Implementing AI in Higher Education Institutions (HEIs) in India – Examining the need for transformational leadership

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Introduction & Purpose of the study

The article discusses the process of implementation of artificial intelligence (AI) in the educational process of higher education institutions (HEIs) and examines how this process can be facilitated by the use of transformational leadership. Rapid advancements in artificial intelligence have brought about profound changes in various aspects of our lives, including the realm of higher education (Popenici & Kerr, 2017).

The use of artificial intelligence and current advanced technologies has been found to assist instructors and students to gain more educational experience, as well as giving information to teachers and management about the practices and scope of artificial intelligence in education necessary to achieve greatness (Alotaibi & Alshehri, 2023). Hence, it is in the best interests of the Indian higher education sector to adopt AI and machine learning technologies wherever possible.

There is widespread discussion on the transformative potential of AI, especially in the higher education sector. It has been noted that higher education institutions (HEIs) are notably behind their corporate counterparts in widespread adaptation toward AI product experimentation and adoption. The aim of the study is not to understand the reason for the backwardness but to focus on those HEIs where there is significant and dedicated effort to implement partially or fully in the relevant processes. The study focuses on how this implementation can be facilitated. The study aims to study whether transformational leadership can help in overcoming the challenges of implementation and help in speedier and relevant implementation of AI in HEIs.

There are numerous studies in the present literature on the implementation of AI in HEIs. Most of the studies discuss the potential of using AI and technologies related to machine learning. The studies also stressed on the benefits accrued to HEIs due to the use of AI and how students and staff members of the institutions can benefit from AI. It is noted that each study outlines one or more

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challenges and problems that are encountered during the implementation of AI and related technologies in the educational process of HEIs.

Number of studies can be found where the study probes into the AI implementation in Indian HEIs, mostly universities. Challenges are mentioned and their effect on the implementation process has been widely discussed. But there is no discussion on specific and targeted measures to handle and manage these problems during AI implementation, especially in Indian HEIs.

The study focuses on this gap. While these challenges of AI implementation may be dealt with in several ways, use of transformative leadership has received lot of support from academicians and heads of institutions. This study endorses the use of the parameters of transformative leadership in effective and creative manner so that the expected outcome is achieved by the HEIs.

The structure of the study is as follows: review of previous literature, methodology followed, data analysis and finally results and conclusions along with limitations and outlook.

Literature Review

Artificial intelligence (AI)

Artificial intelligence (AI) refers to computer systems capable of performing complex tasks that historically only a human could do, such as reasoning, making decisions, or solving problems.

Academicians, educators, and higher education institutions are continuously seeking methods to enhance the value and quality of learning experiences for students (Crosling et al., 2007).

Importance of AI in the higher education industry

Universities and other HEIs have shown interest to integrate AI into the education process. The widespread acceptance of AI is due in large part to the realisation that it may provide solutions to several issues and introduce exciting new avenues of study in the classroom. HEIs are always looking for ways to do away with routine and repetitive tasks and provide customized and relevant information to the students. AI is expected to provide solutions in this direction (Igbokwe, 2023).

Educational technologies and platforms powered by artificial intelligence are revolutionising the way HEIs educate the students. These platforms provide flexible and adaptable learning settings that may be tailored to the students' needs. Education institutions are also using AI to improve efficiency in administrative tasks. The use of AI to automate previously labour-intensive tasks like admissions, resource allocation, and attendance tracking is on the rise.

Opportunities provided by AI in HEIs

Previous studies demonstrate that AI can provide several opportunities to HEIs so that they may achieve the organizational objectives and enhance the learning process. They are:

Personalized Learning: AI technologies possess the aptitude to scrutinize extensive datasets and deliver customized learning encounters that are meticulously attuned to the unique requirements, inclinations and cognitive preferences of individual learners. Empirical investigations have substantiated that adaptive learning systems propelled by AI evince a substantial enhancement in student engagement, academic accomplishment, and retention rates of students (Akinwalere & Ivanov, 2022).

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Optimized Teaching and Administrative Processes

The integration of AI can automatize routine administrative responsibilities including tasks such as grading, data administration, and scheduling. This would provide an opportunity for faculty and staff to allocate their efforts towards more strategic tasks. Previous studies have indicated that instructional design and delivery supported by AI can result in more constructive pedagogical practices. This is shown to lead to improved learning outcomes (Hemachandran et al., 2022).

Enhanced Student Support Services: There are many research articles that explain the effective use of chatbots, and virtual assistants propelled by AI in HEIs. It has been shown that the use of such technological aids can offer round-the-clock support to students, extending aid in areas such as course enrolment, academic advisement, and career counselling. It has been shown in previous studies that AI-driven student support services have the capacity to enhance student satisfaction, engagement, and academic attainment.

Advanced Learning Analytics: AI has the capability to scrutinize voluminous datasets stemming from student interactions with educational technologies, thereby unearthing profound insights into learning behaviours, performance trends, and cognitive inclinations. Empirical investigations have underscored that data-informed approaches facilitated by AI can illuminate curriculum design, optimize learning trajectories, and foster enhanced student outcomes (Ahuja & Bala, 2021).

Challenges faced by HEIs when implementing AI

HEIs often resort to technology to achieve higher level of efficiency and accuracy. AI is one of the technologies being used by HEIs in India at present. But previous studies have shown that HEIs face multitude of challenges while implementing AI (Kuleto et al., 2021). The successful integration of AI into the learning process of HEIs necessitates faculty and staff to cultivate novel proficiencies and expertise. Previous studies have revealed that the integration of AI poses a significant challenge as the faculty and staff of HEIs are not ready for this adoption. The reluctance on the part of the faculty and staff may be an expression of resistance to change and/or lack of technical capacity and know-how. This provides an additional challenge to the management of HEIs to provide professional development opportunities and robust support systems for the faculty and staff (Crompton & Burke, 2023).

Methodology

This research article discusses the impact of transformational leadership on the implementation of artificial intelligence in the processes of HEIs. This research is aimed at studying the challenges faced by leadership of HEIs to successfully implement the adaptation of AI in various processes of HEIs. This study used semi-structured interviews to elicit opinions from leaders of HEIs who are in the process of implementing AI or planning to implement AI in various processes in their organizations. The questionnaire was adapted from the study conducted by Shwedeh et al, 2024 on the students of HEIs in UAE to determine AI adoption and educational sustainability. (See Appendix 1)

Data collection

The authors chose the semi-structured interviews as a tool for collecting information as this method has several advantages.

In comparison to the questionnaire method, the rate of responses was higher.

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This method is well suited to the exploration of attitudes, values, beliefs and motives of use of AI in the selected field. As the implementation of AI in this field is low compared to other sectors, an in-depth study of perceived challenges and benefits is possible using semi-structured interviews (Barriball & While, 1994).

Using this method, the researchers can avoid situations where respondents provide responses that they feel are expected from them instead of factual or practical responses.

The length of the interview can be varied depending on the responses made by the respondents. More time can be spent with a respondent with multiple perspectives or experiences. This option cannot be exercised while using a questionnaire.

The respondents for this study included heads of the departments (HODs), registrars, senior professors and other academicians working in Higher Education Institutions (HEIs). The study targeted those members of the HEIs who were directly responsible for implementation of process improvement strategies or had strong knowledge of the modalities of these processes. The authors reached out to those individuals who described themselves as playing any of the roles mentioned above. Some of them were in the co-authors' network and others were contacted by the authors through the social media, like LinkedIn and through personal emails.

The preliminary contact with the prospective respondents was in the form of a message that explained the general outline of the study. The recipient was informed about the purpose of the study and information. Keeping in mind the ethical guidelines for conducting interviews, participants were assured of the confidentiality and anonymity of their responses. Further to their informed consent to participate in the study, a second interview was conducted. The interview design was semi-structured guided by an indicative list of questions. Interviewees were given the flexibility to attain deeper insights into the study purpose.

Analysis

Opinions and viewpoints of 34 respondents were finally considered for the study. The details of the designations of respondents is presented in the table below.

S. No	***Designation***	***Number of respondents (N=34)***
1.	***Senior Professor***	***3***
2.	***Professor***	***7***
3.	***Associate Professor***	***5***
4.	***Assistant Professor***	***2***
5.	***Dean***	***1***
6.	***Associate Dean***	***3***
7.	***HOD***	***11***
8.	***Director***	***1***
9.	***Founder***	***1***

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The affiliation of the respondents is shown in the table below:

Description of HEI	*Number*
Privately owned Deemed-to-be University	*12*
Central university (Institute of eminence)	*8*
Public University	*5*
College affiliated to a technological University	*5*
B-School	*4*

The interviews contents were transcribed, and open, axial and selective coding was adopted. Using open coding, the authors meticulously dissected the data, assigning initial codes to capture the fundamental concepts present. This stage facilitates unbiased exploration, and authors did not force-fit data into pre-existing categories.

Next, axial coding was employed to subcategorize the data within each category. Building upon the initial codes, authors started categorizing and interlinking them to form more comprehensive themes. The aim was to identify connections and relationships between these categories.

Finally, through selective coding, all categories were unified around a core category representing the central phenomenon of the study, namely how transformational leadership helped in the implementation of AI. The authors refined and established the links between this core category and other concepts.

Throughout the data collection, authors consistently compared new data with existing codes and categories, refining their understanding and allowing the concept to evolve organically.

The grounded theory approach adopted in this study, allowed factors to emerge more inductively with respect to the study context and the constant comparative method ensured consistency in the qualitative process.

Data analysis

LinkedIn was sourced for probable candidates. Individuals who corresponded to the criteria described in section 3 were sourced from followers' accounts, network lists and general listings in LinkedIn. 125 candidates were identified as probable candidates who can provide relevant and accurate information regarding adaptation of educational AI in HEIs. They were notified about the study using a brief note which detailed the scope and objectives of the study. The note also indicated the kind of questions that the respondents can expect to answer. 46 of the 125 respondents responded positively; they were sent the AI questionnaire (see Table 1). The respondents were given a choice to answer the questions via email or through phone conversations.

34 of the 46 respondents responded to the questionnaire, out of which 12 were received via email and 8 respondents spoke to the authors on the phone. The phone conversations were recorded after seeking prior permission from the respondents and were transcribed to reveal the conversation

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points. 3 of the respondents sent voice recordings via WhatsApp and they were duly transcribed. The remaining 14 candidates sent the questionnaires with their responses.

From the compilation of respondents' opinions and viewpoints, the following points could be noted.

With respect to the respondents' attitude towards adoption of AI in educational processes in HEIs, the following observations found support from the respondents.

30 out of the 34 respondents feel that 'Future applications are possible thanks to AI technology'

18 out of 34 opine that 'Because it offers opportunities for rich material in educational settings, AI is innovative'

14 out of 34 feel that 'In comparison to the previous method, AI technology allows me to save time and effort'

22 out of 34 feel that 'The requirements of the academic personnel are met/not met by IA technology

It was found that AI was being applied or proposed to be applied to five major areas of educational processes in the HEIs in India. These areas are automatic assessment, creating tests & assignments, feedback, personalized learning and support to the students of the HEIs (Hooda et al., 2022).

Further, various sub-fields where AI and AI-related tools were being used were identified. As part of improving the speed and accuracy of assessment, AI was being used (or proposed to be used) in evaluating multiple choice questions (MCQs) and subjective answers with the help of the provided answer keys. Grading of essay or long answers using AI was not being attempted (except for 1 HEI), the reason being that it involves much higher levels of technology and preparation and may be put in practice soon.

Respondents also disclosed that the most wide-spread use of AI was in providing timely and accurate responses to student queries. Many HEIs had facial recognition systems in place for identification and verification of students during exams and assessments. Few HEIs have started taking steps to undertake data assessment and predictive analytics for predicting the needs of students, both prospective and presently studying.

The most significant observations from the respondents were the responses to the question 'Any other observations?' Several important points were mentioned by the respondents who strategized and/or implemented AI adaptation in their respective HEIs. Various challenges and problems are likely to surface during the visualization, implementation and subsequent use of technology. Similarly, these respondents brought forth a few issues that included ethical validity, security of student and university data, cost of technology, in-house or outsource dilemma, etc. There was unanimity that this implementation caused concerns about job displacement of faculty and non-faculty roles. The reasons for these challenges and ways to deal with them were discussed by the respondents.

The salient features of AI implementation is presented in the table below:

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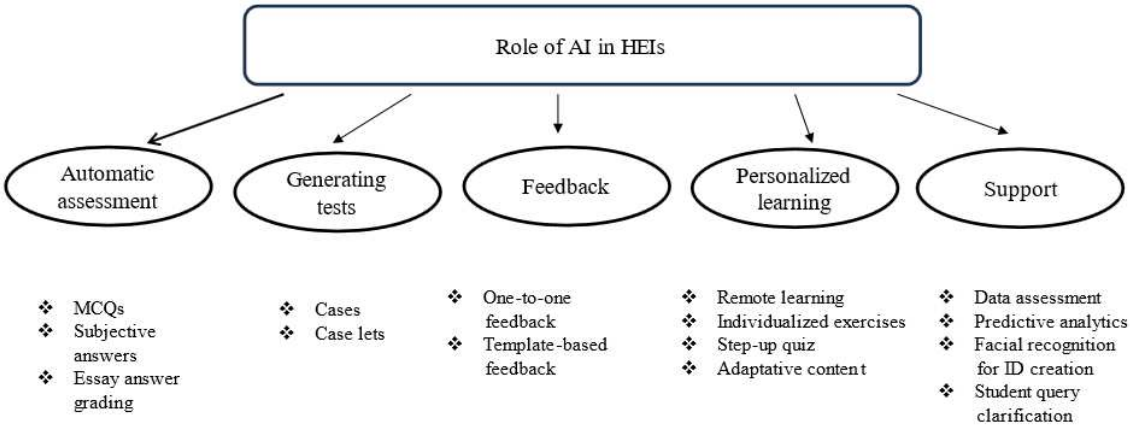

Results and conclusions

Adoption of semi-structured interviews methodology proved apt for this study as it elicited free and frank opinions and freed the interviewers from the confines of rigid questions. Artificial intelligence has immense potential to enhance human capabilities and drive growth in the higher education industry. It is projected to greatly improve governance, and education outcomes. However, the adoption of AI tools in HEIs has picked up only after the COVID epidemic (since 2020-2021) (Ranjan et al., 2021). The respondents have admitted to being plagued by self-doubts regarding the dimensions of changes and the cost of implementation and training. There is a great deal of discussion on whether AI can deliver the value to learners and learning process and how it can prove to be better than the existing conventional systems (Bates et al., 2020).

Apart from this, the respondents also mentioned the difficulties encountered during the implementation of the AI tools in various processes of the HEIs. Previous studies have highlighted the need for transformational leadership and how it can be effectively applied to the higher education industry (Tarisayi, 2024). Transformational leadership means that the leader motivates his or her followers by acting as a positive role model, being caring and nurturing, and encouraging independent and creative thinking (Prestiadi et al., 2020).

Transformation has become an increasingly important theme in higher education and can refer to changes in institutional culture and structures, curriculum development, as well as academic and student experiences (Shwedeh et al., 2024). Interviews with respondents have revealed some success stories where leaders used transformational leadership to facilitate, motivate and ensure smooth transitions during the AI implementation. Some of the measures adopted by the leaders are detailed below:

Acting as role models: The HOD of a private university explained how he acted as one of the team members during the implementation of automatic evaluation using AI. He freely expressed his doubts and highlighted his learning experience in full view of the team. This encouraged the team to share their ideas openly and reduced resistance to the tool.

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Stressing on the benefits instead of problems: One respondent who was the head of the student services wing of a science and technology institute explained about a recent experience. The institute decided to install a facial recognition software to monitor student attendance in various classes and labs. The student services wing executives were apprehensive that this system would lead to job cuts and as a result were uncooperative and sullen during the implementation. The head of the services wing explained to the authors that many rounds of discussions were needed to reassure the executives. The benefits of the system and the policies of the management towards manpower had to be explained in detail to inspire confidence in the executive. The head reported to the authors that the discussions led to successful implementation and the student services staff were satisfied with the tool and its working.

Critical thinking and problem solving: This measure is a part of transformational leadership and was reported by three respondents. One of the respondents was a senior professor and was in-charge of installation Chatbots. This was meant to replace the FAQ system that was found in the LMS of the HEI. Extremely complicated machine learning algorithms were used to create the Chatbot. The respondent explained to the authors that he along with the software executives of the university enrolled in an online course to understand the working of the installation. Similar measures were reported by other respondents (Rodríguez-Abitia et al., 2021).

Limitations and future research

The study suffers from certain limitations. One of them is the small sample size (34). A larger sample size would have offered more insights into the way leaders managed and transformed the student experiences and learning processes by implementing AI. However, the semi-structured interview method requires a large amount of time spent on respondents which limits the number of discussions.

The other limitation is that some challenges were foreseen but not yet experienced as the implementation was work-in-progress. Further updates are required to understand the full spectrum of challenges faced by educators.

As AI and ML technologies are in the nascent stage of being applied to the education industry, the field invites a close look at the way HEIs implement and use AI. The authors feel that there is a huge scope for further research into this topic at various levels of higher education like B-schools, engineering colleges, pharmacy and medical colleges, online and distance education departments etc.

In conclusion, the opportunities and challenges of AI in higher education are significant and complex, and responsible implementation is crucial. By taking a proactive and transformative approach, HEIs can leverage the potential of AI for positive transformation in higher education while addressing the challenges and ensuring responsible use. As AI continues to evolve, it is imperative for HEI stakeholders to stay informed, collaborate, and adapt to the changing landscape of AI-driven transformations in higher education. With responsible implementation, AI has the potential to enhance the quality, accessibility, and effectiveness of higher education, benefiting students, faculty, and institutions alike and the industry as a whole.

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Appendix 1

Implementation of AI in your organization and your perspective on the need and

challenges of AI implementation

1. My organization/department is prepared to use AI technology in its educational programs.

2. My organization/department is prepared to modernize its educational platforms and use AI in

them.

3. The existing educational system is compatible with AI technology.
4. The learning styles and teaching methods are compatible with AI technology.
5. AI is incompatible with the existing educational framework.
6. Future applications are possible thanks to AI technology.
7. Future educational activities can be assessed with the aid of AI technology.
8. Because it offers opportunities for rich material in educational settings, AI is innovative.
9. Compared to previous technologies, AI offers more educational functions.
10. In comparison to the previous method, AI technology allows me to save time and effort.
11. The use of AI in education is incompatible with present educational models
12. At the institutional level, artificial intelligence is broadly recognized.
13. Many users of AI in modern culture are familiar with the technology.
14. Students and academic staff favour AI technology.
15. IA technology was created by other nations and suits societal demands.
16. At the institutional level, demand is considerable for AI technology innovation characteristics.
17. The requirements of the academic personnel are met/not met by IA technology
18. Any other observations? Overall, your opinion on

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