

AN ANALYSIS OF FACTORS INFLUENCING AI-DRIVEN TOOLS AND TECHNOLOGIES IN HIGHER EDUCATION TEACHING, ASSESSMENT, AND ADMINISTRATION

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ABSTRACT

Artificial Intelligence (AI) is revolutionising higher education by augmenting pedagogical efficacy, refining evaluation methodologies, and optimising academic administration. Higher education institutions are progressively implementing AI-driven solutions, including intelligent tutoring systems, automated grading platforms, learning analytics, chatbots, and predictive analytics, to enhance educational results and operational efficiency. The successful use of AI technology relies on various technological, organisational, individual, and environmental aspects. This article examines the principal issues affecting the adoption of AI-driven tools and technology in higher education institutions. Comprehending these aspects can aid politicians, administrators, educators, and technology developers in formulating effective plans for AI integration and sustained digital transformation. The study adopted a descriptive research design to examine the factors influencing AI adoption in higher education. The research was conducted among faculty members and stakeholders in Coimbatore City. A total of 150 respondents were selected using the convenience sampling method, based on their accessibility and willingness to participate in the study. The collected data were analyzed to understand respondents' perceptions regarding AI-based tools and technologies in higher education. The study concludes that respondents hold a positive perception toward the adoption of AI-based tools and technologies in higher education. Factors such as personalized learning experiences, early identification of at-risk students, reduced administrative workload, and enhanced assessment accuracy were perceived as the most influential benefits of AI adoption. The findings indicate that AI has significant potential to improve teaching effectiveness, student engagement, decision-making, and institutional performance. Although Kendall's Coefficient of Concordance revealed a low level of agreement among respondents, the statistically significant result confirms a meaningful consensus regarding the importance of these factors. Therefore, higher education institutions should encourage the effective integration of AI technologies through appropriate infrastructure, training, and policy support to enhance academic and administrative outcomes.

Keywords: Artificial Intelligence, Higher Education, Technology Adoption, Instruction, Evaluation, Academic Administration and Digital Transformation.

INTRODUCTION

The swift progression of Artificial Intelligence (AI) has transformed numerous areas, including education. In higher education, AI-driven technologies have arisen as potent instruments that facilitate personalised learning, automate administrative functions, boost assessment precision, and refine decision-making processes. Global educational institutions are investing in AI-driven solutions to address the increasing demands of students, staff, and administrators. Notwithstanding the prospective advantages, the use of AI in higher education exhibits considerable variability across institutions. Some institutions have effectively incorporated AI into their academic frameworks, while others encounter obstacles pertaining to infrastructure, expenses, competencies, ethical issues, and organisational preparedness. Consequently, recognising the determinants that affect AI adoption is crucial for optimising its advantages and mitigating implementation obstacles. Furthermore, the study intends to identify the challenges faced by faculty members in adopting AI technologies, including lack of technical skills, inadequate training, and concerns regarding ethical and privacy issues. The research also aims to evaluate the extent to which institutional support and technological infrastructure influence the successful implementation of AI in higher education. Ultimately, the study aims to provide recommendations for policymakers and educational administrators to enhance faculty engagement through the effective integration of Artificial Intelligence technologies.

RESEARCH BACKGROUND

1. Customised Learning Experiences: AI-driven solutions allow institutions to adapt educational content, learning speed, and teaching methodologies to meet the specific needs of each student. Through the analysis of learners' performance, preferences, and progress, AI systems deliver tailored recommendations and adaptive learning trajectories. This tailored methodology augments knowledge retention, accommodates various learning styles, and elevates overall academic performance.

2. Enhanced Student Engagement: Artificial intelligence augments student engagement via interactive learning environments, intelligent tutoring systems, virtual assistants, and real-time feedback mechanisms. These technologies promote active engagement, sustain student attention, and provide significant learning experiences. By catering to individual learning requirements and offering ongoing assistance, AI enhances motivation and academic engagement.

3. Improved Assessment Precision: AI-driven evaluation tools enhance the accuracy and uniformity of assessing student achievement. Automated grading systems minimise human errors and subjective biases while delivering prompt feedback. Utilising advanced analytics, AI can evaluate learning outcomes with greater efficacy, enabling instructors to discern strengths, flaws, and places necessitating further instructional assistance.

4. Diminished Administrative Burden: AI technologies automate repetitive administrative functions including scheduling, attendance monitoring, admissions processing, document management, and student enquiries. This automation alleviates the burden on professors and administrative personnel, enabling them to concentrate on strategic and academic duties. As a result, institutions can markedly enhance production and operational efficiency.

5. Accelerated Decision-Making Processes: Artificial intelligence facilitates swift decision-making by scrutinising extensive institutional data and producing actionable insights. Administrators can employ predictive analytics and data-driven insights to make educated decisions about student performance, resource allocation, enrolment management, and

academic planning. This results in enhanced institutional governance and management efficiency.

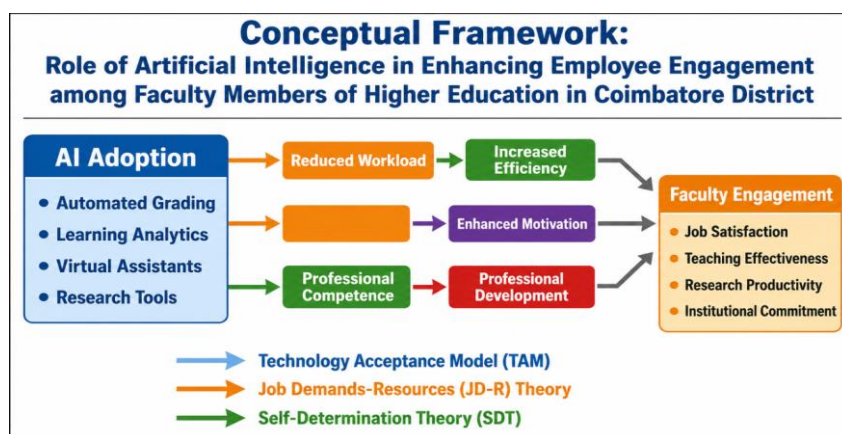
6. Enhanced Resource Optimisation: AI assists higher education institutions in maximising the utilisation of financial, technological, and human resources. Through the analysis of usage patterns and operational data, AI systems can propose efficient allocation options. Enhanced resource management minimises waste, increases productivity, decreases operational expenses, and guarantees the effective utilisation of institutional resources.

7. Early Identification of At-Risk Students: AI-driven predictive analytics can discern students who may be susceptible to academic failure, dropout, or disengagement. Through the observation of attendance, performance, and behavioural trends, institutions can execute prompt interventions and support services. Timely identification allows instructors to tackle difficulties preemptively and enhance student retention rates.

8. Enhanced Operational Efficiency: The use of AI optimises institutional processes through the automation of repetitive operations and the refinement of workflow management. Administrative operations, academic services, and student support activities enhance their efficiency and precision. Improved operational efficiency decreases processing time, minimises errors, and enhances the overall effectiveness and responsiveness of higher education institutions.

9. Augmented Institutional Competitiveness: The implementation of AI technologies bolsters an institution's capacity to compete in a progressively digital and global educational landscape. Advanced educational systems, effective management, and enhanced student performance bolster institutional prestige. Universities that effectively use AI can draw exceptional students, faculty, financial resources, and strategic alliances.

Figure: 1



RESEARCH GAP

Current research on Artificial Intelligence (AI) in higher education has predominantly concentrated on certain applications, including personalised learning, automated assessment, and administrative automation. Nonetheless, scant research has thoroughly investigated the aspects affecting AI adoption in teaching, assessment, and academic administration concurrently. Moreover, numerous researches have been undertaken in developed nations, although actual information from Indian higher education institutions is lacking. There is a deficiency in comprehension concerning stakeholders' opinions of AI adoption and the significance of numerous contributing elements. This study investigates the factors affecting AI adoption in higher education institutions to overcome existing gaps.

SIGNIFICANCE OF THE RESEARCH

The study is significant as AI technologies are progressively revolutionising higher education by augmenting learning experiences, refining assessment methodologies, and optimising administrative activities. Comprehending the determinants affecting AI adoption enables educational institutions to formulate effective strategies for successful deployment. The results offer significant insights for politicians, administrators, and educators concerning the opportunities and challenges linked to AI integration. The study also enhances the existing body of information by identifying critical factors that affect AI acceptability and utilisation. Ultimately, the findings can facilitate informed decision-making and enhance the effective application of AI technologies in higher education institutions.

STATEMENT OF THE PROBLEM

Artificial Intelligence has emerged as a disruptive technology capable of enhancing instruction, evaluation, and academic administration in higher education. The implementation of AI technologies differs markedly among institutions due to technological, organisational, financial, and individual issues, despite its tremendous advantages. Numerous higher education institutions encounter obstacles like insufficient infrastructure, restricted technical proficiency, data privacy issues, and opposition to change. Moreover, there is a lack of comprehension concerning stakeholders' opinions of the aspects that affect AI adoption. Consequently, it is essential to examine and ascertain the principal aspects affecting AI acceptance in higher education to enable efficient implementation and use.

OBJECTIVES OF THE STUDY

The primary objective of this study is to examine the role of Artificial Intelligence in enhancing employee engagement among faculty members in higher education institutions in Coimbatore District. With the growing integration of AI technologies in academic institutions, it is important to understand how these tools influence faculty performance, motivation, and overall engagement in their professional roles.

The study specifically aims to identify Factors Influencing AI Adoption in Higher Education. It also seeks to analyze how AI-based tools contribute to improving teaching efficiency, research productivity, and administrative effectiveness. Another objective of the study is to examine the relationship between AI adoption and employee engagement factors such as job satisfaction, motivation, work involvement, and professional development.

METHODOLOGY

The study adopted a descriptive research design to examine the factors influencing AI adoption in higher education. The research was conducted among faculty members and stakeholders in Coimbatore City. A total of 150 respondents were selected using the convenience sampling method, based on their accessibility and willingness to participate in the study. The collected data were analyzed to understand respondents' perceptions regarding AI-based tools and technologies in higher education.

FACTORS INFLUENCING AI ADOPTION IN HIGHER EDUCATION

The adoption of Artificial Intelligence (AI) in higher education has gained significant attention due to its potential to transform teaching, learning, assessment, and administrative processes. AI-based tools and technologies enable institutions to provide personalized learning experiences, enhance student engagement, improve assessment accuracy, and optimize resource utilization. As higher education institutions increasingly embrace digital transformation, understanding stakeholders' perceptions of the factors influencing AI

adoption becomes essential. Examining these factors helps institutions identify key areas that support successful AI implementation and maximize its educational and operational benefits. The following analysis presents respondents' perceptions regarding various factors influencing AI adoption in higher education based on mean scores, standard deviations, and mean ranks.

Table 1
Perception towards Factors Influencing AI Adoption in Higher Education

Factors Influencing AI Adoption in Higher Education	Mean	Std. Deviation	Mean Rank
Personalized learning experiences	3.86	1.225	5.18
Improved student engagement	3.85	1.229	5.14
Enhanced assessment accuracy	3.86	1.232	5.16
Reduced administrative workload	3.90	1.171	5.17
Faster decision-making processes	3.85	1.176	5.09
Better resource utilization	3.86	1.208	5.10
Early identification of at-risk students	3.89	1.180	5.18
Increased operational efficiency	3.72	1.116	4.42
Enhanced institutional competitiveness	3.74	1.120	4.56

The table presents respondents' perceptions toward factors influencing AI adoption in higher education. Among the identified factors, Personalized Learning Experiences and Early Identification of At-Risk Students secured the highest mean rank of 5.18, with mean scores of 3.86 and 3.89 respectively, indicating that respondents perceive these as the most influential benefits of AI adoption. Reduced Administrative Workload closely followed with a mean score of 3.90 and a mean rank of 5.17, suggesting that respondents highly value AI's ability to automate routine tasks and improve productivity.

Similarly, Enhanced Assessment Accuracy recorded a mean score of 3.86 and a mean rank of 5.16, while Improved Student Engagement achieved a mean score of 3.85 and a mean rank of 5.14, reflecting positive perceptions regarding AI's contribution to teaching and learning effectiveness. Better Resource Utilization (Mean = 3.86, Mean Rank = 5.10) and Faster Decision-Making Processes (Mean = 3.85, Mean Rank = 5.09) also received favorable evaluations, indicating recognition of AI's role in improving institutional management and decision-making.

On the other hand, Enhanced Institutional Competitiveness (Mean = 3.74, Mean Rank = 4.56) and Increased Operational Efficiency (Mean = 3.72, Mean Rank = 4.42) received comparatively lower mean ranks, although their mean scores remained above the midpoint, demonstrating a generally positive perception among respondents. The standard deviation values, ranging from 1.116 to 1.232, indicate a moderate level of variation in respondents' opinions across the factors.

Overall, the findings reveal that respondents hold favorable perceptions toward AI adoption in higher education, particularly regarding its ability to provide personalized learning, identify at-risk students, reduce administrative workload, and improve assessment practices. These results highlight the growing recognition of AI as a valuable tool for enhancing educational outcomes and institutional effectiveness.

Table 2
Kendall's Coefficient of Concordance

N	150
Kendall's W ^a	0.029
Chi-Square	41.237
df	8
Asymp. Sig.	0.000

The results of Kendall's Coefficient of Concordance indicate the level of agreement among the 150 respondents regarding the ranking of factors influencing AI adoption in higher education. The obtained Kendall's W value of 0.029 suggests a low degree of agreement among respondents in ranking the factors. However, the Chi-square value of 41.237 with 8 degrees of freedom is statistically significant at the 1 percent level ($p = 0.000 < 0.01$). The significant p-value indicates that the rankings assigned to the factors are not random and that there is a statistically significant level of consensus among respondents regarding the relative importance of the factors influencing AI adoption in higher education. Therefore, the null hypothesis of no agreement among respondents is rejected. Although the strength of agreement is weak, the respondents exhibit a significant level of consistency in their perceptions toward the factors influencing AI adoption in higher education.

Recommendations for Successful AI Adoption

To maximize AI adoption in higher education, institutions should:

1. Develop comprehensive AI strategies aligned with institutional objectives.
2. Invest in digital infrastructure and data management systems.
3. Provide continuous AI training and professional development programs.
4. Establish ethical guidelines and governance frameworks.
5. Promote collaboration among faculty, administrators, students, and technology providers.
6. Ensure transparency and accountability in AI applications.
7. Strengthen cybersecurity and data privacy protections.
8. Conduct regular assessments of AI effectiveness and impact.

CONCLUSION

Artificial Intelligence is reshaping the landscape of higher education by improving teaching, assessment, and academic administration. However, the successful adoption of AI-based tools and technologies depends on a combination of technological, organizational, individual, environmental, and ethical factors. Institutions that strategically address these factors can enhance educational quality, operational efficiency, and student outcomes. As AI technologies continue to evolve, higher education institutions must develop adaptive strategies that foster innovation while ensuring ethical, transparent, and responsible implementation. Future research should explore the long-term impacts of AI adoption on educational performance, faculty roles, and institutional sustainability. The research reveals that participants possess a favourable view on the implementation of AI-driven tools and technology in higher education. Factors include customised learning experiences, early

detection of at-risk pupils, diminished administrative burden, and improved assessment precision were regarded as the most significant advantages of AI implementation. The results demonstrate that AI possesses considerable potential to enhance instructional efficacy, student involvement, decision-making, and institutional performance. Kendall's Coefficient of Concordance indicated a low level of agreement among respondents; yet, the statistically significant result affirms a substantial consensus on the relevance of these criteria. Consequently, higher education institutions ought to promote the efficient incorporation of AI technologies via suitable infrastructure, training, and policy support to improve academic and administrative results.

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