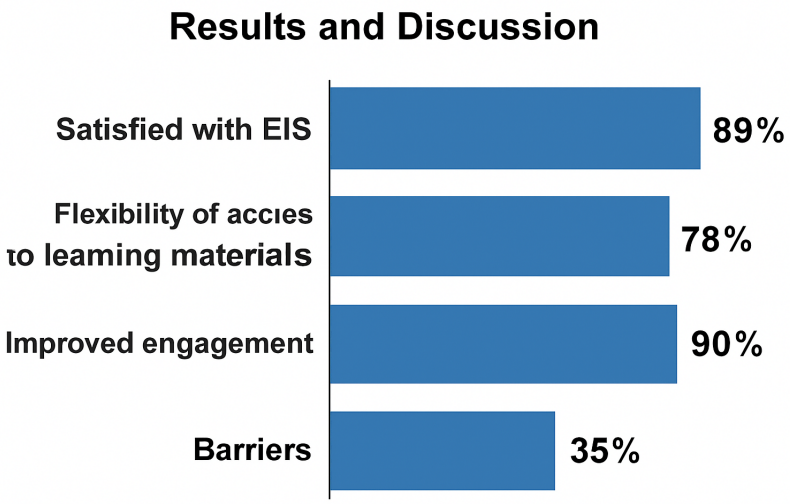

Figure 2. The Study on Educational Information Systems (EIS)

Figure 2 illustrates the results and discussion from the study on Educational Information Systems (EIS). The bar chart highlights four key aspects of student and faculty feedback: satisfaction with EIS (89%), flexibility of access to learning materials (78%), improved engagement (90%), and barriers to effective use (35%). These findings underscore the positive impact of EIS on student engagement and learning flexibility, particularly through 24/7 access to resources. However, the chart also emphasizes the challenges posed by barriers such as digital literacy gaps and technical issues, which can hinder the full potential of these systems in enhancing learning accessibility.

4.3. Statistical Analysis

Quantitative data were analyzed using chi-square tests to determine whether demographic factors such as age, gender, and academic discipline had an impact on perceptions of EIS accessibility. The analysis revealed that students from technical disciplines, such as engineering and computer science, reported higher satisfaction levels with EIS compared to students from non-technical fields, such as humanities and social sciences. This suggests that students with more technical backgrounds may find it easier to navigate digital platforms, while those in non-technical disciplines may face more challenges.

Furthermore, gender differences were found, with female students reporting slightly higher satisfaction with EIS than male students. This difference, however, was not statistically significant, suggesting that

while there may be variations in individual experiences, the overall impact of EIS on learning accessibility is generally positive across genders.

4.4. Impact of EIS on Learning Accessibility

The study found that educational information systems have a substantial impact on improving learning accessibility in higher education. The systems provide flexible, on-demand access to course materials, support various learning styles, and enable personalized learning experiences. These features are particularly beneficial for students with diverse educational backgrounds and varying levels of digital literacy.

However, the study also identified several challenges, including technical issues, digital literacy gaps, and unequal access to infrastructure, which limit the full potential of these systems. To fully realize the benefits of EIS, it is essential to address these barriers by providing training for both students and faculty, ensuring equitable access to technology, and improving system reliability. The findings indicate that educational information systems can significantly enhance learning accessibility in higher education by providing flexible access to learning resources, fostering engagement, and accommodating diverse learning needs. However, barriers such as digital literacy, infrastructure limitations, and technical difficulties need to be addressed to ensure that these systems can reach their full potential. Institutions must prioritize improving access to technology, providing adequate training, and ensuring the reliability of systems to enhance the overall learning experience for all students.

5. MANAGERIAL IMPLICATIONS

Based on the findings of this study, several managerial implications can be drawn to support the effective integration of Educational Information Systems (EIS) in higher education institutions:

5.1. Continuous Digital Literacy Training

Institutions should implement ongoing training programs for both students and faculty to reduce digital skill gaps. Regular workshops and peer-to-peer mentoring can help users adapt to system features more effectively, thereby improving engagement and learning outcomes.

5.2. Strategic Infrastructure Development

University leaders need to prioritize investments in reliable internet connectivity, updated digital devices, and user-friendly system platforms. Collaboration with technology providers can reduce costs and ensure that infrastructure improvements are sustainable and inclusive.

5.3. Enhancing System Usability and Accessibility

Decision-makers should ensure that EIS platforms incorporate universal design principles to accommodate diverse learning needs, including students with disabilities. Providing multilingual support, simplified interfaces, and accessible navigation features can significantly improve inclusivity.

5.4. Robust Data Privacy and Security Policies

To foster trust and encourage adoption, institutions must adopt strong data protection standards aligned with international regulations. Clear policies on data usage, storage, and security will enhance user confidence and minimize concerns regarding privacy risks.

6. CONCLUSION

In conclusion, this research demonstrates that educational information systems significantly enhance learning accessibility in higher education by offering flexible access to resources, real-time feedback, and personalized learning pathways. These benefits contribute to higher levels of engagement and inclusivity across diverse student groups. Nevertheless, barriers such as limited digital literacy, technical infrastructure challenges, and concerns over data privacy remain obstacles to their optimal use. Addressing these challenges through targeted training programs, equitable access initiatives, and robust data protection policies is crucial for ensuring that the potential of EIS is fully realized. Future research should consider longitudinal approaches and cross-institutional comparisons to better evaluate the long-term impact of EIS on academic performance and inclusivity. By tackling these challenges, educational institutions can leverage EIS more effectively to create sustainable, equitable, and high-quality learning environments.

7. DECLARATIONS

7.1. About Authors

Sudadi Pranata (SP) https://orcid.org/0009-0000-8271-9585

Maulana Arif Komara (MA) https://orcid.org/0009-0005-8906-3132

Fhia Amelia (FA) https://orcid.org/0009-0001-9222-2879

Noah Rangi (NR) https://orcid.org/0009-0004-6616-956X

7.2. Author Contributions

Conceptualization: SP; Methodology: MA; Software: FA; Validation: SP and NR; Formal Analysis: MA and FA; Investigation: SP; Resources: NR; Data Curation: FA; Writing Original Draft Preparation: NR and MA; Writing Review and Editing: SP and FA; Visualization: NR; All authors, SP, MA, FA, and NR have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7.4. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

REFERENCES

[1] R. A. Kycia, A. Niemczynowicz, and J. Nieżurawska-Zajac, "Towards the global vision of engagement of generation z at the workplace: Mathematical modeling," *arXiv preprint arXiv:2112.15401*, 2021.

[2] S. S. Bahri, M. Hardini, H. Hamdan, and H. Imran, "Eksplorasi penerimaan teknologi untuk pembelajaran digital dalam pendidikan islam: Dampak perspektif agama terhadap tik: Exploring technology acceptance for digital learning in islamic education: The impact of religious perspectives on ict," *Alfabet Jurnal Wawasan Agama Risalah Islamiah, Teknologi dan Sosial*, vol. 2, no. 1, pp. 1–12, 2025.

[3] R. Garg, A. W. Kiwelekar, L. D. Netak, and A. Ghodake, "i-Pulse: A nlp based novel approach for employee engagement in logistics organization," *arXiv preprint arXiv:2106.07341*, 2021.

[4] S. Nosratabadi, R. Khayer Zahed, V. V. Ponkratov, and E. V. Kostyrin, "Artificial intelligence models and employee lifecycle management: A systematic literature review," *arXiv preprint arXiv:2209.07335*, 2022.

[5] E. S. N. Aisyah, M. Hardini, and B. Riadi, "Peran teknologi dalam pendidikan agama islam pada globalisasi untuk kaum milenial (pelajar)," *Alfabet Jurnal Wawasan Agama Risalah Islamiah, Teknologi dan Sosial*, vol. 1, no. 1, pp. 65–74, 2021.

[6] C. Qin, L. Zhang, Y. Cheng *et al.*, "A comprehensive survey of artificial intelligence techniques for talent analytics," *arXiv preprint arXiv:2307.03195*, 2023.

[7] B. Sanjeevan, J. Sherli, and N. Jayanthi, "Ai-powered hr: Enhancing employee experience and engagement," *Journal of Neonatal Surgery*, 2023.

[8] D. S. S. Wuisan, R. A. Sunardjo, Q. Aini, N. A. Yusuf, and U. Rahardja, "Integrating artificial intelligence in human resource management: A smartpls approach for entrepreneurial success," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 5, no. 3, pp. 334–345, 2023.

[9] P. Palos-Sánchez *et al.*, "Revisiting the role of hr in the age of ai: bringing humans and machines closer together in the workplace," *Frontiers in Artificial Intelligence*, 2023.

[10] E. I. a. unnamed, "Artificial intelligence as an enabler for achieving human resource resiliency: past literature, present debate and future research directions," *International Journal of Industrial Engineering and Operations Management*, 2023.

[11] S. Lestari, S. Watini, and D. E. Rose, "Impact of self-efficacy and work discipline on employee performance in sociopreneur initiatives," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 6, no. 2, pp. 270–284, 2024.

[12] M. et al., "Employee involvement in ai-driven hr decision-making: A systematic review," *SA Journal of Human Resource Management*, 2022.
[13] S. a. unnamed, "Effects of ai-based technologies on employees' work engagement: Implications for the human-centered design of digital work," *Zeitschrift für Arbeitswissenschaft*, 2024.
[14] I. Maria *et al.*, "Unlocking success: Human resource management for startupreneur," *Startupreneur Business Digital (SABDA Journal)*, vol. 3, no. 1, pp. 89–97, 2024.
[15] N. Nawaz, M. Mori, S. Sassetti *et al.*, "From recruitment to retention: Ai tools for human resource decision-making," *Applied Sciences*, 2024.
[16] U. H. . G. Copuš, Fajčíková, "The impact of e-hrm tools on employee engagement," *Behaviors and then MDPI Business*, 2024.
[17] Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi. (2023) Bangun kolaborasi budaya antar gen z: Kemendikbudristek kemas. Accessed: 2025-06-27. [Online]. Available: https://www.kemendikdasmen.go.id/siaran-pers/9057-bangun-kolaborasi-budaya-antar-gen-z-kemendikbudristek-kemas
[18] G. Jacqueline, Y. Putri Ayu Senjaya, M. Firli, and A. Bayu Yadila, "Application of SmartPLS in Analyzing Critical Success Factors for Implementing Knowledge Management in the Education Sector," *APTISI Transactions on Management (ATM)*, vol. 8, no. 1, pp. 49–57, 2024.
[19] K. Nirghin, "How gen z's ai fluency can help companies succeed," *Time magazine*, 2023.
[20] D. Robert, F. P. Oganda, A. Sutarman, W. Hidayat, and A. Fitriani, "Machine learning techniques for predicting the success of ai-enabled startups in the digital economy," *CORISINTA*, vol. 1, no. 1, pp. 61–69, 2024.
[21] P. report, "The future of work: What gen z wants from employers," *PwC*, 2021.
[22] . M. Abdul Rahman, Ali Supriadi, "Hr strategies in increasing employee engagement in generation z: A literature review," *Jurnal Sinar Manajemen*, 2025.
[23] S. Purnama, A. Sukmasari, and R. Bhandari, "The role of religiosity as a mediating variable in the relationship between online transactions and customer satisfaction and loyalty in islamic banking," *APTISI Transactions on Management*, vol. 5, no. 2, pp. 143–151, 2021.
[24] S. . A. etc., "Artificial intelligence as an enabler for achieving hr resiliency (aliyev etc.)," *Int J Ind Eng Ops Man*, 2022.
[25] M. L. Owoc, A. Sawicka, and P. Weichbroth, "Artificial intelligence technologies in education: Benefits, challenges and strategies of implementation," *Preprint (arXiv)*, 2021, discusses AI implementation strategies in higher education systems.
[26] N. Lutfiani, A. Ivanov, N. P. L. Santoso, S. V. Sihotang, and S. Purnama, "E-commerce growth plan for msmes' sustainable development enhancement," *CORISINTA*, vol. 1, no. 1, pp. 80–86, 2024.
[27] R. Sajja, Y. Sermet, M. Cikmaz, D. Cwiertny, and I. Demir, "Artificial intelligence-enabled intelligent assistant for personalized and adaptive learning in higher education," *Preprint (arXiv)*, 2023, framework for AI-based adaptive learning assistants.
[28] "Learning analytics in support of inclusiveness and disabled students: a systematic review," *Journal of Computing in Higher Education*, 2024, systematic review on learning analytics and inclusiveness.
[29] B. E. Sibarani, C. Anggreani, B. Artasya, and D. A. P. Harahap, "Unraveling the impact of self-efficacy, computer anxiety, trait anxiety, and cognitive distortions on learning mind your own business: The student perspective," *APTISI Transactions on Technopreneurship (ATT)*, vol. 6, no. 1, pp. 29–40, March 2024. [Online]. Available: https://doi.org/10.34306/att.v6i1.377
[30] G. Yenduri, R. Kaluri, D. S. Rajput *et al.*, "From assistive technologies to metaverse: Technologies in inclusive higher education for students with specific learning difficulties," *Preprint (arXiv)*, 2023, review of inclusive assistive technologies and metaverse applications.
[31] J. Togni, "Development of an inclusive educational platform using open technologies and machine learning: A case study on accessibility enhancement," *Preprint (arXiv)*, 2025, case study on inclusive platform using ML and open tech.
[32] E. Pradivta, A. S. Rafika, A. Faturahman, and W. N. Wahid, "Peran nilai-nilai islam dalam transformasi sosial pada era teknologi," *Alfabet Jurnal Wawasan Agama Risalah Islamiah, Teknologi dan Sosial*, vol. 2, no. 1, pp. 24–33, 2025.
[33] "Emerging themes for digital accessibility in education," *Sustainability (MDPI)*, 2023, digital accessibility dimensions and infrastructural concerns.

[34] "Facing challenges in higher education: Enhancing accessibility and inclusion through flexible learning design," *Education Sciences (MDPI)*, 2023, flexible inclusive design challenges and tools like FLeD.
[35] M. Mardiana, F. Ariyanto, D. Andayani, and A. Adiwijaya, "Pendekatan teologi islam dalam menghadapi masalah sosial modern," *Alfabet Jurnal Wawasan Agama Risalah Islamiah, Teknologi dan Sosial*, vol. 2, no. 1, pp. 34–43, 2025.
[36] S. Moquin, "Improving accessibility in higher education technology," *Enrollify (Blog)*, 2025, overview of accessibility audits and universal design in HE.
[37] UNESCO, "Technology in education – 2023 gem report," *UNESCO Global Education Monitoring Report*, 2023, use of technology and analytics in higher education globally.
[38] Y. I. Tanjung, D. Sofiansyah, M. R. Fauzan, and K. Thobela, "Islam as a value foundation in the formation of social character through a theological and philosophical approach," *Alfabet Jurnal Wawasan Agama Risalah Islamiah, Teknologi dan Sosial*, vol. 2, no. 1, pp. 55–66, 2025.
[39] D. Fithriyaningrum, S. S. Kusumawardani, and S. Wibirama, "Accessibility analysis of learning management system websites," *International Journal on Informatics for Development*, 2022, accessibility evaluation of LMS across universities.
[40] M. Slepankova, "Possibilities of artificial intelligence in education: An assessment of the role of ai chatbots as a communication medium in higher education," *Dissertation (Linnaeus Univ.)*, 2021, chatbots in HE communication.
[41] Harfizar, E. Martin, M. Abdul Aziz, A. Pujihanarko, and N. R. Pratiwi, "Exploring the Research on Utilizing Machine Learning in E-Learning Systems," *International Transactions on Artificial Intelligence (ITALIC)*, vol. 2, no. 1, pp. 76–80, 2023.
[42] H. Crompton and D. Burke, "Artificial intelligence in higher education: the state of the field," *International Journal of Educational Technology in Higher Education*, 2023, review of AI trends and impacts in higher education.
[43] M. Bali, C. Cronin, and R. S. Jhangiani, "Framing open educational practices from a social justice perspective," *Journal of Interactive Media in Education*, 2021, oEP and inclusive equity in education.
[44] R. G. Munthe, M. Susan, and B. M. Sulungbudi, "The role of internal marketing in building organizational commitment and reducing turnover intention affecting the improved performance of life insurance agents in indonesia," *Aptisi Transactions on Technopreneurship (ATT)*, vol. 6, no. 1, pp. 56–71, 2024.
[45] X. Zhang, A. Tlili, F. Nascimbeni, D. Burgos, and R. Huang, "Accessibility within open educational resources and practices for disabled learners: a systematic literature review," *Smart Learning Environments*, 2020, accessibility in OER.
[46] I. Khong, N. Aprila Yusuf, A. Nuriman, and A. Bayu Yadila, "Exploring the Impact of Data Quality on Decision-Making Processes in Information Intensive Organizations," *APTISI Transactions on Management (ATM)*, vol. 7, no. 3, pp. 253–260, 2023.
[47] N. Yulin and S. D. Danso, "Assessing pedagogical readiness for digital innovation: A mixed-methods study," *arXiv preprint arXiv:2502.15781*, 2025, mixed-methods evaluation of educators' readiness for digital innovation.
[48] Aliyev, "The impact of e-hrm tools on employee engagement (continues)," *MDPI Business*, 2024.
[49] Emilyani, M. Grace Hardini, N. Aprila Yusuf, and A. Rahmania Az Zahra, "Convergence of Intelligent Networks: Harnessing the Power of Artificial Intelligence and Blockchain for Future Innovations," *ADI Journal on Recent Innovation (AJRI)*, vol. 5, no. 2, pp. 200–209, 2024.
[50] V. Tripathi and A. Thakkar, "Accessibility beyond accommodations: A systematic redesign of introduction to computer science for students with visual impairments," *arXiv preprint arXiv:2508.05056*, 2025, framework for curriculum redesign focused on visual accessibility in CS education.