

The Role of AI in Shaping the Future of Higher Education: An Analytical Study on Curriculum Innovation and Institutional Readiness

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ABSTRACT

The article has effectively explored the aspects of how Artificial Intelligence (AI) is reshaping the development of curriculum and how ready the Universities are for using AI in their educational offerings. The focus of this article is on higher education. The article has looked at how AI is being used nowadays in teaching, as well as learning, and institutional systems. A secondary qualitative research method has been used in the study. This was done with the help of drawing on recent studies and reports. The findings that have been gathered throughout the study reflect that AI is beneficial in making learning personalized and flexible. On the other hand, it is also found that many institutions are not yet fully prepared to implement AI. The study concludes with the description that AI brings great innovation potential, but institutions should also make the planning clear, offer more training to their staff, and implement strong systems.

Keywords: *Artificial Intelligence, Higher education, Curriculum innovation, Institutional readiness, Ethical AI use*

INTRODUCTION

Background and Relevance

The utilization of AI is experiencing rapid growth across many industries, including healthcare, as well as finance, and education. The use of AI in the sector of higher education is significantly contributing to shifting the style of students to learn and teachers to plan their teaching measures (Singh and Hiran, 2022). There are different types of tools, like ChatGPT, as well as AI tutors, and predictive systems that make the tasks easy to personalize learning for students and automate different types of tasks related to their study (Chivose, 2023). AI in higher education includes diverse tools tailored to specific needs-content creation (e.g., Jasper AI), research writing support (e.g., Scite.ai), plagiarism checkers (e.g., Turnitin), humanizing paraphrasers (e.g., QuillBot), and platforms like OpenAI's ChatGPT. Many offer free and paid versions, enhancing institutional teaching and learning efficiency.

Problem Statement

The fact is very true that the use of AI is continually becoming a strong force in education that reshapes the age-old procedures of teaching, learning, as well as university management. On the other hand, there are still several Universities found to exist that have not fully grown up to implement the usage of AI. A report by UNESCO has said in the year of 2023 that there are even fewer than 10% of educational institutions that have and implement very clear strategies for implementing AI in studies (UNESCO-2023).

Aim and Objectives

Aim

The primary aim of this article is to study the factors of how using AI is shifting the ways of Universities to offer education and how ready the institutions are to deal with these changes that may come with AI implementation. This study aims to analyze how AI is driving changes in the curriculum within higher

education institutions. It also seeks to assess the level of institutional readiness for effective AI implementation.

To guide this investigation, the study addresses the following key research questions: (1) In what ways is AI contributing to the reshaping of curriculum design and delivery in higher education? (2) How prepared are institutions to adopt and integrate AI technologies into their academic and administrative systems?

CONCEPTUAL FRAMEWORK

A simple conceptual framework has been created to help understand the actual focus of this article. The

conceptual framework reflects the links between AI and the changes in University courses and the readiness of institutions to use different tools of AI. The conceptual framework is designed focusing on three main areas. These areas include curriculum changes, staff readiness, and the right facilities. All of these areas influence the ability of AI to support the aspects of teaching and learning in higher education. This is how the demonstration of the links in the conceptual framework offers a better picture of how AI may significantly help in the process of enhancing the quality of higher education throughout the world.

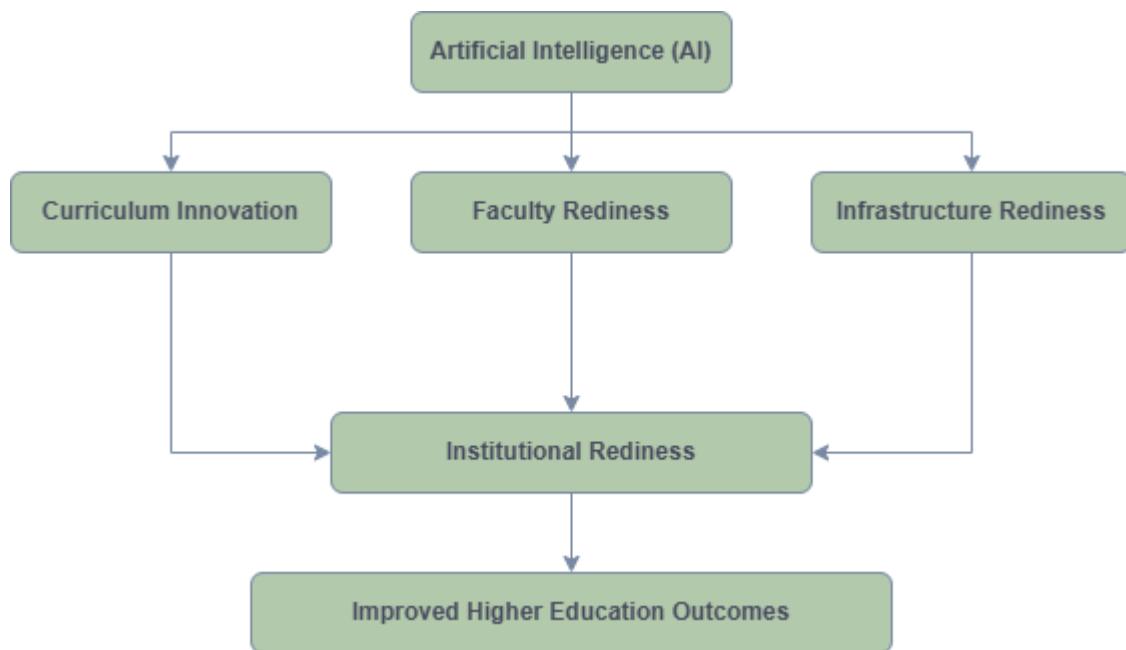


Figure 1: Conceptual Framework

(Source: Self-Developed)

Role of AI in Education

The use of AI nowadays is becoming more important, especially in higher education. This is because it is found to help both aspects of teaching and administration. According to the studies conducted by Aithal and Aithal (2023), there are different types of AI tools, like ChatGPT, that are notably changing traditional models of teaching. As per the author, ChatGPT, Perplexity, Jenni AI, and Linerhelp improve

the aspects of collaboration and encourage critical thinking. Alqahtani *et al.* (2023) have significantly highlighted in their study how the implementation of AI in higher education supports the aspects of learning through personalized feedback as well as automation. Authors like Bearman *et al.* (2023) have reviewed several studies. They have also identified various key narratives around transformative AI and the ethical impacts of AI. The study by Farahani and Ghasemi

(2024) has pointed out the fact that in her study AI is a crucial enabler for opening new access to education. But it is also highlighted that AI may have some risks, like bias and inequality.

Curriculum Innovation through AI

The number of studies that have been written on AI drives significant changes in the courses of universities. As per the findings of Alshammat *et al.* (2024), Adaptive learning systems collect the data of students and use it to adjust the lessons. This is how AI contributes to improving the learning of STEM subjects. On the other hand, Sajja *et al.* (2024) have mentioned how AI significantly assists in learning platforms to help in the matter of increasing the rates of course completion. Authors like Aggarwal (2023) have taken this finding further. He has linked the implementation of AI with IoT. This has been done to offer smart classrooms to the students pursuing higher education. This is how the study has added an extra layer of adaptability to the factor. These specific innovative solutions of AI reflect that the aspects of curriculum design are rapidly evolving towards being more flexible and data-driven.

Institutional Readiness

The fact has been proven by existing studies that not all institutions are equally ready to implement AI in their educational offerings. According to the study conducted by Shwedeh (2024), AI is significant in reducing the admin-related work, but it is also true that there is a need for more leadership training to use AI wisely. On the other hand, Alhammadi and Alhazmi (2025) have offered a six-step model. This specific model talks about aspects like staff training, as well as infrastructure, and ethical planning. Aithal and Aithal (2023) also stressed that there is a need for upskilling of teachers involved in higher education. Alqahtani *et al.* (2023) have mentioned in their study that it is important to have clear rules to efficiently guide the use of AI. This is how together, these studies reflect that the readiness for using AI in higher education significantly depends on several factors, like strong leadership, as well as good planning, and ongoing support.

Gaps in Existing Research

Several studies have effectively explained the factors of implementing the use of AI in learning and teaching. But it is also true that there is very little focus found on

the own experiences and voices of students. On the other hand, there are very few papers that compare how different types of universities prepare students for using AI in their learning. This is why more research is needed, especially on the long-term effects of AI in real classroom practices.

METHODOLOGY

Research Design

The article has followed the design of quantitative primary research (Cheong *et al.*, 2023). It has done a survey. It has been done to explore the factors of how AI is continually contributing to shaping the aspects of higher education.

Data Collection

The information gathered for the compilation of this study was primarily collected through a structured survey conducted among the target population. The survey consisted of both closed- and open-ended questions designed to capture quantitative and qualitative insights. Participants were selected using purposive sampling to ensure relevance to the research objectives (Taherdoost, 2021). The responses were then systematically recorded and analyzed to draw meaningful conclusions.

Data Analysis

The study was designed based on a primary survey method. A structured questionnaire was distributed to a targeted group of respondents to collect first-hand data relevant to the research objectives (Hussain *et al.*, 2023). The survey focused on key themes including curriculum redesign, integration of AI tools, staff development, and policy changes. To analyze the relationships between these variables, regression analysis was applied. This statistical method helped determine the strength and nature of the influence each factor had on the overall effectiveness of educational transformation initiatives.

This analysis, conducted on July 12, 2025, examines data from 100 participants regarding their roles, institutional affiliations, and experiences in higher education, along with their perceptions of AI.

Demographics and Institutional Affiliation:

A survey reveals that most respondents are Administrator/Management staff (48.0%), with IT or

Technical staff and Lecturer/Teaching staff making up 23.0% and 22.0% respectively. A smaller portion consists of Students (4.0%) and "Other" (3.0%). In terms of institution type, Technical or Vocational Institutions and Private Universities dominate, accounting for 48.0% and 39.0% of affiliations. Public Universities represent 9.0%, and "Other" institutions comprise 4.0%. Regarding experience, the majority of respondents (53.0%) have 4-6 years of experience in higher education, while 34.0% have 1-3 years. Only a small percentage has less than 1 year (6.0%) or more than 6 years (7.0%). Finally, the "AI-favored" variable, indicating perceptions of AI in education, has a mean of 14.12 with a standard deviation of 2.53174.

Key Findings from Correlations (Pearson):

The " AI-favored " variable, which represents a favorable perception of AI, demonstrates strong positive correlations with several key aspects of AI integration in educational institutions. Specifically, there is a strong positive correlation ($r = 0.591, p < 0.001$) between " AI-favored " and respondents' ratings of their institution's use of AI tools in teaching and learning, suggesting that those who favored-AI also perceive their institution as utilizing it effectively. Similarly, a strong positive correlation ($r = 0.557, p < 0.001$) exists with the belief that AI improves the quality of education delivery, indicating that a positive perception of AI is linked to a perceived enhancement in educational quality. Furthermore, " AI-favored " shows a strong positive correlation ($r = 0.582, p < 0.001$) with the types of AI applications adopted by the institution, implying that a broader or more advanced adoption of AI applications aligns with a more favorable view of AI. There is also a strong positive correlation ($r = 0.552, p < 0.001$) with the perceived readiness of the institution to widely adopt AI, suggesting that individuals who are more favorable towards AI also believe their institution is prepared for its widespread integration. A statistically significant, albeit weaker, positive correlation ($r = 0.198, p = 0.048$) was found between " AI-favored " and whether the institution provides training on AI tools or their ethical use, indicating that even limited training is associated with a more positive outlook on AI. Conversely, the "biggest challenge an institution faces in implementing

AI" shows a weak and statistically non-significant positive correlation ($r = 0.133, p = 0.186$) with " AI-favored," implying that challenges, while present, don't strongly deter a favorable view of AI. Finally, whether an institution has introduced AI-related topics or skills into its curriculum has a non-significant negative correlation ($r = -0.099, p = 0.325$) with " AI-favored," suggesting that curriculum integration doesn't necessarily align with a more positive overall perception of AI among respondents.

These results suggest that a positive perception of AI in institutions is strongly linked to the current use and adoption of AI tools, beliefs about AI's educational quality improvement, and institutional readiness for wider AI adoption.

The regression analysis examined the relationships between several variables related to AI in higher education. Two separate regression models were run.

Regression Model 1: Dependent Variable - "Has your institution introduced AI-related topics or skills in its curriculum?" (Q2)

Model Fit: The model achieved an R-squared value of approximately 0.211, meaning that about 21.1% of the variance in whether an institution has introduced AI-related topics or skills in its curriculum can be explained by the predictor variables. The adjusted R-squared is 0.160, indicating a moderate fit when accounting for the number of predictors. The F-statistics of 4.146 ($p < 0.001$) suggest that the overall model is statistically significant.

Significant Predictors:

"Do you believe AI improves the quality of education delivery in your institution?" (Q3) is a significant negative predictor ($p < 0.01, B = -0.223$). This suggests that for every unit increase in the belief that AI improves educational quality, there is a decrease of approximately 0.223 units in the likelihood of the institution having introduced AI-related topics or skills. This inverse relationship is unexpected and warrants further investigation.

Non-Significant Predictors: The other predictor variables ("How would you rate your institution's use of AI tools in teaching and learning?" (Q1), "Which type

of the following AI applications has your institution adopted?" (Q4), "Has your institution provided training on AI tools or their ethical use?" (Q5), "To what extent do you think your institution is ready to adopt AI widely?" (Q6), and "What is the biggest challenge your institution faces in implementing AI?" (Q7) found not statistically significant in this model.

Regression Model 2: Dependent Variable - "How would you rate your institution's use of AI tools in teaching and learning?" (Q1)

Model Fit: This model has an R-squared of approximately 0.250, indicating that about 25% of the variance in an institution's rating of AI tool usage in teaching and learning can be explained by the included predictors. The adjusted R-squared is 0.201, suggesting a reasonable fit. The F-statistic of 5.159 ($p < 0.001$) signifies that this overall model is also statistically significant.

Significant Predictors:

"To what extent do you think your institution is ready to adopt AI widely?" (Q6) is a significant positive predictor ($p < 0.05$, $B = 0.221$). This implies that institutions perceiving themselves as more ready for widespread AI adoption tend to rate their use of AI tools in teaching and learning higher.

"What is the biggest challenge your institution faces in implementing AI?" (Q7) is also a significant positive predictor ($p < 0.05$, $B = 0.221$). This is an interesting finding, suggesting that despite facing challenges, institutions with more perceived challenges might also be those actively engaging with AI, leading to a higher rating of AI tool use.

Non-Significant Predictors: "Do you believe AI improves the quality of education delivery in your institution?" (Q3), "Which type of the following AI applications has your institution adopted?" (Q4), "Has your institution provided training on AI tools or their ethical use?" (Q5), and "Has your institution introduced AI-related topics or skills in its curriculum?" (Q2) were not statistically significant predictors in this model.

The regression analysis reveals varying relationships between the perception and implementation of AI in higher education institutions. The first model indicates a counterintuitive negative relationship between the belief in AI's educational quality improvement and the

introduction of AI-related curriculum, which warrants deeper qualitative exploration. The second model suggests that an institution's perceived readiness for AI adoption and the challenges it faces are positively associated with its self-reported use of AI tools in teaching and learning. This implies that engagement with AI, even in the face of challenges, is linked to higher reported usage. Further research could explore the nuances of these relationships and the factors contributing to the observed patterns.

DISCUSSION

Curriculum Innovation

The use of AI continues to shape how university courses are designed and delivered. It is especially evident in institutions that are striving for flexibility and innovation. A key finding from this study is the **positive correlation between favorable perceptions of AI and institutions' readiness to adopt AI tools**. This finding echoes the existing literature that highlights the role of AI in modular and self-paced learning (Fong *et al.*, 2022). Participants from technical and vocational institutions reported a strong level of support for the adoption of AI despite infrastructural limitations. It possibly happened because of the limited access to in-person resources. Here is a clear alignment with Wongvorachan *et al.* (2022), who have found to observe the fact that real-time AI feedback provides the opportunity for the remote learners to track their level of performance and the gaps in learning in a better way.

It is true that many believe AI improves the quality of teaching. But this perception showed a **negative statistical relationship with actual AI curriculum implementation. This is why the perception suggests a clear disconnection between belief and action**. This mirrors the study by Kakar *et al.* (2024). The author of the study has noted that while AI tools like Georgia Tech's "Jill Watson" have gained popularity, their adoption is often concentrated in higher-ranked as well as well-resourced institutions. This is why the geographical remoteness and institutional status may moderate the depth of AI integration. These findings highlight that enthusiasm for AI is not always matched by systemic changes, particularly in lower-tier or rural institutions. Future strategies should consider contextual barriers to bridge this gap between perception and implementation.

Georgia Tech is found to use an effective AI teaching assistant, namely "Jill Watson" (Kakar *et al.*, 2024). This specific AI assistant significantly helps educators to answer the queries of students in different types of online forums. On the other hand, the use of AI-enabled labs at MIT also provides the opportunity for students to perform simulations (Lim, 2021). This is how the students at MIT are working on improving their learning in subjects that are related to science. These are the specific AI-enabled changes in higher education that lead to the betterment of student engagement. On the other hand, they are also improving the concept of

personalized learning. According to a report provided by EDUCAUSE in the year of 2025, approximately 69% of students reported a higher level of satisfaction with the use of AI in their institutions for their studies (Muscanell and Gay, 2025). But it is also true that AI in education may lead to significant concerns. Some of the students may become overly dependent on AI. This may reduce the capabilities of students to solve problems on their own. On the other hand, not all students have equal access to the technology. The issue may significantly increase the existing gaps in learning.

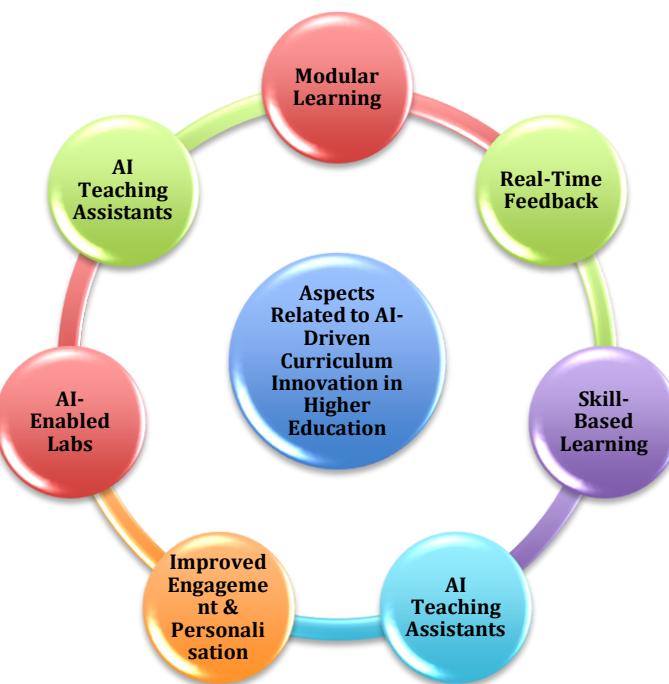


Figure 2: Aspects Related to AI-Driven Curriculum Innovation in Higher Education

(Source: Self-Developed)

Institutional Readiness

The top Universities across the world are now being found to test different types of AI tools in classrooms as well as in administration. The popularly known Oxford University and Stanford University have introduced different types of pilot projects with the help of AI to provide personalized learning and support for research (Callahan *et al.*, 2023). But not all institutions are able to keep up with the trend. A survey by EDUCAUSE in the year of 2025 has shown that the use of generative

AI in educational courses is somewhat limited. Only 43% of the students are using AI for the improvement of their studies (Muscanell and Gay, 2025). Similar to this, many of the universities still found to face a lack of trained staff and appropriate guidelines.

The level of readiness among educational organizations for implementing AI often depends on three main factors. These specific factors include budget, the mindset of staff, and digital skills. Institutions without resource limitations are more able to invest in

technology and training (Tien *et al.*, 2022). On the other hand, other universities usually face a struggle regarding limited resources. Hesitant staff without enough confidence in using AI tools also sometimes leads to challenges. This is why it is very crucial for universities to work on enhancing their infrastructure, providing ongoing training, as well as setting up clear ethical rules for implementing proper use of AI within the classrooms. A continually increasing gap between well-prepared and under-prepared institutions is also noted. This gap is significant, especially in developing regions. The divide may lead to unequal distribution of

opportunities for students. This is how it may make it hard for the students to benefit from the progress AI brings to education and beyond. In response to this, there are several initiatives like India's National Education Policy (NEP) 2020 and the National Digital Education Architecture (NDEAR) that are found to be pivotal (Ram, 2021). The primary aim of these specific programs is to integrate technology at scale as well as promote the training for teachers, and ensure inclusive access is available to digital tools. This is how the initiatives are driving long-term innovation across diverse institutions.

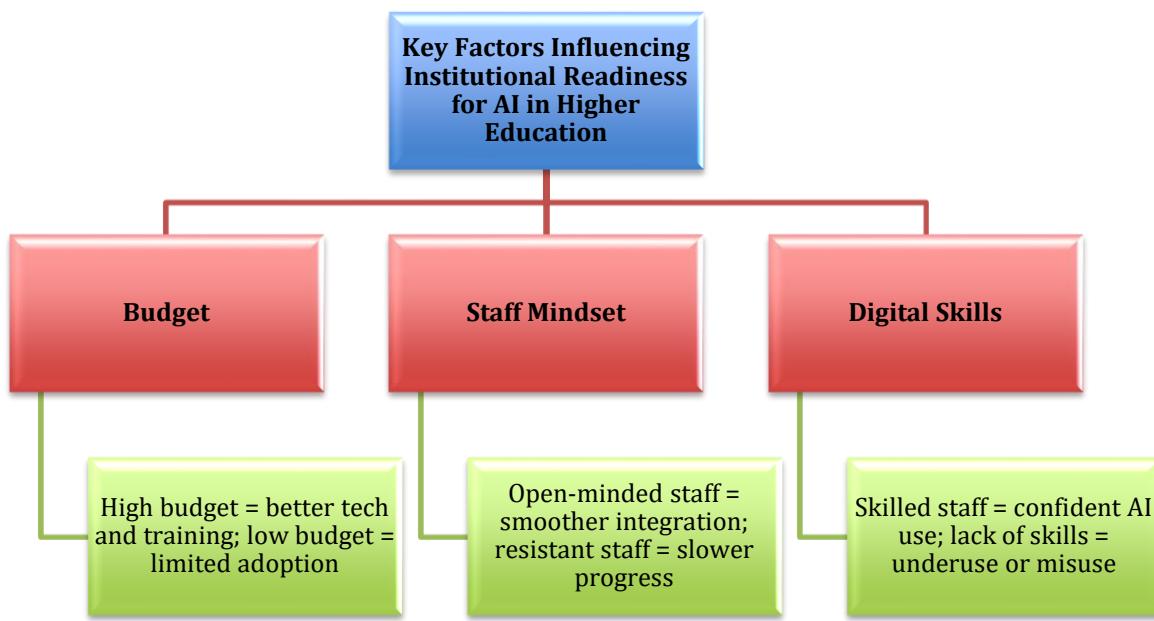


Figure 3: Key Factors Influencing Institutional Readiness for AI in Higher Education

(Source: Self-Developed)

CONCLUSION AND RECOMMENDATION

The overall reflection on the article suggests that the implementation of Artificial Intelligence in higher education is contributing to bringing crucial changes. These changes are especially evident in the increasing flexibility of teaching techniques as well as in the introduction of new types of courses in the organizations. But it is also found that not all of the universities are equally ready to use AI tools in education-related aspects. The unevenness in the progress highlights the need for a shared national or

global plan that will guide the use of AI in education. This is why the recommendations say that there should be stronger partnerships between different types of technology companies and educators. On the other hand, it is also very crucial to offer more support and training for staff. Rules and regulations may also be established on the ethical use of data. Future studies may significantly look at how the implementation of AI influences the learning of students over time. The preparedness of countries to use AI in their universities may also be compared for further information.

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