

Challenges and Prospects of Implementing an AI-Powered Student Information Management System: A Case of the Institute of Public Administration and Management – University Sierra Leone

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Abstract: Student Information Management Systems (SIMS) are vital for managing academic and administrative processes. At the Institute of Public Administration and Management - University of Sierra Leone (IPAM - USL), current practices remain largely manual, leading to delays, errors, and inefficiencies. This study explores the challenges and prospects of implementing an AI-powered SIMS at IPAM. The objectives include assessing existing practices, identifying user expectations, and examining factors influencing adoption. A mixed-methods approach was employed. Structured questionnaires were administered to 60 students and 11 lecturers. Quantitative data were analysed using descriptive statistics, while qualitative responses were examined through thematic analysis. Findings reveal under-utilisation of the current SIMS and strong demand for real-time updates, automation, and mobile access. It is recommended that IPAM-USL adopt a fully integrated, AI-powered SIMS with mobile optimisation and user training to enhance efficiency and engagement.

Keywords: *Student Information Management Systems, Artificial Intelligence, University of Sierra Leone, Academic, Administrative, Mobile.*

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I. INTRODUCTION

Student Information Management Systems (SIMS) are centralised digital platforms designed to support the management of student records, course registration, assessment, and other academic administrative processes within higher education institutions. Such systems are widely recognised for their potential to improve operational efficiency, enhance data accuracy, and support evidence-based decision making. As universities increasingly seek to modernise administrative services, the need for systems that provide timely access to academic information and analytical insights has become more pronounced.

At the Institute of Public Administration and Management, University of Sierra Leone (IPAM - USL), several academic administrative processes continue to rely on manual or semi-automated approaches. Practices such as the submission of grades through email and the use of external storage devices remain common. These methods are associated with challenges including delays in grade processing, risks of data loss or misplacement, lack of submission confirmation, and increased likelihood of manual errors during collation by administrative staff. In addition, access to student performance data is limited, restricting lecturers' ability to monitor academic progress effectively.

From the student perspective, academic administration is characterised by fragmented communication channels. Students often depend on a combination of student portals, social messaging groups, and physical notice boards to obtain information related to registration, timetables, results, and institutional announcements. Difficulties in accessing unofficial transcripts, cumbersome registration procedures, and inconsistent notification mechanisms contribute to dissatisfaction with existing systems. Both students and lecturers have expressed a preference for mobile-friendly platforms, real-time access to academic records, and automated notifications to improve efficiency and transparency.

Recent advances in artificial intelligence (AI) and data analytics present opportunities to enhance the functionality of SIMS. AI-powered assistance has the potential to provide rapid responses to routine academic queries, thereby reducing the administrative burden on staff. Performance analytics can also support academic management by identifying trends, monitoring student progress, and highlighting learners who may require early intervention. However, the successful implementation of AI-powered SIMS depends on several factors, including institutional readiness, technical infrastructure, data governance, and user acceptance.

Despite the global adoption of advanced SIMS solutions, the potential of AI-powered systems remains largely unexplored at IPAM - USL. Concerns related to technical capacity, adoption challenges, and institutional constraints create uncertainty regarding how such technologies could be effectively introduced within the institution. This gap highlights the need for empirical investigation into both the challenges associated with existing systems and the prospects for adopting AI-enhanced solutions.

This study examines the challenges and prospects of implementing an AI-powered Student Information Management System at IPAM - USL. Specifically, the study seeks to explore current SIMS practices and the challenges experienced by students and lecturers, assess expectations and preferences for new system features including AI-powered assistance and performance analytics, and identify institutional, technical, and user-related factors that may influence adoption. Data for the study are collected through questionnaires administered to students and lecturers at IPAM - USL.

By focusing on the experiences and expectations of key stakeholders, this study contributes empirical evidence to inform institutional decision-making and system design. The findings are expected to provide practical insights into how AI-powered SIMS can be leveraged to improve academic administration in IPAM - USL and similar higher education institutions, particularly within developing countries where resource and infrastructure constraints remain significant.

II. MATERIALS AND METHODS

Student Information Management Systems (SIMS) have become foundational components of digital transformation strategies within higher education institutions. As student populations expand and administrative processes grow increasingly complex, universities rely on integrated information systems to manage academic records, registration, assessment, and communication workflows. SIMS are conceptualised as centralised digital platforms designed to consolidate student-related data, streamline administrative processes, and support institutional decision-making (Gürkut et al., 2023). By replacing fragmented, paper-based procedures with automated workflows, these systems aim to enhance efficiency, accuracy, and transparency across academic operations.

Core functionalities of SIMS typically include course registration, grade submission, transcript generation, timetable management, attendance monitoring, and dissemination of institutional updates. Automation of these processes reduces administrative burden, minimises human error, and ensures timely access to reliable student records (Gürkut and Nat, 2017). Empirical studies indicate that effective implementation of SIMS contributes to improved operational efficiency and higher levels of student satisfaction, particularly when systems provide intuitive interfaces and multi-device accessibility (Demirkol and Seneler, 2019). In such institutional settings, students benefit from real-time access to grades and academic information, while lecturers experience streamlined reporting procedures.

Despite these reported benefits, implementation outcomes remain uneven. Several studies highlight persistent challenges, particularly within resource-constrained environments. Limitations frequently include inadequate technical infrastructure, unstable network connectivity, insufficient interoperability between institutional systems, and limited user training (Lwoga, 2014). Data security and privacy concerns further complicate adoption, especially where regulatory frameworks are weak or inconsistently enforced. In many developing countries, reliance on outdated hardware and limited institutional capacity undermines system reliability and sustainability. These findings suggest that technological deployment alone is insufficient. Institutional readiness and organisational alignment are equally critical determinants of success.

Recent advancements in artificial intelligence (AI) have significantly expanded the functional scope of SIMS. AI-driven enhancements introduce capabilities such as chatbots, natural language processing (NLP), recommender systems, predictive analytics, and workflow automation. Chatbots embedded within administrative portals provide instant responses to routine student and staff enquiries, reducing pressure on administrative offices while improving service responsiveness (Okonkwo and Ade-Ibijola, 2021). NLP technologies enable conversational interaction, allowing users to retrieve information efficiently without

navigating complex menu structures. Recommender systems further personalise the academic experience by analysing historical data to suggest courses, learning resources, or intervention strategies tailored to individual needs (Deschênes, 2020).

AI-powered performance analytics represent one of the most transformative developments in higher education administration. By analysing attendance patterns, assessment results, and engagement indicators, predictive models can identify students at risk of academic failure or dropout, enabling early intervention (Ifenthaler and Yau, 2020). Performance dashboards provide lecturers and administrators with visual insights into academic trends, supporting evidence-based decision-making at both departmental and institutional levels (Schwendimann et al., 2017). Workflow automation enhances efficiency by streamlining processes such as registration approval, grade validation, and notification dissemination (Zawacki-Richter et al., 2019). Collectively, these innovations reposition SIMS from passive record-keeping platforms to intelligent decision-support systems.

However, the integration of AI into SIMS introduces additional complexities. The effectiveness of predictive analytics depends heavily on data quality, completeness, and interoperability across institutional databases. In situations where record-keeping practices are inconsistent, AI outputs may be unreliable or biased. Ethical concerns regarding transparency, algorithmic accountability, and data governance are increasingly prominent in the literature (Chaudhry et al., 2022). Institutions must therefore balance technological innovation with robust governance frameworks to ensure responsible and equitable AI deployment.

Understanding adoption of AI-powered SIMS requires engagement with established theoretical frameworks. The Technology Acceptance Model (TAM) states that perceived usefulness and perceived ease of use are primary determinants of user intention to adopt new systems (Davis, 1989). In the context of AI-enhanced SIMS, users are more likely to accept functionalities such as chatbots or performance dashboards when these tools demonstrably improve efficiency and simplify academic tasks. The Unified Theory of Acceptance and Use of Technology (UTAUT) extends this perspective by incorporating social influence and facilitating conditions, emphasising the role of institutional support, infrastructure, and leadership commitment in shaping adoption behaviour (Venkatesh et al., 2003).

The Diffusion of Innovations (DOI) theory further explains adoption dynamics by examining characteristics such as relative advantage, compatibility, complexity, trialability, and observability (Rogers, 2003). AI-powered SIMS may diffuse more rapidly when stakeholders perceive clear benefits over existing processes and when new features align with institutional norms and practices. Conversely, perceptions of complexity or incompatibility can hinder uptake.

From an evaluative standpoint, the DeLone and McLean Information Systems Success Model provides a multidimensional framework for assessing system quality, information quality, service quality, user satisfaction, and net benefits (DeLone and McLean, 2003). Application of this model enables examination of both technical performance and experiential outcomes. Complementing this approach, the Human–Organisation–Technology Fit (HOT-fit) model emphasises alignment between user competencies, organisational structures, and technological capabilities as a prerequisite for sustainable implementation (Yusof et al., 2008). Together, these frameworks highlight that successful adoption is not solely a technological issue but a socio-technical process requiring institutional coherence.

Empirical evidence underscores the importance of institutional and governance factors. Leadership commitment, strategic alignment, financial investment, and policy frameworks significantly influence implementation outcomes (Rabaii, 2009). Technical determinants, including infrastructure reliability and system interoperability, shape the feasibility of AI functionalities (Tarhini et al., 2017). User-related factors such as digital literacy, attitudes towards AI, and perceived usability further determine sustained engagement (Chatterjee and Bhattacharjee, 2020). Systems characterised by mobile-friendliness, intuitive navigation, and responsive design report higher satisfaction and continued usage (Venkatesh et al., 2012). This is particularly relevant in environments where smartphone access predominates over desktop computing.

Communication and engagement mechanisms embedded within SIMS also influence user experience. Integrated notification systems, academic updates, and interactive portals enhance transparency and reduce reliance on informal communication channels (Gürkut et al., 2023). Where communication remains fragmented across messaging platforms and physical notice boards, institutional information systems risk marginalisation, reducing their perceived relevance.

Evidence from developed regions demonstrates successful deployment of AI-powered SIMS, including chatbot-supported student services and predictive analytics for retention management (Chen et al., 2020). However, findings from African and other resource-constrained environments remain comparatively limited. Existing studies often emphasise technological capabilities while underexamining environmental constraints such as infrastructural instability, governance limitations, and user readiness (Tarhini et al., 2017). Furthermore, empirical evaluations of AI-driven early-warning systems in such settings are scarce, and little research systematically explores both student and lecturer perspectives within the same university environment.

Several gaps therefore persist. First, limited empirical research examines AI-powered SIMS adoption in West African universities, where infrastructural and financial constraints may shape implementation differently from well-

resourced institutions. Second, existing studies frequently prioritise technical functionality over user perceptions, digital literacy, and institutional workflows. Third, communication mechanisms within SIMS, particularly their role in influencing satisfaction and engagement, remain insufficiently explored. Finally, few studies integrate multiple theoretical frameworks to develop setting-specific analytical models suitable for resource-constrained environments.

Addressing these gaps is essential for advancing understanding of sustainable AI integration in higher education administration. By examining challenges and prospects of implementing AI-powered SIMS at IPAM - USL, this study contributes institution-specific empirical evidence from a West African institution. Integration of theoretical frameworks with user-centred data provides a comprehensive analysis of technological, institutional, and human determinants of adoption. Such insights are critical for informing design strategies, governance policies, and phased implementation approaches tailored to similar higher education settings.

➤ *Research Methodology*

This study adopted a mixed-methods research design to investigate the challenges and prospects of implementing an AI-powered Student Information Management System (SIMS) at the Institute of Public Administration and Management - University of Sierra Leone (IPAM-USL). The mixed-methods approach was selected to capture both quantitative patterns and qualitative insights related to system usage, user experiences, and adoption expectations among key stakeholders (Creswell and Plano Clark, 2018). This design enables triangulation of data and provided a comprehensive understanding of perceptions surrounding the current SIMS and the potential introduction of AI-powered features (Tashakkori and Teddlie, 2010).

The target population comprised students and lecturers of IPAM-USL, as these groups represent the primary users and evaluators of academic administrative processes supported by the SIMS. Students included undergraduate and graduate students who regularly interact with the system for registration, access to academic records, and performance monitoring. Lecturers were included due to their responsibility for grade submission, academic assessment, and oversight of student performance. Other stakeholders, such as administrative or technical staff, were excluded to maintain focus on user experience, system usability, and adoption perspectives.

A combination of convenience, snowball, and simple random sampling techniques was employed to select participants (Saunders et al., 2019). Students were primarily reached through convenience and snowball sampling, leveraging class groups and peer networks to ensure broad representation across faculties and academic levels. Lecturers were approached through random encounters on campus, with efforts made to obtain at least one respondent from each faculty. In total, 71 respondents participated in the study, comprising 60 students and 11 lecturers. Although

the lecturer sample was relatively small, representation across faculties ensured that diverse academic perspectives were captured.

Data were collected using structured questionnaires administered online through Google Forms. Questionnaires were selected as the primary data collection instrument due to their efficiency, standardisation, and ability to capture both quantitative and qualitative data within a limited timeframe (Bryman, 2016). The student questionnaire focused on experiences with the current SIMS, access and usability preferences, and expectations for AI-powered features such as automated assistance and performance analytics. The lecturer questionnaire addressed academic workflow processes, including grade submission, system reliability, and perceived limitations of existing practices. Both instruments included closed-ended questions for quantitative measurement and open-ended questions to elicit descriptive feedback and recommendations.

Quantitative data were analysed using descriptive statistical techniques, including percentages, to summarise patterns of system usage, challenges, and feature preferences. Graphical representations were employed to enhance interpretation of trends. Qualitative data obtained from open-ended responses were analysed using thematic content analysis, whereby recurring themes related to system challenges, adoption barriers, and expectations for AI-powered SIMS were identified and interpreted (Braun and Clarke, 2006). Microsoft Excel was used to manage datasets, generate descriptive statistics, and organise qualitative responses.

Ethical considerations were strictly observed throughout the research process. Participation was voluntary, and informed consent was obtained from all respondents prior to questionnaire completion. Participants were informed of the study's purpose and assured that responses would be used solely for academic research. No personally identifiable information was collected, and anonymity and confidentiality were maintained (Bell et al., 2022). Respondents were informed of their right to withdraw at any stage without consequence.

III. FINDINGS AND DISCUSSIONS

➤ *Demographic Characteristics*

A total of 60 students and 11 lecturers participated in the study. Student respondents were predominantly male (81.7%) and largely within the 21–30 age range, reflecting a young and technologically literate population. Most students were enrolled in degree programmes, particularly within the Faculty of Information Systems and Technology and the Faculty of Accounting and Finance, and were mainly based at the main college campus.

Lecturer respondents were similarly male-dominated (90.9%) and represented multiple faculties, with most holding the rank of Lecturer and possessing fewer than five years of teaching experience. The relatively young academic

cohort suggests favourable conditions for the adoption of digital and AI-enabled academic systems.

- *RQ1: What are the Current Practices of the Existing SIMS at IPAM-USL, and What Challenges are Experienced by Students and Lecturers?*

✓ *Student Usage Patterns and Satisfaction:*

Student engagement with the current SIMS was largely grade-driven. Over three-quarters of students (76.7%) reported using the system to check grades, while fewer accessed academic profiles (51.7%) or unofficial transcripts (30%). Usage frequency varied, with only 23.3% accessing the system daily and 31.7% reporting rare use. This suggests that interaction with the SIMS is largely episodic and necessity-based, rather than continuous.

Satisfaction levels were generally moderate, with a notable proportion expressing neutrality or dissatisfaction. While 30% of students reported being satisfied and only 6.7% very satisfied, a large proportion remained neutral (43.3%), and 20% expressed dissatisfaction. These findings indicate that although the system meets basic requirements, it lacks the breadth and usability needed to deliver a positive user experience. Prior studies similarly associate low satisfaction with limited functionality and poor system integration (Venkatesh et al., 2012).

✓ *Access to Academic Processes:*

Significant inefficiencies were observed in key academic processes. Transcript access remained partially manual, with 30.0% of students relying solely on physical requests and 38.3% using both online and manual methods. Furthermore, 55.0% of students reported never completing semester registration online, confirming the absence of automated registration functionality within the current SIMS.

Communication practices further highlighted system weaknesses. Institutional updates were primarily disseminated through WhatsApp groups (71.7%) and notice boards (43.3%), while only 8.3% of students relied on the SIMS. This reliance on informal channels reduces the system's institutional relevance and undermines its role as a central academic platform.

✓ *Lecturer Experiences and Academic Workflow Challenges:*

Lecturers reported no direct interaction with the SIMS for core academic tasks. Grade submission was conducted almost exclusively via email (90.9%), exposing the process to risks of data loss, delays, and manual errors. All lecturers reported the absence of online access to student academic records, limiting their ability to monitor progress or provide timely academic support.

The lack of role-based access and automated workflows reflects a fragmented academic management structure. Similar studies have shown that excluding academic staff from core information systems significantly

reduces system effectiveness and institutional efficiency (Al-Fraihat et al., 2020).

✓ *Current Practices and Challenges of the Existing SIMS:*

The study revealed that the existing SIMS is under-utilised and limited in functionality. Students primarily engaged with the platform for grade checking and accessing their academic profiles, while other features such as transcript downloads and fee balance inquiries were used less frequently. A significant proportion of students interacted with the system infrequently, reflecting limitations in the system's comprehensiveness and usability (Chen et al., 2022; Al-Fraihat et al., 2020).

Challenges identified include inconsistent access to transcripts, reliance on manual processes for semester registration, and under-utilisation of communication tools, with external platforms such as WhatsApp and notice boards being primarily used for updates. Lecturers reported similar limitations, with grade submission conducted almost entirely via email, no online access to student records, and a lack of integrated system functionalities. These issues collectively indicate that the current SIMS does not meet the holistic needs of either students or lecturers, confirming the importance of automation, integration, and user-centred design in higher education information systems (Ifenthaler and Yau, 2020; Venkatesh et al., 2012).

- *RQ2: What are the Expectations and Preferences of Students and Lecturers Regarding New Features in a SIMS, Including AI-Powered Assistance and Performance Analytics?*

✓ *Desired Features and Functionalities:*

Both students and lecturers expressed strong demand for a more comprehensive and intelligent SIMS. Students prioritised online access to lecture materials (81.7%), automated notifications (80%), real-time grade viewing (68.3%), online registration (65%), and AI-powered academic assistance (65%). Academic performance dashboards were also strongly supported (63.3%). Lecturers unanimously (100%) supported features such as online grade submission, performance dashboards, access to historical student records, automated confirmation of submissions, and AI-powered assistants. This convergence indicates a shared institutional need for automation, transparency, and data-driven academic management.

Both students and lecturers expressed clear expectations for a new, more intelligent SIMS. Students prioritised online access to lecture materials, real-time grade viewing, automated notifications, semester course registration, performance analytics and AI-powered academic assistance. Lecturers emphasised online grade submission, access to historical performance records, performance dashboards, timetable management, and AI-enabled support for academic queries. The findings indicate a strong convergence of expectations, highlighting the need for a system that is accessible, transparent, and capable of supporting evidence-based teaching and learning practices (Ifenthaler and Yau, 2020; Chen et al., 2022).

✓ *Importance of AI Assistance and Analytics:*

AI-powered support emerged as a central expectation. Two-thirds of students (66.7%) rated the inclusion of a chatbot as *very important*, while lecturers unanimously rated it as essential. Similarly, support for academic performance dashboards exceeded 96% among students and 100% among lecturers.

These findings align with literature highlighting the role of AI assistants in reducing administrative burden, improving response times, and enhancing user satisfaction in higher education systems (Chen et al., 2020). The strong demand for analytics further reflects a shift toward evidence-based learning and teaching practices.

• *RQ3: What Institutional, Technical, and User-Related Factors may Influence the Adoption of an AI-Powered SIMS at IPAM-USL?*

✓ *Device Usage and Mobile-Friendliness:*

Mobile phones dominated both current and preferred access patterns. Over 90% of students and all lecturers preferred smartphone access, while laptops and tablets remained important for more detailed tasks. All students rated mobile-friendliness as important or very important, reinforcing the need for a responsive, multi-platform system. Lecturers similarly emphasised interface usability, with 100% rating a user-friendly design as important or very important. These findings indicate that **technical design factors**, particularly mobile optimisation and usability, will play a decisive role in adoption success.

✓ *Readiness for Adoption:*

Lecturers demonstrated high levels of digital readiness, with 72.7% describing themselves as very comfortable using online academic systems and the remainder as comfortable. Combined with strong student demand, this readiness suggests favourable conditions for implementing an AI-powered SIMS at IPAM - USL.

However, successful adoption will depend not only on technology but also on institutional commitment, system integration, and user-centred design. Without addressing these factors, the benefits of AI integration may not be fully realised.

✓ *Factors Influencing Adoption of an AI-Powered SIMS:*

The adoption of a new SIMS is influenced by multiple technical and institutional factors. Mobile devices, particularly smartphones, were identified as the primary access point, with both students and lecturers expecting multi-platform compatibility. Mobile responsiveness, usability, and intuitive interface design were considered critical to ensuring user acceptance. Additionally, lecturers suggested extending the system to include multifunctional features, such as institutional communication and governance tools, which could enhance engagement and overall utility. These factors align with global research on technology acceptance, emphasising that ease of use, perceived usefulness, and institutional readiness collectively

shape adoption decisions (Venkatesh et al., 2012; Aldowah et al., 2017).

✓ *Synthesis and Implications:*

Overall, the findings reveal that the current SIMS at IPAM-USL is underutilised, fragmented, and insufficiently integrated into core academic workflows. Students rely on it mainly for grade checking, while lecturers are largely excluded from its use. Persistent manual processes, limited communication integration, and lack of automation significantly constrain system effectiveness.

In contrast, both groups expressed strong and convergent expectations for an AI-powered SIMS that supports automation, analytics, and intelligent assistance. The alignment between student and lecturer priorities presents a compelling case for institutional investment in a unified, AI-enabled platform capable of enhancing academic efficiency, transparency, and decision-making.

IV. CONCLUSIONS AND RECOMMENDATIONS

➤ *Conclusion*

This study examined the challenges and prospects of implementing an AI-powered Student Information Management System (SIMS) at the Institute of Public Administration and Management, University of Sierra Leone (IPAM-USL), drawing on perspectives from students and lecturers. The findings indicate that the existing SIMS is under-utilised, fragmented, and insufficiently integrated into core academic and administrative processes. Student interaction is largely limited to grade checking and profile access, while semester registration, transcript access, and institutional communication remain partially manual. Lecturers face similar limitations, relying primarily on email-based grade submission and lacking direct access to student academic records. These practices undermine efficiency, transparency, and data reliability, reinforcing concerns highlighted in prior studies on higher education information systems.

Despite these challenges, both students and lecturers expressed strong and convergent expectations for a redesigned, AI-powered SIMS. Desired features included automation of academic workflows, real-time access to academic records, integrated communication mechanisms, and AI-enabled tools such as chatbots and performance analytics. Students emphasised accessibility, automated notifications, performance monitoring, and intelligent academic assistance, while lecturers prioritised online grade submission, performance dashboards, and access to historical student data. The alignment of expectations across user groups suggests a clear institutional demand for a comprehensive, user-centred system capable of supporting evidence-based teaching, learning, and administration.

The findings further reveal that adoption of an AI-powered SIMS will be shaped by technical, institutional, and usability factors. Mobile devices, particularly smartphones, emerged as the dominant access platform, highlighting the

importance of mobile responsiveness and multi-platform compatibility. Ease of use, intuitive interface design, and perceived usefulness were identified as critical determinants of acceptance. In addition, institutional readiness, including leadership commitment, policy support, training provision, and continuous technical support, was recognised as essential for successful implementation. These factors are consistent with established technology acceptance and information systems success models, which emphasise the interaction between technological capabilities, human factors, and the organisational environment.

From a practical perspective, the study underscores the need for IPAM-USL to invest in a fully integrated, AI-powered SIMS that consolidates academic and administrative processes, reduces reliance on manual procedures, and embeds intelligent support mechanisms. Incorporating AI-driven assistance and performance analytics has the potential to enhance administrative efficiency, improve student engagement, and support timely, data-driven decision-making. Continuous monitoring of system performance and user feedback will be essential to ensure sustainability and alignment with evolving user needs.

Overall, the study contributes empirical evidence from a resource-constrained higher education environment, demonstrating both the limitations of traditional SIMS and the potential benefits of AI-enhanced solutions. By aligning system design with user expectations and institutional capacity, AI-powered SIMS can play a transformative role in strengthening academic governance, operational efficiency, transparency, and data-driven decision-making at IPAM-USL and similar resource-constrained institutions.

➤ Recommendations

Based on the findings and conclusions of this study, several practical and scholarly recommendations are proposed to support the successful implementation of an AI-powered Student Information Management System (SIMS) at IPAM - USL and similar resource-constrained higher education institutions.

- IPAM - USL should prioritise the development or acquisition of a fully integrated, AI-enabled SIMS that consolidates core academic and administrative processes within a single platform. The system should incorporate online semester registration, grade submission, transcript access, performance dashboards, and embedded communication tools. Integration of AI functionalities, including chatbot assistance and academic performance analytics, is recommended to enhance responsiveness, support data-driven decision-making, and reduce administrative workload.
- System design should emphasise mobile responsiveness and multi-platform compatibility. Given the dominance of smartphone usage among students and lecturers, the platform must provide seamless access across mobile devices, laptops, and tablets. Intuitive interface design, clear navigation structures, and simplified workflows

will be critical in strengthening perceived usefulness and ease of use, thereby promoting sustained adoption.

- Institutional readiness must be strengthened through structured training programmes and continuous technical support. Capacity-building initiatives should focus on improving digital literacy, fostering positive attitudes towards AI-powered functionalities, and ensuring that lecturers and students can effectively utilise performance analytics and automated features. Leadership commitment and policy alignment will be essential in embedding the system into routine academic operations.
- Integrated communication mechanisms should be embedded within the SIMS to centralise academic updates, notifications, and announcements. Reducing reliance on fragmented external platforms will enhance transparency, institutional coherence, and system relevance.
- Continuous monitoring and evaluation mechanisms should be established to assess system performance, user satisfaction, and adoption trends. Periodic feedback collection and iterative refinement will ensure that the system remains aligned with user expectations and institutional objectives.

In addition to institutional recommendations, further research is encouraged to examine longitudinal impacts of AI-powered SIMS on academic performance, administrative efficiency, and user engagement. Future studies should incorporate perspectives of administrative and technical staff, explore advanced AI functionalities such as predictive modelling and personalised learning recommendations, and assess how infrastructural and governance factors shape adoption outcomes in resource-constrained universities. Collectively, these recommendations provide a practical roadmap for translating user expectations into sustainable system design and implementation strategies, thereby strengthening the potential of AI-powered SIMS to transform higher education administration within developing country settings.

REFERENCES

- [1] Adebayo, S. O. and Abdulhamid, S. I. (2019) Determinants of user acceptance of a student information system in a Nigerian university. *Journal of Education and Practice*, 10(14), pp. 1–10.
- [2] Alalwan, A. A., Dwivedi, Y. K. and Rana, N. P. (2017) Integrating UTAUT2 with additional factors for mobile banking adoption: a systematic review. *International Journal of Information Management*, 37(6), pp. 628–643.
- [3] Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). Evaluating E-Learning Systems Success: An Empirical Study. *Computers in Human Behavior*, 102, pp. 67-86.
- [4] Aldowah, S., Rehman, S. and Ghazal, S. (2017) Critical factors for adopting e-learning systems in a higher education institution: an empirical study. *Interactive Technology and Smart Education*, 14(4), pp. 310–330.

- [5] Alhassan, A., Sam, J., Agyemang, G. and Osei, B. (2021) Factors influencing the adoption of a student information system in a Ghanaian university. *Education and Information Technologies*, 26(1), pp. 1–20.
- [6] Alonso, F., Manrique, M. A., & Moreno-Ger, P. (2020). A survey on the use of recommender systems in education. *Computers in Human Behavior*, 102, pp. 24–34.
- [7] Alrawashdeh, H., Al-Mashaqbeh, H., & Almajali, D. (2019). The impact of information technology infrastructure on the success of an enterprise resource planning system. *International Journal of Computer and Information Technology*, 8(3), pp. 43–52.
- [8] Baker, T., Smith, M., & Ananiadou, S. (2021). Towards ethical AI in education: A framework for responsible design and implementation. *Journal of Educational Technology & Society*, 24(1), pp. 12–25.
- [9] Bell, E., Harley, B. and Bryman, A. (2022) *Business Research Methods*. Oxford: Oxford University Press.
- [10] Braun, V. and Clarke, V. (2006) ‘Using thematic analysis in psychology’, *Qualitative Research in Psychology*, 3(2), pp. 77–101.
- [11] Bryman, A. (2016) *Social Research Methods*. 5th edn. Oxford: Oxford University Press.
- [12] Cabitza, F., Campagner, A., & Simone, M. (2020). Ethical challenges of artificial intelligence in healthcare: A systematic review of the literature. *Journal of Medical Internet Research*, 22(12), pp. e25191.
- [13] Chatterjee, S. and Bhattacharjee, K. K. (2020) ‘Adoption of artificial intelligence in higher education: a quantitative analysis using structural equation modelling’, *Education and Information Technologies*, 25(5), pp. 3443–3463.
- [14] Chaudhry, M. A., Cukurova, M. and Luckin, R. (2022) ‘A transparency index framework for AI in education’, in *International Conference on Artificial Intelligence in Education*. Cham: Springer International Publishing, pp. 195–198.
- [15] Chen, L., Chen, P. and Lin, Z. (2020) ‘Artificial intelligence in education: a review’, *IEEE Access*, 8, pp. 75264–75278.
- [16] Chen, J., Chen, H. and Lin, R. (2022) A conceptual framework of user-centered design for student information systems. *Computers & Education*, 182, pp. 104470.
- [17] Creswell, J. W. (2014) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 4th edn. Thousand Oaks, CA: Sage Publications.
- [18] Creswell, J. W. and Clark, V. L. P. (2017) *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: SAGE Publications.
- [19] Davis, F. D. (1989) ‘Perceived usefulness, perceived ease of use, and user acceptance of information technology’, *MIS Quarterly*, 13(3), pp. 319–340.
- [20] DeLone, W. H. and McLean, E. R. (2003) ‘The DeLone and McLean model of information systems success: a ten-year update’, *Journal of Management Information Systems*, 19(4), pp. 9–30.
- [21] Demirkol, D. and Seneler, C. (2019) ‘Evaluation of student information system (SIS) in terms of user emotion, performance and perceived usability: a Turkish university case (an empirical study)’, *Procedia Computer Science*, 158, pp. 1033–1051.
- [22] Deschênes, M. (2020) ‘Recommender systems to support learners’ agency in a learning context: a systematic review’, *International Journal of Educational Technology in Higher Education*, 17(1), p. 50.
- [23] Dillman, D. A., Smyth, J. D. and Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: the tailored design method*. 4th edn. Hoboken, NJ: John Wiley & Sons.
- [24] Etikan, I., Musa, S. A. and Alkassim, R. S. (2016) Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), pp. 1–4.
- [25] Fowler, F. J. (2014) *Survey research methods*. 5th edn. Thousand Oaks, CA: Sage Publications.
- [26] Gürkut, C. and Nat, M. (2017) ‘Important factors affecting student information system quality and satisfaction’, *EURASIA Journal of Mathematics, Science and Technology Education*, 14(3), pp. 923–932.
- [27] Gürkut, C., Elçi, A. and Nat, M. (2023) ‘An enriched decision-making satisfaction model for student information management systems’, *International Journal of Information Management Data Insights*, 3(2), p. 100195.
- [28] Holden, R. J. and Karsh, B. T. (2010) The technology acceptance model: its application in healthcare and future directions for healthcare information technology research. *Journal of Biomedical Informatics*, 43(1), pp. 159–170.
- [29] Ifenthaler, D. and Yau, J. S. (2020) Student and lecturer perceptions of an academic information system. *Education and Information Technologies*, 25(3), pp. 2011–2029.
- [30] Ifinedo, P. (2017) A model of user-based adoption of information systems in Nigerian universities: the case of student information system. *Information Systems Management*, 34(1), pp. 49–62.
- [31] Israel, M. and Hay, I. (2006) *Research ethics for social scientists: between theory and practice*. London: Sage Publications.
- [32] Johnson, R. B. and Onwuegbuzie, A. J. (2004) Mixed methods research: a research paradigm whose time has come. *Educational Researcher*, 33(7), pp. 14–26.
- [33] Lwoga, E. (2014) ‘Critical success factors for adoption of web-based learning management systems in Tanzania’, *International Journal of Education and Development using ICT*, 10(1).

- [34] Mtebe, J.S. and Raisamo, R. (2014) Investigating students' acceptance of e-learning systems in Tanzania. *Education and Information Technologies*, 19(1), pp. 101–118.
- [35] Nagy, P. (2018) The digital university: a view from the administrative side. *EDUCAUSE Review*, 53(2), pp. 10–17.
- [36] Okonkwo, C. W. and Ade-Ibijola, A. (2021) 'Chatbots applications in education: a systematic review', *Computers and Education: Artificial Intelligence*, 2, p. 100033.
- [37] Pina, A. A. (2012) The impact of student information systems on student retention and success. *Journal of Educational Technology Development and Exchange*, 5(1), pp. 1–15.
- [38] Rabaai, A. (2009) 'Identifying critical success factors of ERP systems at the higher education sector', in *Proceedings of the Third International Symposium on Innovation in Information and Communication Technology*. Swindon: British Computer Society, pp. 133–147.
- [39] Rogers, E. M. (2003) *Diffusion of innovations*. 5th edn. New York: Free Press.
- [40] Saunders, M., Lewis, P. and Thornhill, A. (2009) *Research Methods for Business Students*. Harlow: Pearson Education.
- [41] Schwendimann, B. A., Rodriguez-Triana, M.J., Vozniuk, A., Prieto, L.P., Boroujeni, M.S., Holzer, A., Gillet, D. and Dillenbourg, P. (2017) 'Perceiving learning at a glance: a systematic literature review of learning dashboard research', *IEEE Transactions on Learning Technologies*, 10(1), pp. 30–41.
- [42] Tarhini, A., Masa'deh, R. E., Al-Busaidi, K. A., Mohammed, A. B. and Maqableh, M. (2017) 'Factors influencing students' adoption of e-learning: a structural equation modelling approach', *Journal of International Education in Business*, 10(2), pp. 164–182.
- [43] Tashakkori, A. and Teddlie, C. (2021) *SAGE Handbook of Mixed Methods in Social and Behavioral Research*. Thousand Oaks, CA: SAGE Publications.
- [44] Venkatesh, V., Morris, M., Davis, G. and Davis, F. (2003) User acceptance of information technology: toward a unified view. *MIS Quarterly*, 27(3), pp. 425–478.
- [45] Venkatesh, V., Thong, J. and Xu, X. (2012) Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), pp. 157–178.
- [46] Wang, M., Yu, H. and Fong, J. (2019) An overview of learning analytics and educational data mining. *Journal of Computer Assisted Learning*, 35(1), pp. 1–13.
- [47] Yusof, M.M., Kuljis, J., Papazafeiropoulou, A. and Stergioulas, L.K. (2008) An evaluation framework for health information systems: human, organization and technology-fit factors (HOT-fit). *International Journal of Medical Informatics*, 77(6), pp. 386–398.
- [48] Zawacki-Richter, O., Marín, V.I., Bond, M. & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in education – a review of articles. *Education and Information Technologies*, 24(5), pp. 3519–3544.
- [49] Zawacki-Richter, O., Marín, V.I., Bond, M. & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), pp. 1-27.