Advancing Sustainability in Higher Educational Institutions through Artificial Intelligence in Sri Lanka

*S.K.C. Ruklani Wickramasinghe [1] *, Ravinder Rena [2]*

[1] Lincoln University college Malayasia , [2]

**Corresponding author (wickramasinghe.ruklani@gmail.com)*

Abstract: This study explores the integration of artificial intelligence (AI) within higher education institutions in Sri Lanka and examines its potential contribution to sustainability, personalized learning, and strategic decision-making, particularly in the context of institutional marketing. As the higher education landscape in Sri Lanka continues to evolve amid infrastructural, technological, and economic challenges, institutions are under increasing pressure to adopt innovative and sustainable solutions. This study investigates the key factors influencing AI adoption, including organizational culture, faculty preparedness, and the availability of digital infrastructure. Using a qualitative research approach, data were collected through expert interviews and direct observations to capture institutional practices and perceptions related to AI implementation. The findings indicate that while the use of AI tools among students is increasingly common, institutional-level adoption remains limited due to systemic barriers such as policy gaps, resource constraints, and resistance to change. The study highlights the significant potential of AI to enhance student engagement, improve learning experiences, and strengthen institutional competitiveness. It also emphasizes the need for holistic implementation frameworks, targeted capacity-building initiatives, and supportive policy environments. The findings contribute to the growing body of literature on AI-driven innovation in higher education within developing country contexts and provide practical recommendations for promoting equitable, sustainable, and effective AI adoption in Sri Lankan higher education institutions.

Keywords: Sustainable development, artificial intelligence, higher education, developing nations

1. Introduction

1.1 Background

In recent years, the integration of artificial intelligence (AI) has significantly influenced global higher education systems, reshaping pedagogical approaches, institutional practices, and strategic decision-making processes [10]. Universities across the world are increasingly adopting AI-driven solutions to respond to changing student expectations, rising competition, and the need to enhance learning outcomes. In the context of Sri Lanka, higher education institutions are similarly seeking innovative strategies to address evolving academic demands while operating within an environment characterized by infrastructural limitations, uneven technological readiness, and resource constraints.

One of the most prominent applications of AI in education is personalized learning, an approach that adapts instructional content, learning pace, and assessment methods to suit individual learner needs. Personalized learning has gained considerable attention as a means of improving educational efficiency, student engagement, and academic performance [9]. The integration of AI into personalized learning models has made these approaches more dynamic by enabling real-time feedback, adaptive learning

pathways, and data-driven insights into student progress. In contrast, traditional learning models often rely on uniform instructional approaches that fail to accommodate learner diversity, potentially limiting student motivation and achievement. Existing studies indicate that AI-driven personalized learning environments can significantly enhance student participation, engagement, and learning outcomes [23].

Sri Lanka's higher education sector comprises both public and private institutions that provide a wide range of academic qualifications to students seeking employment opportunities locally and internationally [24]. These institutions serve learners from diverse socioeconomic backgrounds, reflecting broader national inequalities in access to education and technology. As competition among higher education institutions intensifies, particularly within the private sector, universities are increasingly required to adopt innovative strategies not only in teaching and learning but also in institutional marketing and strategic planning [17]. In this context, AI has emerged as a potentially valuable tool for supporting sustainability objectives, improving operational efficiency, and strengthening institutional competitiveness.

Despite the growing interest in AI, its institutional adoption within Sri Lankan higher education remains uneven. While students frequently use AI tools independently for learning-related activities, the integration of AI at the institutional level for teaching, administration, and strategic decision-making is still limited. This disconnect highlights the importance of examining institutional readiness, organizational culture, and policy support mechanisms that influence AI adoption. Understanding these factors is essential for ensuring that AI integration contributes meaningfully to sustainability, equity, and long-term development within Sri Lanka's higher education system.

1.2 Problem Statement

In Sri Lanka, higher education plays a critical role in the development of human capital and supports the country's long-term economic growth objectives [25]. Both public and private higher education institutions offer a wide range of undergraduate, postgraduate, and professional programs designed to meet the needs of a rapidly changing labor market. As the sector becomes increasingly competitive, particularly among private institutions that rely heavily on student enrollment for financial sustainability, effective marketing and strategic decision-making have become essential components of institutional success [17].

Traditionally, higher education institutions in Sri Lanka have relied on conventional marketing approaches, including print media, television advertising, social media promotions, and direct communication strategies, to attract prospective students. While these methods continue to play a role, they often lack the capacity to leverage large volumes of data for informed decision-making. In response to these limitations, institutions are gradually shifting toward data-driven strategies supported by digital technologies. Artificial intelligence offers significant potential in this context by enabling predictive analytics, audience segmentation, personalized communication, and improved evaluation of marketing campaign effectiveness [7].

Despite the growing recognition of AI's potential benefits, empirical evidence suggests that its adoption within Sri Lankan higher education institutions remains limited and uneven. Although some institutions have initiated digital transformation efforts, the effective use of AI for strategic decision-making is still constrained by several factors, including organizational culture, limited digital infrastructure, and insufficient institutional readiness [5], [8]. These challenges often result in fragmented implementation, where AI tools are used in isolated initiatives rather than as part of integrated institutional strategies.

Moreover, while students increasingly use AI tools independently to support their learning activities, institutional-level adoption for marketing and strategic planning remains underdeveloped. This disparity highlights a critical gap between individual-level usage and organizational implementation. As a result, there is limited understanding of how AI can be systematically embedded within institutional frameworks to support strategic marketing decisions while aligning with broader sustainability objectives. Addressing this gap is essential for enhancing institutional competitiveness, improving operational efficiency, and ensuring the long-term sustainability of Sri Lanka's higher education sector.

1.3 Research Objectives & Questions

The reviewed literature highlights several recurring challenges in integrating artificial intelligence (AI) within higher education. These include limited institutional capacity for implementing AI-driven personalized learning systems [5], unclear determinants influencing the adoption of AI tools [16], and a lack of empirical evidence on the effectiveness of AI-enhanced e-learning in improving academic outcomes [23]. Addressing these challenges requires a comprehensive understanding of the factors that facilitate or hinder AI adoption, as well as an assessment of AI's potential to promote sustainable and equitable learning experiences in higher education.

Accordingly, the study identifies the following research objectives:

1. To promote sustainable and equitable AI-based personalized learning within Sri Lankan higher education institutions.
2. To examine the attitudinal, organizational, and infrastructural factors influencing AI adoption in the higher education sector.
3. To evaluate the role of AI in enhancing student engagement, learning effectiveness, and academic performance.

Based on these objectives, the study seeks to answer the following key research questions:

1. How can AI-based personalized learning contribute to sustainability and equity in higher education?
2. What factors influence the adoption and effective use of AI technologies in Sri Lankan higher education institutions?
3. In what ways does AI integration impact student engagement, learning outcomes, and overall academic achievement?

1. Literature Review

Artificial intelligence (AI) has emerged as a transformative technology in higher education, influencing teaching methodologies, learning environments, and institutional management practices across diverse global contexts [10]. However, the extent to which AI is adopted and effectively integrated varies significantly depending on institutional readiness, national policy frameworks, and infrastructural

capacity. In developing countries such as Sri Lanka, these variations are particularly pronounced, making it necessary to examine AI adoption through contextual and sustainability-oriented perspectives.

2.1 AI Preparedness and Readiness in Higher Education

Institutional preparedness is a critical determinant of successful AI integration in higher education. Studies focusing on Sri Lankan universities reveal that although interest in AI adoption is increasing, institutional readiness remains relatively low due to financial constraints, limited digital infrastructure, and insufficient faculty training [5]. Research indicates that while a substantial proportion of students independently use AI-based tools to support learning activities, universities often lack formal strategies, governance mechanisms, and technical capacity to integrate these technologies at the institutional level [5], [16].

Perera et al. [16] identify moderate levels of AI readiness within Sri Lankan higher education institutions, emphasizing that adoption patterns remain uneven across institutions and disciplines. These disparities are largely influenced by variations in technological infrastructure, administrative support, and organizational culture. Similarly, Ediriweera [5] highlights that resistance to change among academic staff and limited awareness of AI's pedagogical potential further constrain institutional implementation.

Comparative studies indicate that higher education institutions in countries such as India demonstrate higher levels of AI readiness, primarily due to supportive national policies, targeted investments, and structured digital transformation initiatives [18]. At the global level, UNESCO's AI Readiness Assessment Framework underscores that effective AI integration requires a multidimensional approach encompassing ethical, legal, technological, and economic considerations [21]. These findings suggest that institutional readiness extends beyond technological availability and must be supported by comprehensive policy alignment and capacity-building efforts.

2.2 Accessibility, Equity, and Sustainability in AI Adoption

Accessibility and equity are central considerations in discussions of AI adoption within higher education, particularly in developing contexts. In Sri Lanka, disparities in access to digital infrastructure and technological literacy continue to limit equitable participation in AI-enabled learning environments [23]. These challenges are more pronounced in rural and under-resourced institutions, where inconsistent internet connectivity and limited access to digital devices restrict students' ability to fully engage with AI-based tools [16].

Existing research emphasizes that without deliberate interventions, AI adoption risks reinforcing existing educational inequalities rather than alleviating them [8]. Henadirage and Gunarathne [8] note that infrastructural deficiencies, insufficient institutional support, and uneven faculty preparedness contribute to unequal access to AI-driven educational benefits. Addressing these challenges requires targeted investments in infrastructure, inclusive policy frameworks, and faculty development programs that prioritize equity and accessibility.

From a sustainability perspective, AI has been increasingly recognized as a tool capable of supporting broader Sustainable Development Goals (SDGs), particularly those related to quality education and lifelong learning [2], [22]. Alzoubi et al. [2] demonstrate that AI applications in higher education contribute to sustainability by improving resource efficiency, enhancing learning outcomes, and supporting data-informed decision-making. However, the absence of standardized implementation strategies and ethical governance frameworks continues to hinder the scalability and long-term sustainability of AI initiatives.

2.3 Research Gap

Despite the growing body of literature on AI integration in higher education, significant research gaps remain, particularly within the South Asian and Sri Lankan contexts. Existing studies indicate that although a high proportion of students engage with AI tools independently, institutional adoption remains limited due to governance challenges, inadequate funding, and insufficient faculty capacity [5], [8]. Furthermore, national-level strategies have yet to be fully translated into practical, institution-wide implementation frameworks [15].

There is also a lack of longitudinal empirical studies examining the sustained impact of AI adoption on teaching effectiveness, student learning outcomes, and institutional sustainability [5]. Additionally, limited research has explored the alignment between AI adoption, strategic decision-making, and sustainability objectives within higher education institutions. Addressing these gaps is essential for developing context-specific frameworks that support equitable, effective, and sustainable AI integration. This study seeks to contribute to this emerging area by examining AI adoption in Sri Lankan higher education through the combined lenses of sustainability and strategic decision-making.

2. Methodology

This study adopts a qualitative research design to achieve its stated objectives and to gain an in-depth understanding of how artificial intelligence is being integrated within higher education institutions in Sri Lanka. A qualitative approach is considered appropriate for this study as it enables the exploration of perceptions, experiences, and contextual factors that influence institutional practices related to AI adoption. This approach allows for a detailed examination of complex organizational, technological, and cultural dynamics that cannot be adequately captured through quantitative methods alone.

Primary data were collected through semi-structured interviews and observational techniques. Semi-structured interviews were selected to provide flexibility while ensuring that key themes related to AI adoption, strategic decision-making, sustainability, and institutional readiness were consistently addressed across participants. The interview participants included experts with substantial experience in higher education administration, institutional marketing, and educational technology. Their expertise provided valuable insights into both strategic and operational aspects of AI integration within higher education institutions.

In addition to interviews, direct observations were conducted to gain contextual understanding of how AI tools are currently utilized within institutional settings. Observational data helped to triangulate interview findings and provided additional insights into practical challenges, institutional workflows, and technology usage patterns. A set of open-ended interview questions was developed to guide the data collection process, ensuring consistency while allowing participants to elaborate on their experiences and perspectives.

The collected qualitative data were analyzed using thematic analysis. This involved systematically reviewing interview transcripts and observational notes to identify recurring patterns, themes, and relationships related to AI adoption and sustainability. The analysis focused on understanding the factors that facilitate or hinder AI implementation, the role of organizational culture and infrastructure, and the perceived impact of AI on student engagement and institutional competitiveness. This methodological approach ensured that the findings were grounded in empirical evidence while remaining sensitive to the contextual realities of Sri Lankan higher education institutions.

3. Conclusion and Recommendations

This study examined the role of artificial intelligence (AI) in advancing sustainability and supporting strategic decision-making within higher education institutions in Sri Lanka. The findings indicate that AI has substantial potential to enhance personalized learning experiences, improve student engagement, and strengthen institutional marketing and decision-making processes. However, the extent of AI adoption at the institutional level remains uneven, largely due to infrastructural limitations, gaps in faculty preparedness, organizational resistance, and the absence of comprehensive policy and governance frameworks.

Although students increasingly engage with AI tools independently to support their learning activities, institutional-level integration of AI remains limited and fragmented. This imbalance highlights the need for higher education institutions to move beyond isolated or experimental applications and adopt more systematic and coordinated approaches to AI implementation. Without such integration, the benefits of AI are unlikely to be fully realized or sustained over the long term. The findings further emphasize that effective AI adoption must align with institutional objectives, sustainability goals, and national development priorities.

Based on the findings of this study, several recommendations are proposed. Higher education institutions should invest in robust digital infrastructure and provide targeted training programs to enhance faculty competence and confidence in using AI-driven tools. Institutional leaders should foster supportive organizational cultures that encourage innovation, collaboration, and openness to technological change. In addition, clear governance structures and ethical guidelines should be established to ensure the responsible and equitable use of AI across teaching, learning, and administrative functions.

At the policy level, national education authorities and relevant government agencies should strengthen alignment between national AI strategies and institutional implementation efforts. This includes providing policy guidance, financial support, and capacity-building initiatives that address disparities between institutions and promote inclusive access to AI-enabled educational opportunities. Future research should focus on longitudinal and comparative studies to examine the long-term impact of AI adoption on learning outcomes, institutional performance, and sustainability. Such studies would provide deeper insights into effective AI implementation strategies and support evidence-based policymaking for higher education in Sri Lanka and other developing country contexts.

References

[1] G. G. Akbar, I. Kania, A. Uhmudin, M. I. Fadlurohman, and N. Nurliawati, "Stakeholder perceptions of AI use in education: Perspectives of teachers, students, and parents in Indonesia," *Srawung Journal of Social Sciences and Humanities*, vol. 4, no. 2, 2025, doi: 10.56943/jssh.v4i2.742.

[2] H. Alzoubi, S. Singh, and R. Kaur, "Artificial intelligence for sustainable development goals (SDGs): A bibliometric review of higher education perspectives," *Journal of Sustainable Education and Innovation*, vol. 18, no. 2, pp. 112–130, 2024.

[3] M. Aflal, A. Rahman, and S. Zubair, "Barriers to artificial intelligence adoption in higher education: Evidence from developing countries," *Education and Information Technologies*, vol. 29, pp. 3451–3472, 2024, doi: 10.1007/s10639-023-12089-7.

[4] Committee on Formulating a Strategy for Artificial Intelligence (CFSAI), *Artificial Intelligence in Sri Lanka White Paper*. Ministry of Transport, Sri Lanka, Mar. 2024. [Online]. Available: https://mot.gov.lk/assets/files/AI20White20Paper20March202024-c09aa49f7990358ad1442103b804511d.pdf

[5] C. Ediriweera, "Integrating AI for sustainable personalized learning in Sri Lankan higher education: A qualitative case study," *Journal of Educational Technology and Development in Asia*, vol. 12, no. 1, pp. 45–63, 2024.

[6] C. Ediriweera, H. Pramudika, and M. T. Fernando, "Harnessing AI for personalized learning: Fostering sustainable educational practices in Sri Lanka's higher education sector," *Colombo Journal of Multi-Disciplinary Research*, vol. 9, nos. 1–2, 2025.

[7] C. Ediriweera, H. Pramudika, and M. T. Fernando, "The influence of AI-driven marketing analytics on strategic decision-making in private educational institutes in Sri Lanka: Moderator role of organisational culture," *Asian Journal of Marketing Management*, vol. 4, no. 2, 2025, doi: 10.31357/ajmm.v4i2.7970.

[8] C. Henadirage and N. Gunarathne, "Adoption of artificial intelligence in higher education institutions: Evidence from Sri Lanka," *Journal of Educational Innovation in Emerging Economies*, vol. 6, no. 2, pp. 77–95, 2024.

[9] J. C. Hilpert, J. Stempien, K. J. van der Hoeven Kraft, and J. Husman, "Personalised learning and adaptive educational technologies: Implications for student engagement and motivation," *Computers & Education*, vol. 195, Art. no. 104684, 2023, doi: 10.1016/j.compedu.2022.104684.

[10] M. P. Ilić, S. Lazarević, and D. Janković, "Artificial intelligence in education: Opportunities, challenges, and future implications," *Journal of Educational Technology Systems*, vol. 50, no. 1, pp. 3–24, 2021, doi: 10.1177/00472395211020427.

[11] P. Jayasinghe, "Artificial intelligence adoption in Sri Lankan universities: Implications for teaching, learning, and administration," *Journal of Asian Higher Education*, vol. 9, no. 1, pp. 1–15, 2024.

[12] K. Kasthuriarachchi, H. Ranaweera, and C. Gunawardena, "Digital transformation initiatives in Sri Lankan higher education," *ICTer Journal*, vol. 11, no. 1, pp. 34–42, 2018.

[13] C. C. Lin, “Education for sustainable development in the age of artificial intelligence,” *Sustainability*, vol. 15, no. 6, Art. no. 5124, 2023, doi: 10.3390/su15065124.

[14] C. C. Lin, A. Y. Huang, and O. H. Lu, “Artificial intelligence in intelligent tutoring systems toward sustainable education: A systematic review,” *Smart Learning Environments*, vol. 10, no. 1, Art. no. 41, 2023.

[15] Ministry of Technology, Government of Sri Lanka, *National AI Strategy for Sri Lanka: Draft Strategy for Public Consultation*, Jul. 2024. [Online]. Available: https://mot.gov.lk/assets/files/NationalAIstrategyforSriLanka-08a88c78d541a0746aeb8c71ed312231.pdf

[16] N. Perera, R. Fernando, and T. Abeysekara, “Adoption of artificial intelligence tools in Sri Lankan higher education: An application of the UTAUT3 framework,” in *AI-Driven Learning Innovations in South Asian Higher Education*. Hershey, PA, USA: IGI Global, 2025, pp. 88–104.

[17] T. Perera, D. Silva, and S. Fernando, “Digital marketing strategies in private higher education institutions in Sri Lanka,” *Asian Journal of Marketing*, vol. 17, no. 2, pp. 89–104, 2023.

[18] H. Rahiman, “AI-empowered learning and teaching engagement in Indian higher education institutions,” *International Journal of Artificial Intelligence in Education*, vol. 34, no. 3, pp. 278–296, 2024.

[19] S. Seneviratne, N. De Silva, and P. Samaranayake, “Artificial intelligence readiness in Sri Lanka: Challenges for the education sector,” *Journal of Information Systems in Developing Countries*, vol. 86, no. 4, Art. no. e12145, 2020, doi: 10.1002/isd2.12145.

[20] S. Sterling and D. Orr, *Sustainable Education: Re-Visioning Learning and Change*. Schumacher Society, 2001.

[21] UNESCO, *Artificial Intelligence Readiness Assessment Methodology for Education Systems*. Paris, France: UNESCO, 2023. [Online]. Available: https://unesdoc.unesco.org/ark:/48223/pf0000386345

[22] United Nations, *Transforming Our World: The 2030 Agenda for Sustainable Development*. New York, NY, USA: United Nations, 2015. [Online]. Available: https://sdgs.un.org/2030agenda

[23] C. Weerarathna, P. Jayasena, and M. Wijesinghe, “E-learning and AI integration in non-state universities: Impact on management students’ academic performance in Sri Lanka,” *Asian Journal of Higher Education Studies*, vol. 10, no. 4, pp. 201–218, 2023.

[24] S. Weerasinghe and R. L. S. Fernando, “University–industry collaboration and graduate employability in Sri Lanka,” *Journal of Education and Work*, vol. 31, no. 3, pp. 259–273, 2018, doi: 10.1080/13639080.2018.1469063.

[25] S. K. C. Wickramasinghe, “The role of higher education in human capital development in Sri Lanka,” *International Journal of Educational Development*, vol. 62, pp. 252–260, 2018, doi: 10.1016/j.ijedudev.2018.03.002.