Artificial Intelligence in Higher Education: Faculty Perceptions of Integration and Other Considerations

Disclosures

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Abstract

This research explores the integration of Artificial Intelligence (AI) in higher education, focusing on faculty perceptions, challenges, opportunities, and ethical considerations. This research uses a survey-based approach to explore faculty members' perceptions regarding AI's potential to enhance teaching and learning. Although AI offers promising opportunities for personalized education and administrative efficiency, concerns about data privacy, ethical implications, and the digital divide persist. These findings highlight the need for comprehensive training, institutional support, and policies to ensure responsible AI use. This research contributes to the ongoing dialogue on AI's role in shaping the future of higher education, providing insights for policymakers, administrators, and faculty.

Keywords: AI, Challenges, Opportunities, Ethics

Introduction

Integrating artificial intelligence (AI) into higher education has become a pivotal area of exploration, as institutions grapple with the challenges and opportunities presented by this industry-disrupting technological advancement. The term AI is often defined as a machine designed to learn and capable of performing tasks that need human intelligence (Luckin et al., 2016; UNESCO, 2021). The most popular integration of AI in higher education is generative AI, which can be defined as "computational techniques that are capable of generating seemingly new, meaningful content such as text, images, or audio from training data" (Feuerriegel et al., 2024, p. 111). This research is timely, essential, and emerging at a critical juncture for strategic planning, resource allocation, and policy formation in higher education.

The significance of this research lies in its relevance to current trends and future projections. AI's potential to revolutionize and disrupt higher education is immense, especially as it evolves and becomes more "intelligent." This research surveyed previous studies on Computer-Assisted Instruction (CAI) and Intelligent Tutoring Systems (ITS) because of their relevance to current AI efforts in education. It also examines how AI is utilized in higher education, focusing on faculty perceptions, challenges, and opportunities. The insights gained are vital for informing strategic decisions and policies at both system and institutional levels.

The contributions of this research to the field are multifaceted. It provides findings that move beyond theoretical discussions surrounding AI in academia by gathering and analyzing data from faculty across higher education. It also aims to offer insights into AI adoption and ethical use, thereby providing a preliminary overview of how AI is reshaping educational practices and implications for stakeholders.

The implications of this research can be extended to various stakeholders in higher education. Faculty can gain insights into AI's potential to augment teaching, research, and student engagement, underscoring the need for professional development in this area. Administrators can learn about the necessary infrastructure and support systems for successful and ethical AI integration, and the potential for AI to enhance efficiency and decision-making processes. At the policy level, this research provides evidence-based recommendations for crafting guidelines and policies that foster ethical AI practices in higher education.

This research offers valuable insights into the current state and future potential of AI in higher education, focusing on the perspectives and experiences of faculty. The findings can inform strategic planning, practice, and policy formation, providing a meaningful contribution to ongoing conversations concerning AI’s role in shaping the future of higher education.

In the following sections, the authors provide background information on the significance of AI in higher education, examine existing research on AI's applications, challenges, and opportunities, and describe the research design, data collection methods, and analytical techniques employed. The findings section highlights key insights into faculty perceptions, the extent of AI integration, challenges faced, opportunities identified, and ethical considerations in using AI. The discussion section provides an interpretation of these findings within the context of the existing literature, discussing their implications for practice, policy, and future research.

Literature Review

The advent and evolution of AI marks a seminal transformation in human history, redefining the boundaries of the role of technology across diverse sectors. From its conceptual origins to its rapid proliferation, AI has emerged as a pivotal force reshaping services, societal norms, and the fabric of daily life. Its historical journey from theoretical constructs to practical applications underscores the relentless pursuit of mimicking and augmenting human intelligence through computational means. The transformative impact of AI is most palpable in its ability to automate complex tasks, enhance decision-making processes, and foster innovations that were once the realm of science fiction (Roser, 2022).

Integrating AI in higher education promises numerous benefits, including personalized learning experiences, efficient administrative operations, brainstorming ideas, and novel research methodologies. However, it poses challenges, such as ethical considerations, privacy concerns, and the digital divide, necessitating thoughtful examination. The literature review presented in the next section seeks to navigate the intricate landscape of AI, offering insights into its development, applications, and implications for higher education (Butterman et al., 2023).

Background and Context of AI

Alan Turing introduced the Turing Test in his 1950 paper as a measure of machine intelligence, suggesting that a machine is intelligent if it convincingly mimics human behavior (Millican, 2021). The 1956 Dartmouth Conference marked AI's formal inception, leading to significant research that included the development of neural networks and learning algorithms, inspired by the human brain (Ivezek, 2017). During that year, the logic theorist (Logic Theory-LT) program introduced by Neweell, Shaw, and Simon to solve mathematical problems was regarded as the first artificial intelligence system (Mijwel, 2015).

Later, between 1965 and 1970, AI developments underwent a "dark period" as AI technologies were unsuccessful in becoming intelligent machines by simply uploading data and due to the limited capacity to handle information (Khan et al., 2021; Mijwel, 2015). Over the years of AI research and development, technology has experienced periods of stagnation and breakthroughs (Tobin et al., 2020). During 1970 and 1980, there was an advancement in technology due to developments in subjects for disease diagnosis, leading to the foundation of AI today. In the 1980s, AI was integrated into larger projects and adapted to solve practical problems (Mijwel, 2015). In the late 1980s, a large number of companies focused on the development and maintenance of AI technologies, especially in Japan, in which the government dedicated funds to the Fifth Generation Project, designed "to build a machine that could communicate, translate languages, recognize pictures, and argue like a human" (Khan et al., 2021, p.5-6).

By the late 20th century, expert systems demonstrated AI's capability in specialized decision-making, enhancing its application in healthcare and finance (Daniel et al., 2024). Later, in 2015, AI technologies resurged in the form of Deep Learning, illustrated by the success of AlphaGo, a program created by Google, in defeating the world champion in the game of Go. This new form of learning by machines serves as the foundation of most applications categorized under the term AI today (Haenlein & Kaplan, 2019). AI's evolution from theoretical concepts to practical uses highlights its societal impact and future potential in education.

AI in Education

Early efforts in programmed instruction, dating back to the 19th century, aimed to automate teaching tasks, freeing teachers from menial work to focus on teaching (McDonald et al., 2005). Various approaches, including Computer-Assisted Instruction (CAI), Intelligent Tutoring Systems (ITS), programming languages such as LOGO, and Computer-Supported Collaborative Learning (CSCL), have contributed to technology integration in education (Koschmann, 1996). This research focuses on CAI and ITS because of their relevance to the current AI efforts in education.

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CAI, prominent since the early introduction of computers, emphasizes behavioristic learning with rote memorization through drills (Dede & Swigger, 1988; Stahl et al., 2006). Intelligent Tutoring Systems (ITS) follow a cognitivist approach that simulates learners' mental representations and progression from novice to expert (Stahl et al., 2006). SCHOLAR, developed by Jaime Carbonell in 1969 for teaching high school geometry, exemplified one of the first ITS approaches by separating teaching knowledge from content and utilizing a conversational format between learners and programs (Carbonell, 1970; Woolf, 1991). Its organization mirrored the brain's semantic network, facilitating interactive learning.

Since then, AI-powered tools have evolved and become more sophisticated. Examples of AI-powered tools used in education include Grammarly and QuillBot, leading AI–powered writing assistant tools. Grammarly can assist students in writing because of its ability to detect and correct grammatical errors, punctuation, and writing style inconsistencies (Chen et al., 2022). QuillBot also offers a range of features to enhance writing productivity and improve quality; however, it also has a plagiarism detection feature to assist in maintaining academic integrity. QuillBot highlights potential instances of plagiarism and encourages users to employ ethical practices by appropriately citing reference sources. Ummeaimon Shabbir (2023) found that QuillBot assisted users with productivity due to the tool's personalized writing support and advanced language processing capabilities.

Regular use of tools, such as Grammarly, has enhanced writing fluency and increased confidence in students' writing abilities (Maulidinaand & Wibowo, 2022). AI is revolutionizing student writing by making it easier to produce high-quality writing with less effort (Raheem et al., 2023). It is important to note that these tools can inhibit students' ability to develop writing skills, stifle creativity, and critical thinking skills, if not used responsibly (Raheem et al., 2023).

Adaptive Learning and Personalized Education

With further technological advancements, early applications of AI evolved into new adaptive and personalized learning approaches. Personalized education involves the use of instructional approaches to customize learning according to individual learners' needs (Taylor et al., 2021). Pearson Interactive Labs is an example of an adaptive learning tool in higher education. This platform provides online biology and microbiology labs for students featuring real-world scenarios with guided feedback (Pearson, 2024). This tool presents students with customized assignments based on their needs and skill levels. It also uses data from learners´ interactions with the tool to adapt the learning experience based on students' needs, behaviors, and outcomes. Overall, with the current affordances of adaptive learning technologies, learners' needs can be identified, and they can be provided with individualized learning paths to help them succeed.

Defining adaptive learning can be more challenging because of the nature of the concept and technologies used to adapt learning (i.e., technology is constantly evolving and changing). Still, adaptive learning systems are "data-driven—and, in some cases, nonlinear—approach to instruction and remediation." (Moskal et al., 2017, para. 5). These systems assess learners' current knowledge and skills and provide personalized learning to meet their needs through feedback and content. For example, suppose that a student uses a tool such as Duolingo for language learning. In this case, it can adapt the content based on the mistakes made by the learner or increase the difficulty level of the questions if the learner answers them correctly. Adaptive learning technologies also use learning algorithms to monitor learners' progress, offering content and resources to support and improve their learning throughout the course (Taylor et al., 2021). Currently, most adaptive learning technologies are intelligent, using AI capabilities to personalize information based on learners' needs (Kolchenko, 2018). These concepts and systems intersect for the most part and are now expanding their potential for education.

AI in Higher Education and Faculty Perceptions

Utilizing AI in higher education has several strengths and limitations. Faculty integrating these technologies are leveraging them for scenario-based examples, personalized learning, tutoring, and supplementing resources (Bin-Nashwan et al., 2023; Wang et al., 2023). AI applications include automated feedback systems, test creation, and collaboration tools for brainstorming (Chan & Lee, 2023; Gimpel et al., 2023; Ouatik et al., 2021; Yang et al., 2021). However, challenges such as accuracy, reliability, and plagiarism persist (Amani et al., 2023; Kasnecia et al., 2023; Lim et al., 2023).

Faculty perceptions of AI integration vary. In a social media content analysis study, early adopters expressed mixed feelings regarding productivity, efficiency, and ethics (Mogavi et al., 2024). Many are concerned about academic honor code violations and the lack of clear policies and detection methods (Amani et al., 2023; Lo, 2023; Petricini et al., 2023; Sullivan et al., 2023; Yu, 2023). While some anticipate an increase in AI-assisted coursework completion, others oppose restrictions (Petricini et al., 2023). Despite its familiarity, faculty remain uncertain about effective integration and lack trust in AI (Petricini et al., 2023).

Challenges and Opportunities in AI Adoption

Several barriers have impeded the widespread adoption of AI in higher education. The key challenges include concerns about data privacy, ethical considerations, and the digital divide (Al Badi et al., 2022), which can limit access to AI technologies for underprivileged students (Abulibdeh et al., 2024; Velte, 2023). A notable gap exists in faculty proficiency in AI-powered tools, which necessitates comprehensive development and training programs. Such initiatives should focus on equipping educators with the necessary skills to effectively integrate AI into their teaching methodologies, thereby enhancing their educational experience (Alnasib, 2023; Office of Educational Technology, 2023).

The impact of AI on learning outcomes is an area of increasing interest. Preliminary studies have indicated that AI-driven personalized learning environments can significantly improve student engagement and performance (Bin-Nashwan et al., 2023; Huang et al., 2023). These technologies offer tailored educational experiences, adapt to individual learning styles, and provide real-time feedback that can lead to more effective learning outcomes (Wang et al., 2023). However, further research is needed to conclusively determine the extent of AI's impact on education and address the challenges associated with its adoption (Abulibdeh et al., 2024).

Ethical Considerations in AI in Education

The ethical integration of AI in education encompasses critical issues such as privacy, data security, bias, fairness, and accountability (Kasnecia et al., 2023). As AI has become a staple in educational tools, from personalized learning to automated grading, it is essential to examine its ethical implications. Ethical data management is vital, as AI applications handle extensive personal student data, necessitating robust protection measures and transparency in compliance with regulations such as the General Data Protection Regulations (The Economist, 2018).

AI's inherent biases, reflecting its training data or creators' assumptions, pose risks of amplifying inequalities, underscoring the need for fairness through diverse datasets and bias audits (Huang et al., 2022). Accountability becomes paramount when AI decisions affect students' futures and demand clear responsibility and appeal processes to ensure that decisions can be reviewed and corrected.

As AI is integrated into education, its potential to enhance learning must be balanced with ethical considerations to protect student rights and privacy and promote an equitable, secure, and inclusive educational environment. This balance concerns risk management and actively crafting a future where AI enhances education without compromising ethical standards.

Integrating AI into education introduces a new frontier of possibilities, from personalized learning to enhanced administrative efficiency. However, this integration has challenges such as ethical considerations, privacy concerns, and the digital divide (Abulibdeh et al., 2024; Office of Educational Technology, 2023). In the next section, we discuss the methods used to examine the impact of AI on faculty perceptions, challenges, opportunities, and ethical considerations that must be considered.

Methodology

This research employed a survey-based approach to examine the impact of AI in higher education. The survey consisted of Likert-style questions to gather quantitative data on faculty perceptions, integration, and challenges of AI and open-ended questions to collect qualitative insights into their experiences. The survey was distributed to faculty members teaching within various disciplines within higher education institutions. The data analysis was primarily quantitative, focusing on responses to Likert-style questions to identify trends and patterns. At this stage, qualitative data from the open-ended questions were not subjected to formal, thematic analysis but were reviewed for additional context and understanding.

Research Questions (RQ)

The advent of AI in higher education presents opportunities and challenges for faculty members. This research explored faculty perceptions, the extent of integration, challenges, opportunities, and ethical considerations associated with using AI within higher education. This research aims to provide a preliminary overview of how AI is shaping educational practices and the implications for stakeholders.

This research sought to explore the multifaceted dimensions of AI integration in higher education through the following seven (7) research questions:

RQ1: Faculty Perceptions: How do faculty members perceive the role of AI in higher education?

RQ2: Faculty Awareness: What is the level of faculty awareness of AI technologies in their respective fields?

RQ3: Faculty Comfort: What is the level of faculty comfort with AI technologies in their respective fields?

RQ4: Extent of AI Integration: To what extent have faculty integrated AI technologies into their curriculum design and course delivery?

RQ5: Challenges in AI Adoption: What challenges do faculty face regarding the access, adoption, and practical application of AI tools in their courses, including technological, institutional, and ethical barriers?

RQ6: Opportunities for AI in Education: What opportunities do faculty identify for enhancing teaching, learning, and research by adopting AI tools and how can these opportunities be maximized?

RQ7: Ethical Considerations in AI Use: How do faculty consider ethical implications when using AI to create assignments or design curriculum, and what specific ethical considerations are considered?

By examining these questions, this research aims to provide insights into AI's current state and future potential in higher education, focusing on faculty perspectives and experiences.

Procedures

This research utilized a survey method that combined email distribution and snowball sampling to reach a diverse and representative sample of faculty members in higher education. An anonymous cross-sectional survey instrument distributed via Qualtrics® was used for the data collection. The research employed a quantitative design, and survey construction followed the guiding principles outlined by Dillman et al. (2014) for mail and Internet surveys. The survey, which contained Likert-style and open-ended questions, was initially emailed to a preselected list of faculty members across various disciplines. To expand the reach and ensure a broader representation, recipients were encouraged to forward the survey to their colleagues, employing a snowball sampling technique. This approach expanded reach into networks of faculty members beyond the initial contact list, increasing the sample size and diversity of responses. The data collected through this method were analyzed quantitatively, and qualitative responses were reviewed for additional insights.

Survey Instrument

The survey was structured into six distinct sections: (1) Institution Demographics; (2) Faculty Demographics; (3) Perception, Awareness, & Comfort with AI; (4) Challenges in Accessing, Adopting, & Using AI; (5) Educational Impact of AI; and (6) Ethics.

The quality of this research's findings centers on the survey items' internal consistency and alignment with specific domain categories. To evaluate the reliability of the survey questions, survey responses were examined to determine whether they were consistent across participants and whether the questions related to each domain maintained internal consistency within the measurement framework. Stata (version 18) (StataCorp., 2023) was used to analyze the relationship between the survey items and their intended domains. The reliability of each domain was determined using Cronbach's Alpha, with a score of 0.7 or above considered as demonstrating satisfactory internal consistency (Elkaseh et al., 2016; Elkaseh et al., 2016; Hair et al., 1995; Nunnally, 1978). The descriptions provided below present the domains, items included, and their corresponding Cronbach's Alpha scores, indicating that all items satisfied the criteria for internal consistency. The internal consistency for the domain "Challenges in Accessing, Adopting, & Using AI" could not be evaluated due to the nature of the question formats. Specifically, the domain was assessed with one Likert-scale question alongside two 'select all that apply' questions, which are incompatible with internal consistency analysis.

Perception, Awareness, & Comfort with AI: To determine the perspectives on AI's relevance and application within the respondent's field/discipline, questions were asked of the participants based on the following concepts: (1) Awareness Level of AI, (2) Comfort Level with AI, (3) Perception of AI in Higher Education, (4) Future Prospects of AI in education, (5) Integration of AI in Curriculum, (6) Preparedness to Teach AI concepts, (7) Readiness for AI Integration, (8) Adequacy of Faculty Training and Development in AI, and (9) Adequacy of Student Training and Development in AI. Respondents reported their level of agreement with the survey using a 5-point Likert scale that varied by question (1-very aware, 2-somewhat aware, 3-Neutral, 4-Somewhat unaware, 5-Very unaware). A Cronbach α of 0.80 was determined for this section, suggesting a very high internal consistency among the scale items (Nunnally, 1978).

Challenges in Accessing, Adopting, & using AI: To determine the challenges in accessing, adopting, and using AI, one question was asked of the participants based on the following concepts: (1) Extent to use of AI Technology in Curriculum Design and Delivery. The other questions in this section asked the respondents to select all that applied to challenges and opportunities. Internal consistency could not be determined due to the nature of the questions.

Educational Impact of Artificial Intelligence (AI): To determine the impact of AI on curriculum design and its broader implications on educational outcomes, questions were asked of the participants based on the following concepts: (1) Impact on Curriculum Design, (2) Impact on Educational Outcomes, (3) Preparation for AI-Driven Future, (4) Importance of AI Literacy, (5) Effectiveness of AI in Enabling Personalized Education, and (6) AI Integration Fosters

Innovative Problem-solving in field/discipline. Respondents reported their level of agreement with the survey using a 5-point Likert scale that varied by question (1-Strongly agree, 2-Agree, 3-Neutral, 4-Disagree, 5-Strongly disagree). A Cronbach α of 0.85 was determined for this section, suggesting a very high internal consistency among the scale items (Nunnally, 1978).

Ethics: To determine the importance of ethical considerations in AI education, questions were asked of the participants based on the following concepts: (1) Criticality of Ethical Consideration of AI in field/discipline, (2) Frequency of Ethical Discussions, (3) Considerations of the Ethical Implications of using AI in the creation of assignments and curriculum development. Respondents reported their level of agreement with the survey using a 5-point Likert scale that varied by question (1-Always, 2-Often, 3-Sometimes, 4-Rarely, 5-Never). A Cronbach α of 0.65 was determined for this section, suggesting a moderate internal consistency among the scale items (Nunnally, 1978).

Participants

The dataset comprised responses from 261 participants, each affiliated with various schools or colleges within a larger academic institution. Colleges or Schools of Business were the most represented, accounting for 39% (102) of the responses. Colleges or Schools of Nursing accounted for 25% (65) of the participants. Colleges or Schools of Health Professions and Colleges or Schools of Public Health represented 8.8% (23) and 8% (21) of the participants, respectively. Other colleges or schools were represented by one to nine participants each.

Participants were employed across various geographic locations, predominantly within the United States, but also included international locations. North Carolina hosts the largest number of participants at 24% (62), followed by Texas at 13% (34), and Florida and Virginia at

8% (21). The distribution across other states ranges from one to seven participants, with six entries classified as non-U.S./International.

Institutional affiliation showed a concentration in research universities, with 36% (94) of participants at R1 Doctoral Universities and 27% (70) at R2 Doctoral Universities. An additional 11% (n = 28) were affiliated with Doctoral/Professional Universities. State or Public Colleges or Universities employ 67% (174) of the participants, Private Colleges or Universities 19% (49), and Two-Year Technical or Community Colleges 5% (13). Regarding the location of these institutions, 50% (130) were in urban areas, 32% (84) were in suburban areas, and 16% (41) were in rural settings.

The median age of the participants was 56 years, with 65% (170) reporting employment for more than 10 years. Regarding academic roles, 40% (104) of participants teach in undergraduate programs, and 33% (86) in Graduate, Master's Curriculum programs. Faculty status reveals that 47% (122) are tenure track (tenured), and 30% (79) are not on the tenure track. Faculty ranks include 30% (78) as Professors, 21% (55) as Associate Professors, and 14% (36) as Assistant Professors. Additionally, 33% (86) of respondents report no secondary role, 9% (24) are Program Directors, and 7% (19) are Department Chairs.

Educational qualifications showed that 75% (196) of the respondents held doctoral degrees and 15% (39) had master's degrees. The gender distribution is 52% (137) female and 36% (95) male. Racially, 73% (191) identify as White or Caucasian, with 16% either not disclosing their race or not responding, and 4% (11) are Asian American.

This demographic profile provides a comprehensive overview of the participants, highlighting the diversity of their academic roles, institutional affiliations, and educational backgrounds. This underscores the predominance of female participants, the extensive experience of many respondents, and the significant representation of research universities in the sample.

Statistical Analysis

The analyses were performed using Stata (version 18) (StataCorp., 2023). The survey data were downloaded directly from Qualtrics software (version 2020) into an Excel spreadsheet (version 16.0; Microsoft Corp.). Analysis of Variance (ANOVA) was used to examine the differences among groups. ANOVA is a statistical method that compares means across multiple groups to determine whether they have statistically significant differences. It assesses the variation between group means relative to the variation within groups, thus providing insight into the effect of the independent variable(s) on the dependent variable. Please refer to Table 1, which presents the demographic data for the survey participants.

Table 1. Demographic of survey participants (N=261).

Variables		Values, n (%)
Employed		
	College or School of Business	102 (39%)
	College or School of Nursing	65 (25%)
	College or School of Health Professions	23 (9%)
	College or School of Education	21 (8%)
	College or School of Public Health	9 (3%)
	All others	54 (16%)
Years Employed as a Faculty Member		
	0 - 9	69 (26%)
	10 - 19	89 (34%)
	20 - 29	50 (19%)
	≥ 30	31 (12%)
	No response	22 (8%)
Gender		
	Female	137 (53%)
	Male	95 (36%)
	Non-binary	1 (0.4%)
	I prefer not to disclose.	6 (5%)
	No response	22 (5.6%)

Ethnicity	
White or Caucasian	191 (73%)
Asian American	11 (4%)
Hispanic/Latinx	5 (2%)
Two or More Races	5 (2%)
Black or African American	4 (2%)
American Indian/Native American or Alas	1 (0.4%)
Native Hawaiian or Other Pacific Island	1 (0.4%)
I prefer not to disclose.	19 (7%)
No response	24 (9.2%)
Age group (years):	
30-39	9 (4%)
40-49	58 (22%)
50-59	64 (24%)
60-69	66 (25%)
≥70	28 (11%)
No response	36 (14)
Research Level:	
R1 – Doctoral University – Very high research activity	94 (36%)
R2 – Doctoral University – High research activity	70 (27%)
D/PU – Doctoral/Professional University	28 (11%)
Masters Comprehensive	37 (14%)
Community or Technical College	20 (8%)
No response	12(4%)
Type of institution:	
Two Year Technical or Community College	13 (5%)
For-profit College or University	10 (3%)
Technical College or University	2 (1%)
Private College or University	49 (19%)
State or Public College or University	174 (67%)
No response	13 (5%)
Role:	
Lecturer or Instructor	33 (13%)
Assistant Professor	36 (14%)
Assistant Clinical - / Practice- Track	9 (3%)
Associate Professor	55 (21%)
Associate Clinical - / Practice- Track	12 (5%)
Professor	78 (30%)
Clinical- / Practice- Track Professor	8 (3%)
Does not apply or no response	30 (11%)
Institution Setting	

Urban	130 (50%)
Suburban	84 (32%)
Rural	41 (16%)
No response	6 (2%)
Tenure level:	
Tenure Track (Non-tenured)	36 (14%)
Tenure Track (Tenured)	122 (47%)
My position is not on the tenure track.	79 (30%)
No response	24 (9%)
Primary Teaching Placement	
Undergraduate Curriculum (i.e., Associates Degree)	14 (5%)
Undergraduate Curriculum (i.e., Bachelors)	104 (40%)
Graduate, Masters Curriculum (i.e., MBA, MHA, MSN, MS, M.Ed., etc.)	86 (33%)
Graduate, Doctoral Curriculum (i.e., DBA, DHA, DNP, PhD, EdD, etc.)	34 (13%)
No response	23 (9%)
Primary or Secondary Role	
Program Director (Program Director, Program Coordinator)	26 (10%)
Department Chair	19 (7%)
Director of Academic Programs	8 (3%)
Dean (Dean, Associate Dean, Assistant Dean)	7 (3%)
Curriculum Coordinator	6 (2%)
Director of Graduate Studies	6 (2%)
Academic Dean	5 (1%)
All others and no response	190 (73%)
Degree	
Undergraduate (i.e., Bachelors)	4 (2%)
Graduate, Masters (i.e., MBA, MHA, MSN, etc.)	39 (15%)
Graduate, Doctoral (i.e., DBA, DHA, Ph.D., DNP, DrPH, etc.)	196 (75%)
No response	22 (8%)

Discussion

In this research, the data collected was analyzed to address seven research questions, offering insights into faculty perspectives on AI in higher education. The examination began with faculty perceptions (RQ1), revealing how faculty members view the role and impact of AI in their academic environments. Following this, the level of awareness (RQ2) and comfort (RQ3) of faculty members with AI technologies was explored, shedding light on their familiarity and ease with these tools. The extent to which AI has been integrated into curriculum design and course delivery (RQ4) was assessed, highlighting successful implementation and areas for improvement. The challenges faculty members face in adopting AI (RQ5), including technological, institutional, and ethical barriers, are discussed to understand the obstacles that hinder broader AI adoption. Finally, opportunities for AI in education (RQ6) were identified, and the ethical considerations (RQ7) that the faculty considered were examined to provide a comprehensive understanding of how AI can be ethically and effectively integrated into higher education.

Perception, Awareness, and Comfort with AI

This area of the research aimed to determine whether differences existed in the perception (RQ1), awareness (RQ2), and comfort (RQ3) with AI based on various factors: research level (R1-doctoral university, R2-doctoral university), type of institution (Public or Private), institution setting (Rural vs. Urban), and gender.

Perception

Concerning RQ1, faculty at R2-doctoral universities displayed a somewhat or very positive perception of AI in higher education (N=64, M=2.4, SD=0.97) compared to faculty at R1-doctoral universities (N=82, M=2.5, SD=1.16). A one-way ANOVA test revealed no significant difference between the levels of perception of AI in higher education and research level, $F(4, 216) = 0.864$, $p = 0.636$. Faculty at private institutions had a somewhat or very positive perception of AI in higher education (N=41, M=2.2, SD=1.13) compared to those at public universities (N=158, M=2.5, SD=1.07). The one-way ANOVA test showed no significant difference between perception levels and institution type, $F(4, 215) = 1.06$, $p = 0.377$. Faculty of

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urban universities exhibited a somewhat or very positive perception of AI in higher education (N=117, M=2.3, SD=1.07) compared to rural universities (N=37, M=2.5, SD=1.26). The one-way ANOVA test indicated no significant difference between perception levels and institution setting, $F(2, 222) = 0.89$, $p = 0.413$. Faculty on the tenure track but non-tenured had a somewhat or very positive perception of AI in higher education (N=36, M=2.4, SD=1.01) compared to faculty on the tenure track and tenured (N=115, M=2.4, SD=1.17) and those not on the tenure track (N=76, M=2.3, SD=1.11). A one-way ANOVA test revealed no significant difference in perception between tenure status groups, $p = 0.485$. Male faculty members had a somewhat or very positive perception of AI in higher education (N=91, M=2.3, SD=1.07) compared to female faculty members (N=130, M=2.4, SD=1.08). The one-way ANOVA test indicated no significant difference in perception based on gender, $p = 0.738$.

Awareness

Concerning RQ2, faculty at R2-doctoral universities were somewhat or very aware of AI in curriculum development (N=64, M=1.98, SD=0.99) compared to faculty at R1-doctoral universities (N=83, M=1.78, SD=0.92). The one-way ANOVA test showed no significant difference in awareness levels based on research level, $F(4, 217) = 1.2$, $p = 0.3118$. Faculty at private institutions were somewhat or very aware of AI in curriculum development (N=41, M=1.68, SD=0.99) compared to public universities (N=160, M=1.86, SD=0.92). The one-way ANOVA test revealed no significant difference in awareness levels based on institution type, $F(4, 217) = 1.26$, $p = 0.290$. Faculty in urban universities were somewhat or very aware of AI in curriculum development (N=119, M=1.79, SD=0.92) compared to rural universities (N=37, M=1.89, SD=0.91). The one-way ANOVA test showed no significant difference in awareness levels based on institution setting, $F(4, 224) = 0.25$, $p = 0.781$. Male faculty members were somewhat or very aware of AI technologies and their potential applications in their field or discipline (N=92, M=1.7, SD=0.90) compared to female faculty members (N=131, M=1.9, SD=0.91). The one-way ANOVA test indicated no significant difference in awareness levels based on gender, $p = 0.738$. Faculty on the tenure track but non-tenured were somewhat or very aware of AI technologies and their potential applications in their field or discipline (N=36, M=1.6, SD=0.87) compared to tenured faculty (N=115, M=1.8, SD=0.84) and those not on the tenure track (N=76, M=1.9, SD=1.02). The one-way ANOVA test revealed no significant difference in awareness levels between tenure status groups, $p = 0.485$.

Comfort

Concerning RQ3, faculty at R2-doctoral universities felt somewhat or very comfortable with AI in curriculum development (N=64, M=2.29, SD=1.08) compared to faculty at R1-doctoral universities (N=83, M=2.31, SD=1.20). A one-way ANOVA indicated no significant difference in comfort levels based on research level, $F(4, 217) = 0.56$, $p = 0.690$. Faculty at private institutions felt somewhat or very comfortable with AI in curriculum development (N=41, M=2.29, SD=1.29) compared to those at public universities (N=160, M=2.34, SD=1.10). The one-way ANOVA test showed no significant difference in comfort levels based on institution type, $F(4, 217) = 1.05$, $p = 0.382$. Faculty of urban universities felt somewhat or very comfortable with AI in curriculum development (N=119, M=2.30, SD=1.16) compared to rural universities (N=37, M=2.41, SD=1.04). The one-way ANOVA test revealed no significant difference in comfort levels based on institution setting, $F(2, 224) = 0.37$, $p = 0.690$. Male faculty members felt somewhat or very comfortable with AI technologies and their potential applications in their field or discipline (N=92, M=2.0, SD=1.12) compared to female faculty members (N=131, M=2.5, SD=1.08). An Analysis of Variance (ANOVA) indicated a statistically significant difference in comfort levels based on gender, F(3, 225) = 5.52, p = 0.001. Post hoc comparisons using the Bonferroni test revealed that the mean score for female faculty (M = 2.5, SD = 1.08) significantly differed from the mean score for male faculty (M = 2.0, SD = 1.12), p = 0.001. Faculty on the tenure track but non-tenured were somewhat or very comfortable with AI technologies and their potential applications in their field or discipline (N=36, M=2.2, SD=1.15) compared to tenured faculty (N=115, M=2.3, SD=1.07) and those not on the tenure track (N=76, M=2.3, SD=1.91). The one-way ANOVA test revealed no significant difference in comfort levels between tenure status groups.

Integration of AI in Curriculum

Related to RQ4, the analysis of AI integration in higher education revealed that faculty members generally perceive a high level of AI integration within their disciplines across various institutions, genders, and tenure statuses. Although there were differences in the perceived impact of AI on course design and delivery, these differences were not statistically significant. Overall, the findings suggest broad acceptance of AI in academia and highlight the importance of fostering an environment that supports AI integration in educational practices.

All respondents were asked to identify their level of integration of AI in their field or discipline. These were compared based on several factors: research level (R1-doctoral university, R2-doctoral university), type of institution (Public or Private), institution setting (Rural vs Urban), gender (Male, Female), and faculty classification (Tenure Track - Non-tenured, Tenure Track - Tenured, Not on Tenure Track).

Faculty working at R2-doctoral universities feel their discipline is highly or fully integrated with the use of AI in their field or discipline (N=64, M=3.7, SD=1.02) compared to faculty at R1-doctoral universities (N=83, M=4.02, SD=0.86). Faculty at private institutions also feel their discipline is highly or fully integrated with AI (N=41, M=3.76, SD=1.07) compared to public universities (N=160, M=3.91, SD=0.89). Faculty in urban universities feel their discipline is highly or fully integrated with AI (N=119, M=3.94, SD=0.94) compared to those in rural universities (N=37, M=3.62, SD=1.19).

Male faculty feel their discipline is highly or fully integrated with AI (N=92, M=3.7, SD=1.07) compared to female faculty (N=131, M=3.91, SD=0.92). Tenure Track (non-tenured) faculty feel their discipline is highly or fully integrated with AI (N=36, M=4.0, SD=0.86) compared to Tenure Track (tenured) faculty (N=115, M=3.8, SD=0.96) and those not on tenure track (N=76, M=3.7, SD=1.11).

An Analysis of Variance (ANOVA) showed no statistically significant differences between research level, type of institution, institution setting, tenure status, or gender regarding the level of AI integration in their field or discipline.

Impact of AI on Course Design and Delivery

All the respondents were asked to identify how AI technology impacted the design and delivery of their courses. These were compared based on several factors: research level (R1-doctoral university, R2-doctoral university), type of institution (Public or Private), institution setting (Rural vs Urban), gender (Male, Female), and faculty classification (Tenure Track - Non-tenured, Tenure Track - Tenured, Not on Tenure Track).

Faculty at R2-doctoral universities felt that AI technology somewhat or significantly enhanced the design and delivery of their courses (N=58, M=3.45, SD=1.80) compared to faculty at R1-doctoral universities (N=70, M=3.59, SD=1.75). Faculty at private institutions felt that AI technology enhanced their courses (N=36, M=3.17, SD=1.80) compared to public universities (N=144, M=3.50, SD=1.81). Faculty in urban universities (N=103, M=3.18, SD=1.70) compared to those in rural universities (N=36, M=3.81, SD=1.98) showed similar perceptions. Male faculty believe that AI technology has somewhat or significantly enhanced the design and delivery of their courses (N=84, M=3.3, SD=1.72) compared to female faculty (N=115, M=3.4, SD=1.85). Tenure Track (non-tenured) faculty believe that AI technology has somewhat or significantly enhanced the design and delivery of their courses (N=32, M=3.1, SD=1.66) compared to Tenure Track (tenured) faculty (N=102, M=3.6, SD=1.80) and those not on tenure track (N=67, M=3.3, SD=1.84).

An Analysis of Variance (ANOVA) showed no statistically significant differences between research level, type of institution, institution setting, tenure status, or gender regarding the perceived impact of AI on course design and delivery.

Examples of AI Use in Teaching and Curriculum Design

The key finding of this section is that there are diverse use cases for AI in teaching and curriculum design.

For this area of the research, the survey question related to the current use of AI in curriculum design and teaching elicited a variety of responses, indicating diverse levels of integration and applications of AI technologies. Overall, the responses indicated a growing interest in integrating AI technologies into curriculum design and teaching, with a focus on ethical use, student engagement, and enhancing the learning experience.

Some respondents used AI-powered tools, such as Chat-GPT, Feedback Fruits, and Grammarly, to assist in grading, developing rubrics, and creating content. Others incorporate AI into assignments, encouraging students to use AI platforms for research, ideation, and content generation while emphasizing the importance of fact-checking and ethical considerations.

Several faculty are experimenting with AI to enhance group projects, lesson planning, and report writing. Tools such as RNMKRS, machine learning in investments, and stable diffusion models for image generation are being explored for specific applications. There was also a focus on teaching the ethics of AI, developing case studies, and using AI for plagiarism checking.

Regarding student engagement with AI, some faculty assign research on AI software, ask students to critique it, and integrate AI into creating learner support materials. Additionally, AI is used to support teachers in the classroom, differentiate instruction, and address the needs of students with disabilities.

Challenges in AI Access, Adoption, and Use

Concerning RQ5, the key finding of this section is that faculty members face challenges in accessing, adopting, and using AI in their courses.

For this area of the research, the survey question related to Challenges in AI Access, Adoption, and Use elicited various responses. Overall, the responses indicated that a multifaceted approach involving training, institutional support, access to resources, ethical considerations, and collaborative efforts is needed to overcome the challenges of integrating AI into educational courses.

Respondents emphasized several key areas in addressing strategies and resources that might help overcome challenges in integrating AI into courses. Training and education have emerged as critical factors, with many calling for formal training for faculty and students on using and incorporating AI effectively. This includes basic AI training, specialist training for instructional designers, and the integration of AI education into the curriculum for first-year students.

Institutional support was also highlighted as essential, including developing AI policies at the institutional level, integrating AI-powered tools into the Learning Management System (LMS), and accessing graphical processing units. Workshops or one-on-one sessions are suggested to assist in training and implementation.

Access to AI-powered tools was another significant theme, with respondents emphasizing the need for easy-to-use, intuitive AI-powered tools. An in-house AI chatbot was proposed to ensure data privacy and address concerns regarding student work being evaluated via AI without explicit permission.

Ethical considerations were a concern for some respondents, who suggested institutional policies addressing privacy, data, ethics, and access to all students. Reflecting on the ethical issues of AI and ensuring fair evaluation are also mentioned as essential strategies.

Resource development was identified as a way to overcome challenges, with suggestions for developing examples or templates for assignments that integrate AI and resources for assessing student learning with AI integration.

Finally, collaboration and brainstorming were recommended as strategies, with group brainstorming with colleagues and additional training and resources suggested to facilitate the effective integration of AI into educational courses.

Opportunities in AI Integration

Concerning RQ6, the key finding of this section is that faculty members see opportunities for AI to enhance learning outcomes and teaching efficiency.

For this area of the research, the responses indicate that maximizing AI opportunities in education requires a multifaceted approach, including integrating AI into the curriculum, overcoming resistance to technology, and preparing students to use AI effectively and ethically in their future careers.

In exploring ways to maximize the opportunities identified for using AI to enhance learning outcomes and teaching efficiency, the respondents provided a range of insights. Several respondents highlighted the potential for gamification, real-time automatic grading, and individually tailored competency development and tracking. Incorporating more simulations in classes was suggested to facilitate learning and bring real-world experiences to students.

Integrating AI into the Learning Management System (LMS) to assist with grading and competency assessment has been noted to eliminate subjective grading. The need for faculty and administration to move past their fear of technology and view AI as more than a cheating tool was emphasized. The respondents also suggested using AI for feedback on student assignments, creating test questions, and fostering the development of critical thinking.

The potential for AI to facilitate hands-on experience with complex nursing technologies and expedite grading, allowing more time for discussing concepts and critical thinking with students, was noted. Some respondents mentioned using AI for suggestions on assignments, grading rubrics and activities, and AI-assisted grading of grammar to focus more on grading content.

Challenges include delineating what students are responsible for learning versus what they can use AI-powered tools to retrieve. The importance of preparing students to use AI ethically and to fulfill their capabilities was underscored. Respondents also mentioned the potential of AI to assist in identifying code bugs, designing database architecture, evaluating process designs, and conducting risk analysis in IT and other disciplines.

How Critical Are Ethical Considerations?

Concerning RQ7, the analysis of the ethical considerations of AI in higher education revealed that faculty members across various institutions, genders, and tenure statuses generally agreed on the importance of including ethical considerations in their curriculum. Although there are differences in how frequently these discussions occur and the personal emphasis placed on these ethical considerations, the overall trend indicates a shared recognition of their importance. This highlights the need for targeted strategies to foster consistent and frequent ethical discussions regarding AI use.

All respondents were asked to determine how critical they consider the inclusion of ethical considerations of AI in their field or discipline. These were compared based on several factors: research level (R1-doctoral university, R2-doctoral university), type of institution (Public or Private), institution setting (Rural vs Urban), gender (Male, Female), and faculty classification (Tenure Track - Non-tenured, Tenure Track - Tenured, Not on Tenure Track).

Faculty working at R2-doctoral universities consider the inclusion of ethical considerations of AI in their field or discipline as very or extremely critical (N=57, M=1.6, SD=0.844) compared to faculty at R1-doctoral universities (N=69, M=1.5, SD=0.933). Faculty at private institutions also consider it very or extremely critical (N=35, M=1.5, SD=0.98) compared to faculty at public universities (N=142, M=1.6, SD=0.95). Similarly, faculty in urban universities (N=101, M=1.55, SD=0.81) compared to those in rural universities (N=35, M=1.57, SD=0.85) share this view. Tenure Track (non-tenured) faculty felt more strongly about this inclusion (N=32, M=1.3, SD=0.54) compared to Tenure Track (tenured) faculty (N=101, M=1.6, SD=0.96) and those not on tenure track (N=64, M=1.7, SD=1.02). Male faculty (N=32, M=1.4, SD=0.65) and female faculty (N=32, M=1.9, SD=1.15) also considered the inclusion of ethical considerations to be very or extremely critical.

An Analysis of Variance (ANOVA) indicated no significant difference in the frequency of discussion based on research level, type of institution, or institution setting. However, a statistically significant difference was found between male and female faculty, $F(3, 195) = 5.75$, $p = 0.001$. Post hoc comparisons using the Bonferroni test revealed that the mean score for male faculty (M = 1.9, SD = 1.15) significantly differed from the mean score for female faculty (M = 1.4, SD = 0.65), $p = 0.001$.

Discussion of Ethical Implications with Students

Related to RQ7, all respondents were asked to determine how often they discussed the ethical implications of AI with their students. These were compared based on several factors: research level (R1-doctoral university, R2-doctoral university), type of institution (Public or Private), institution setting (Rural vs Urban), gender (Male, Female), and faculty classification (Tenure Track - Non-tenured, Tenure Track - Tenured, Not on Tenure Track).

Faculty working at R1-doctoral universities discuss frequently or very frequently with their students the ethical implications of the use of AI (N=69, M=3.00, SD=1.20) compared to faculty at R2-doctoral universities (N=56, M=3.08, SD=1.00). Faculty at private institutions also discuss these implications frequently or very frequently (N=35, M=2.66, SD=1.08) compared to faculty at public universities (N=141, M=3.08, SD=1.13). Faculty in urban universities (N=101, M=2.97, SD=1.23) compared to those in rural universities (N=34, M=3.15, SD=1.16) exhibit similar patterns. Tenure Track (non-tenured) faculty frequently discuss these ethical implications (N=32, M=2.7, SD=1.15) compared to Tenure Track (tenured) faculty (N=101, M=3.1, SD=1.10) and those not on tenure track (N=63, M=2.9, SD=1.22). Male faculty (N=85, M=3.1, SD=1.18) and female faculty (N=110, M=2.9, SD=1.13) also discuss these implications frequently.

A one-way ANOVA test showed no significant difference in the frequency of discussion based on research level, type of institution, institution setting, or gender.

Personal Ethical Implications

Concerning RQ7, all respondents were asked to identify their personal ethical considerations for using AI to create assignments or design their curriculum. These were compared based on several factors: research level (R1-doctoral university, R2-doctoral university), type of institution (Public or Private), institution setting (Rural vs Urban), gender (Male, Female), and faculty classification (Tenure Track - Non-tenured, Tenure Track - Tenured, Not on Tenure Track).

Faculty working at R1-doctoral universities felt they always or often considered their personal ethical implications of using AI in creating assignments or designing their curriculum (N=68, M=2.51, SD=1.37) compared to faculty at R2-doctoral universities (N=57, M=2.49, SD=1.18). Faculty at private institutions also felt this way (N=35, M=1.82, SD=0.95) compared to faculty at public universities (N=141, M=2.59, SD=1.29). Faculty in urban universities (N=101, M=2.97, SD=1.34) compared to those in rural universities (N=34, M=2.38, SD=1.01) showed similar trends. Tenure Track (non-tenured) faculty (N=32, M=2.7, SD=1.15) felt more strongly about this compared to Tenure Track (tenured) faculty (N=101, M=3.1, SD=1.10) and those not on tenure track (N=63, M=2.9, SD=1.22). Male faculty (N=85, M=2.6, SD=1.32) and female faculty (N=109, M=2.3, SD=1.20) also felt this way.

An Analysis of Variance (ANOVA) indicated a statistically significant difference between Tenure Track (non-tenured) faculty and Tenure Track (tenured) faculty, $F(2, 193) = 4.60$, p =

0.011. Post hoc comparisons using the Bonferroni test revealed that the mean score for Tenure Track (tenured) faculty (M = 2.7, SD = 1.33) was significantly different from the mean score for Tenure Track (non-tenured) faculty (M = 2.0, SD = 1.0), p = 0.032.

Ethical Frameworks and Guidelines Followed by Faculty

Concerning RQ7, the key finding of this section was that faculty members reported a broad spectrum of approaches to ethical considerations in AI integration, ranging from specific policies and considerations to a lack of formal frameworks. The emphasis on ethical use, data privacy, and responsible integration of AI into educational settings underscores the complexity and evolving nature of AI ethics in academia.

Based on the responses to the question on ethical frameworks, guidelines, and considerations followed when integrating AI into the curriculum and creating assignments, a variety of perspectives were provided. Some respondents outlined specific measures they took, such as including an AI policy section in their syllabi, which explains how AI should be used and requires the disclosure of AI use. Others reported not following specific frameworks or guidelines, but shared their liberal views on AI use in higher education.

A few respondents mentioned that they had discussions about AI ethics, although no formal framework guided them. Ethical considerations include reviewing AI outputs to ensure they communicate intent accurately and addressing concerns about data privacy and student data usage in AI models. Some faculty highlighted the importance of understanding where data come from, especially in representing marginalized individuals.

Meanwhile, others are designing AI integration into their curriculum using guiding principles from organizations such as the World Health Organization (WHO), and focusing on accountability, transparency, and traceability in AI systems.

Implications

This research highlights several implications for faculty, institutions, and policymakers in higher education.

Implications for Faculty and Institutions

Integrating AI into higher education presents opportunities and challenges for faculty members and institutions. Practical implications include the need for comprehensive training and education for faculty and students to effectively incorporate AI into courses. The findings suggest a need for targeted professional development programs to enhance faculty comfort and proficiency in AI technologies. Institutions should consider offering workshops, seminars, and training sessions focusing on ethical AI use, data privacy, and integrating AI into curriculum design.

Implications for Policy

The research highlights the importance of institutional support through clear policies and guidelines for AI integration. Policymakers should develop frameworks that address ethical considerations, promote transparency, and ensure equitable access to AI resources for all students and faculty members. In addition, policies should address the issue of academic dishonesty and provide guidelines for the attribution and use of AI in assignments. Developing institutional policies that support the ethical and practical use of AI in education is crucial for fostering trust and ensuring that AI technologies are used responsibly.

Implications for the Future of AI in Higher Education

The future of AI in higher education holds significant potential for enhancing learning outcomes and teaching efficiency. Related findings indicate the potential opportunities for AI to enhance teaching and learning outcomes. Institutions should explore innovative AI applications such as personalized learning environments and automated feedback systems to improve student engagement and academic performance. The integration of AI enhancements into higher education has the potential to transform teaching and learning. However, it requires concerted effort from faculty, institutions, and policymakers to manage it ethically and effectively.

In conclusion, integrating AI into higher education has practical, policy, and future implications for faculty, institutions, and the broader educational landscape. Addressing these implications requires a collaborative approach that prioritizes ethical considerations, supports the development of AI resources, and fosters an environment that encourages responsible use of AI technologies in education.

Limitations and Future Research

This research has several limitations that should be considered when interpreting the results. First, reliance on self-reported data may introduce bias, as participants' responses may be influenced by their perceptions or experiences. Second, the sample may not fully represent the diversity of faculty experience across different institutions and disciplines, which could limit the generalizability of the findings.

Future research should address these limitations by employing mixed-method approaches, longitudinal studies, and larger, more diverse samples. Additionally, exploring the impact of AI on student learning outcomes, the development of AI-specific pedagogical strategies, and the long-term effects of AI integration in educational practices is crucial for further investigation.

Conclusion

In conclusion, integrating AI into higher education presents a complex landscape of opportunities and challenges. This research has illuminated faculty perceptions, highlighting the potential benefits of AI in enhancing learning outcomes and teaching efficiency and concerns related to ethical considerations, privacy, and the digital divide. The findings underscore the importance of comprehensive training for faculty and students, institutional support, and the development of clear policies and guidelines to ensure the responsible and effective use of AI technologies in education.

As we forge forward, higher education institutions must embrace the opportunities presented by AI while addressing the challenges head-on. Collaborative efforts among faculty, administrators, policymakers, and technology developers are essential for creating an educational environment that leverages AI to foster innovation, inclusivity, and excellence in teaching and learning. Future research should continue to explore AI's evolving role of AI in education, focusing on its long-term impacts on pedagogy, curriculum design, and student engagement. The journey of integrating AI into higher education is ongoing and holds the promise of transforming the educational landscape for future generations.

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