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Artificial Intelligence Impact on Higher Education

Ph.D. Thesis

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Abstract

Artificial Intelligence (AI) is increasingly prevalent, making its implementation in higher education a topic of great interest. This thesis investigates the impact of AI on higher education through the critical analysis of four Scopus articles (3 articles in Q3 and 1 article in Q4). The research methods employed in each report include systematic review, unstructured interviews, surveys, and discourse analysis.

The first article conducts a systematic study using Web of Science, Scopus, and ERIC databases, focusing on publications from 1900 to 2021. It employs Rayyan Software for education quality, learning and teaching, evaluations, future careers, ethics analysis, and VOSviewer to examine co-authorship and keyword occurrence. The main findings reveal that while AI enhances learning, teaching, and evaluations, critical gaps exist in AI effect evaluations, ethics, and future employment studies warrant further investigation.

The second article utilises unstructured interviews with AI experts in higher education to explore AI's impact on administration, learning, instruction, and ethics. The findings emphasise AI's cost reduction, efficiency improvement, and personalised learning capabilities. AI is also found to play a significant role in maintaining academic integrity by providing precise and objective assessments. However, critical scrutiny of ethical considerations is necessary to mitigate potential drawbacks and ensure responsible AI deployment.

The third article employs surveys of AI-savvy professors and researchers to examine AI's drivers, challenges, and solutions in higher education. The implications show that AI enhances productivity, program efficiency, and internationalisation, fostering educational equity and diversity. AI also assists in addressing student concerns and improving learning and performance. However, critical ethical considerations, policies, and privacy concerns must be discussed thoroughly to ensure responsible AI deployment.

The fourth article utilises discourse analysis of significant AI ethics policies to address biased algorithms and the displacement of humans in higher education. The research highlights the importance of stakeholder collaboration, ethical AI deployment, transparency, and traceability. The main findings underscore the critical need for fair AI usage and protecting vulnerable groups from biased AI decisions.

Overall, this thesis sheds critical light on AI's transformative potential in higher education. It emphasises the importance of critical analysis, responsible AI implementation, stakeholder collaboration, and ethical considerations to maximise AI's benefits while critically evaluating potential risks. By embracing AI ethically and critically, higher education can offer equitable,

personalised, and innovative learning experiences for students and educators, preparing them for the critical challenges of the future.

Keywords: *AI; assessment; barriers; drivers; experts; future career; higher education; impact; implementation; perception; solutions.*

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1. Introduction

1.1 Background

The higher education landscape has witnessed a change in thinking with Artificial Intelligence (AI) integration. AI's evolution has promised transformative potential, presenting opportunities to redefine educational institutions' learning paradigms, teaching methodologies, and administrative processes. This technological advancement has heightened anticipation for improved academic quality and optimised learning outcomes.

However, despite the enthusiasm surrounding AI integration, critical gaps persist in comprehending the holistic impact of AI on higher education. The rapid advancement of AI technology has outpaced our understanding of its implications, leaving crucial questions unanswered. These gaps underscore the need for a comprehensive exploration encompassing various dimensions of AI's influence on educational quality, learning outcomes, and teaching practices.

1.2 The purpose of the study

This study aims to comprehensively explore the impact of Artificial Intelligence (AI) on higher education, aiming to fill critical gaps in understanding its implications across various dimensions within educational settings. This research seeks to address the following key objectives:

Holistic Examination: Investigate the multifaceted influence of AI integration on educational quality, learning outcomes, teaching methodologies, administrative processes, instructional design, and academic integrity.

Identification of Gaps: Conduct a systematic review to identify gaps in effect evaluations, ethical considerations, and future employment prospects related to AI in higher education, utilising data from reputable databases.

In-depth Exploration: Engage in interviews with AI experts and surveys targeting professionals well-versed in AI, aiming to delve deeply into the effects of AI in higher education, including cost reduction, efficiency improvement, personalised learning, challenges faced, and ethical considerations.

Research Significance: Offer comprehensive insights to guide the responsible deployment of AI in higher education, informing policies, practices, and decision-making within educational institutions. Emphasise ethical considerations, stakeholder collaboration, transparency, and traceability for equitable and ethically driven AI integration.

Future Landscape of Higher Education: Contribute findings and recommendations derived from diverse methodologies to shape a future educational landscape in the AI era. Empower institutions with knowledge and strategies to leverage AI while effectively ensuring equity, diversity, and privacy protections.

Overall, this research aims to bridge existing knowledge gaps, inform decision-makers in educational institutions, and pave the way for a more adaptive, ethical, and technologically enriched higher education environment amidst AI integration.

1.3 Problem Statement

The current state of knowledge in AI's impact on higher education presents a significant challenge. There is an absence of comprehensive insights into AI's diverse and nuanced effects within educational contexts. Questions regarding evaluating AI's effects, encompassing ethical considerations, algorithmic biases, and future employment prospects, remain unexplored. This lack of understanding impedes the development of informed strategies for responsible AI deployment within higher education institutions.

Furthermore, the challenges surrounding the implications of AI in higher education administration, instructional design, and academic integrity pose obstacles. Ethical dilemmas, potential biases in algorithms, and the uncertain future of employment due to AI integration remain pressing concerns. The absence of clarity on key drivers, challenges, and solutions hampers efforts to ensure responsible AI deployment while safeguarding privacy, equity, and diversity within educational settings.

1.4 Scope

This research endeavours to conduct an expansive exploration of AI's impact on higher education across diverse facets. It encompasses a systematic review, interviews with AI experts, qualitative surveys among professors and researchers, and discourse analysis of AI ethics policies. This multidimensional approach allows for a thorough investigation into the multifaceted implications of AI in educational quality, learning outcomes, teaching practices, administration, instructional design, and academic integrity.

The systematic review aims to meticulously analyse data from reputable databases, identifying gaps in effect evaluations, ethics, and future employment studies related to AI in higher education. Interviews with AI experts and surveys targeting AI-savvy professionals intend to delve deeply into AI's influence, exploring cost reduction, efficiency improvement, personalised learning, challenges faced, and ethical considerations.

1.5 Research significance

This research holds significant importance in bridging existing gaps in understanding the profound impact of AI on higher education. It aims to offer comprehensive insights into the complex interplay between AI integration and various aspects of educational processes by addressing critical questions and objectives.

The findings of this research endeavour to guide the responsible deployment of AI in higher education. The study seeks to inform educational institutions' policies, practices, and decision-making through informed analysis and recommendations derived from diverse methodologies. It emphasises ethical considerations, stakeholder collaboration, transparency, and traceability to ensure equitable, diverse, and ethically driven AI integration.

By contributing comprehensive insights, this research aims to shape the future landscape of higher education in the AI era. It strives to empower institutions with knowledge and strategies to leverage AI effectively while safeguarding equity, diversity, and privacy protections. It aims to propel educational institutions toward a more adaptive, ethical, and technologically enriched future.

2. Literature Review

2.1 Impact of AI on Educational Quality and Practices

The integration of artificial intelligence (AI) into higher education has witnessed significant global growth, as Hu (2022) noted. This integration strategically employs AI-enabled methods to enhance teaching and learning processes. Hu (2022) underscores the interconnectedness of these processes with the classical multiple-criteria decision-making issue, highlighting the importance of assessing influences and prioritising improvement dimensions. Key dimensions encompass skills, competencies, interaction data supporting learning, and global classroom accessibility, guiding AI-driven educational plans.

Salas-Pilco and Yang (2022) highlight the surge of interest in AI applications across diverse sectors, emphasising its potential to revolutionise the educational landscape. Their study explores AI applications in learning, teaching, and administration, delving into breakthroughs achieved through machine learning, deep learning, and natural language processing. These applications, such as predictive modelling and intelligent analytics, address crucial educational concerns like dropout prediction and ensuring education quality (Salas-Pilco & Yang, 2022).

Moreover, Zekaj's (2023) systematic literature review delves into AI's incorporation to assist academic faculty, emphasising its effects on teaching methodologies, personalised learning, and administrative processes. This comprehensive evaluation reveals the transformative capacity of AI tools like ChatGPT and intelligent tutoring systems. These tools enhance instruction quality, facilitate adaptive learning, and streamline administrative procedures, contributing to enhanced educational outcomes (Zekaj, 2023).

However, Zekaj's review also illuminates certain limitations, identifying critical gaps and challenges and offering substantial groundwork for future research endeavours and strategies for effective AI integration within educational settings.

2.2 Exploration of AI's Influence through Expert Views

Arun Kumar et al. (2023) advocate for personalised educational approaches through AI in e-learning, emphasising individualised teaching methodologies. Additionally, Phillips et al. (2022) highlight the potential of natural language processing to support teachers' reflection, simplifying data collection and analysis. Furthermore, Hua Hu's (2023) work in College Ideological and Political Education (IAPE) underscores the significant benefits of integrating AI-driven IT, showcasing technology's impact on students' learning enthusiasm and diversified teaching methods.

Hua Hu (2023) emphasises the indispensable role of AI applications in e-learning, providing automated learning processes and optimising education in higher academia and business settings. The study accentuates AI's capacity to facilitate individualised instruction through data analytics, personalising the educational process (Hua Hu, 2023).

2.3 Implications of AI in Educational Processes

Bressane et al.'s (2022) research underlines the importance of AI in predicting student performance trends aiding educators in interventions for at-risk students. Meanwhile, Williamson et al. (2023) offer a comprehensive analysis of digital technologies in education, serving as crucial reading material for diverse stakeholders seeking insights into educational digitalisation.

Amedu and Ohene-Botwe (2024) provide insights into the potential and limitations of integrating ChatGPT in radiography education. The discussion emphasises the significance of ethical implementation and its potential to enhance student outcomes.

Khoo & Kang's (2022) study highlights AI Socialisation's positive impact on promoting academic integrity and language development among students, emphasising learner-driven language learning and critical thinking skills.

2.4 Challenges, and Responsible Deployment of AI

Lancaster (2023) critically evaluates text generation tools' potential to erode educational integrity, advocating for initiative-taking measures to address their ethical use. Additionally, Owino and Paschal (2023) stress socio-technical considerations for responsible AI implementation, while Slimi and Carballido (2023) highlight the importance of fair use and gender bias mitigation in AI deployment within higher education.

These studies emphasise AI's transformative potential by ensuring a balanced discussion across studies while underscoring the critical need for ethical and responsible deployment in educational settings.

In conclusion, integrating artificial intelligence in higher education has become increasingly prevalent, offering innovative approaches to teaching, learning, and student support. The diverse applications of AI in this domain are a subject of extensive research, focusing on personalised learning, teacher reflection, student success prediction, and academic integrity enhancement. By harnessing the potential of AI, educational institutions can enhance their capabilities and adapt to the evolving needs of the digital age.

3. Methodology

The research employs a pragmatic philosophical method, emphasising novel and dynamic approaches to address research issues. The practical methodology combines a deductive approach, ensuring a scientific investigation. The study delves into existing theories of the examined topic, assessing concepts derived from them. A qualitative approach is adopted to investigate the impact of AI on higher education in depth. The research design includes four distinct methods aligned with respective articles, critically analysing AI's influence.

3.1 Research Questions

1. How does implementing Artificial Intelligence (AI) impact higher education quality, learning outcomes, and teaching practices?

2. What are the critical gaps in evaluating the effects of AI on higher education, including ethics considerations, future employment prospects, and algorithmic biases?

3. What are the implications of AI in higher education administration, instructional design, and academic integrity, including cost reduction, efficiency improvement, and personalised learning experiences?

4. What are the key drivers, challenges, and solutions for integrating AI in higher education, as perceived by AI-savvy professors and researchers, and how can responsible AI deployment be achieved while addressing privacy concerns and ensuring equity and diversity?

3.2 Research Objectives

The research objectives are explicitly connected to the theoretical frameworks and prior research.

Objective 1: Explore AI's impact on higher education using data from leading academic databases. Identify trends, assess efficacy, and highlight ethical and employment implications.

Theoretical Connection: This objective is guided by the Technology Acceptance Model (TAM), which emphasises perceived usefulness and ease of use as critical factors influencing AI adoption (Davis, 1989; Venkatesh & Bala, 2008).

Prior Research: The focus on personalised learning and operational efficiency draws from Salas-Pilco and Yang (2022), who highlighted the importance of AI-driven predictive analytics and teaching innovations.

Objective 2: Investigate AI's role in higher education through interviews with AI experts, focusing on administration, pedagogy, and ethics. Evaluate AI's potential for cost-efficiency, operational efficacy, and personalised learning, considering its limitations.

Theoretical Connection: This aligns with the principles outlined in AI Ethics Frameworks, emphasising transparency and fairness in decision-making (Wu et al., 2020)

Prior Research: Studies by Zekaj (2023) and Arun Kumar et al. (2023) highlight gaps in understanding AI's ethical dimensions and its role in future career preparation.

Objective 3: Analyse survey data to understand factors influencing AI adoption in academia. Examine AI's contributions to productivity, curriculum design, and global reach, while addressing ethical and policy challenges.

Theoretical Connection: TAM and ethical governance frameworks provide a foundation for exploring stakeholder perceptions.

Prior Research: Phillips et al. (2022) and Hua Hu (2023) underscore the role of AI in enhancing operational efficiencies while posing ethical challenges.

Objective 4: Conduct a discourse analysis of AI ethics frameworks, addressing algorithmic biases and human displacement in academia. Advocate for stakeholder collaboration, ethical AI deployment, and transparent accountability to protect academic integrity and vulnerable groups.

Theoretical Connection: This builds on the Responsible AI Framework, advocating for stakeholder collaboration and transparency (Prinsloo, 2020).

Prior Research: Studies by Lancaster (2023) and Owino & Paschal (2023) emphasise the socio-technical considerations required for responsible AI use.

Overall, this thesis critically examines the impact of AI on higher education, investigating its effects on education quality, learning outcomes, teaching practices, administration, and ethics. It aims to identify AI implementation's potential benefits and challenges, including ethical considerations and equitable learning experiences. Through systematic analysis and stakeholder insights, the study proposes responsible AI

deployment strategies for fostering innovation and preparing higher education for future challenges.

3.3 Research Method for Each Article:

This section introduces the overall research design, explaining its alignment with the thesis objectives and the methodologies used in each article.

This thesis employs a mixed-methods research design to systematically address its four research objectives. The research questions are distributed across four articles, each of which uses a specific methodology tailored to explore a distinct objective. Together, these articles provide a comprehensive understanding of AI's role in higher education, spanning its impact, challenges, and solutions. The research design follows this structure:

Objective 1: Holistically examine AI's influence on educational quality and academic integrity through a systematic literature review. **Systematic review (Article 1**): A systematic review of existing literature from reputable databases is conducted, spanning 1900 to the present. The methodological rigour ensures a comprehensive examination of AI's effects on higher education. Ethical considerations are paramount, safeguarding participant confidentiality and anonymity through informed consent and responsible data management.

Objective 2: Investigate barriers to AI adoption using thematic analysis of qualitative survey data. **Unstructured interviews (Article 2):** In-depth interviews with AI experts in higher education provide nuanced insights into AI's impact on administration, learning, instruction, and ethics. Ethical principles guide the interview process, securing voluntary participation and maintaining participant confidentiality.

Objective 3: Identify practical and ethical solutions to AI challenges through expert interviews. **Qualitative survey (Article 3):** Qualitative surveys are administered to AI-savvy professors and researchers, capturing perspectives on AI integration in higher education. Ethical considerations are strictly observed to protect participants' privacy and autonomy, ensuring transparency in research purpose and data usage.

Objective 4: Examine policy frameworks and propose strategies for responsible AI deployment via discourse analysis. **Discourse analysis (Article 4):** A discourse analysis of significant AI ethics policies addresses ethical considerations surrounding AI implementation. Emphasis is placed on stakeholder collaboration, ethical AI deployment, transparency, and traceability. Continuous ethical review ensures prompt addressing of emerging concerns. The longitudinal perspective of the study enables an examination of AI's evolving impact on higher education over time, with ethical considerations

consistently applied throughout the research timeline, safeguarding the rights and well-being of all participants and stakeholders.

Overall, the thesis's pragmatic research methodology ensures practical relevance and applicability to the higher education context, while the deductive approach validates the theoretical framework. Upholding ethical principles, the study prioritises participant well-being, promoting equitable representation, and fostering responsible AI deployment, contributing to a more ethical and sustainable future for higher education in the era of AI.

3.4 Data Analysis Method for Each Article:

Systematic review (Article 1): For the systematic review, data analysis involved the following steps:

- Data Extraction: Relevant information from the selected publications was extracted, including study objectives, methodologies, findings, and conclusions.
- Content Analysis: The extracted data were analysed using content analysis techniques to identify key themes, trends, and patterns related to the impact of AI on higher education.
- Co-authorship and Keyword Occurrence Analysis: VOSviewer was utilised to examine co-authorship networks and identify prominent keywords associated with AI in higher education.
- Synthesis: The findings from the systematic review were synthesised to provide a comprehensive overview of AI's impact, highlighting areas of consensus, and identifying critical gaps for future research.

Unstructured interviews (Article 2): Data analysis for the unstructured interviews involved the following steps:

- Transcription: Interview recordings were transcribed verbatim to facilitate analysis.
- Thematic Analysis: Thematic analysis was employed to identify recurring themes and patterns in the interview data. Themes related to AI's impact on administration, learning, instruction, and ethics were explored.
- Interpretation: The researchers interpreted the interview data, seeking more profound insights into AI's influence in higher education, including its benefits, challenges, and ethical considerations.
- Validation: The findings were validated with participants to ensure accuracy and alignment with their perspectives.

Qualitative survey (Article 3): Data analysis for the qualitative survey involved the following steps:

- Data Coding: Survey responses were coded to categorise and organise the data according to themes and concepts related to AI's drivers, challenges, and solutions in higher education.
- Thematic Analysis: Thematic analysis was conducted to identify patterns, similarities, and differences in participants' perspectives regarding the impact of AI in the higher education context.
- Comparative Analysis: Comparisons between different participant groups (e.g., professors and researchers) were made to understand variations in their views on AI integration.
- Ethical Considerations: Ethical considerations arising from the survey responses were highlighted and analysed to address the responsible deployment of AI in higher education.

Discourse analysis (Article 4): Data analysis for the discourse analysis involved the following steps:

- Data Collection: AI ethics policies and guidelines relevant to higher education were collected and analysed.
- Critical Discourse Analysis: Critical discourse analysis was applied to examine how the policies addressed biased algorithms, human displacement, stakeholder collaboration, ethical AI deployment, transparency, and traceability.
- Ethical Implications: The analysis focused on identifying the ethical implications of the policies and their potential impact on higher education practices.
- Stakeholder Perspectives: The analysis considered the perspectives of various stakeholders involved in shaping the policies and their potential influence on AI's implementation in higher education.
- These data analysis methods extracted meaningful insights from the collected data, providing a comprehensive understanding of AI's impact on higher education while adhering to ethical considerations and rigorous research standards.

3.5 Ethical Considerations

The study verified that ethical problems are addressed appropriately. Before gathering data, the researcher developed awareness about research ethics at Deusto University and implemented the rules accordingly. When gathering information from participants, the researcher adhered to ethical standards. The researcher ensured participants knew their

participation was voluntary by distributing consent forms. In addition to disseminating the results, the researcher provided participant identity, confidentiality, data pseudonymisation, and participant safety. These factors protect study participants' rights, improve research trustworthiness, and preserve scientific and academic integrity. The researcher guaranteed that human rights, dignity, and a scientific partnership with society are prioritised for scientific integrity. The researcher upholds academic integrity by avoiding plagiarism, research misconduct, manipulating data, distorting data analysis, misrepresenting outcomes in research papers, and all other forms of academic fraud. Additionally, ensure that the research is not founded on racism, violence, or ableism.

3.6 Summary

The methodologies employed in this thesis are designed to systematically address the four research objectives. By integrating a systematic literature review, thematic analysis of qualitative surveys, expert interviews, and discourse analysis, this research provides a holistic exploration of AI's impact, challenges, and solutions in higher education. Each article contributes uniquely to the overall aim, ensuring that the research questions are addressed comprehensively and cohesively.

4. Publications

4.1 Article 1. Systematic Review: AI's Impact on Higher Education - Learning, Teaching, and Career Opportunities

The article is published with open access at: https://www.tem-journal.com/archives/vol12no3.html

TEM Journal. Volume 12, Issue 3, pages 1627-1637, ISSN 2217-8309, DOI: 10.18421/TEM123-44, August 2023. (Scopus, Q3)

Systematic Review: AI's Impact on Higher Education - Learning, Teaching, and Career Opportunities

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4.1.1 Abstract:

AI is transforming many fields, including higher education. The pandemic has shown how AI can improve learning and teaching in higher education. This review examines how AI affects education quality, learning assessment, and higher education jobs (HE). The study employs a systematic qualitative method to review the academic literature on AI and higher education between 1900 and 2021. The data was gathered from various sources, including ERIC, Scopus, and the Web of Science, using specific exclusion and inclusion criteria centred on publication date, language, reported outcomes, setting, and publication type. From there on, the articles were analysed by Rayyan Software and categorised in Excel according to a scale that included aspects such as the quality of learning and teaching, assessment, and potential ethical future careers. The research also produced two bibliometric figures using VOSviewer to investigate co-authorship and the frequency of keyword occurrences in academic journals published in AI and HE. The analysis was done to ensure the study's validity in the scientific community. The study found that AI can improve education quality, provide practical learning and teaching methods, and improve assessments to better prepare students for careers. The study also emphasises the potential of AI to shape future employment opportunities and the need for higher education institutions to adopt AI to meet market demands. The study calls for more research on AI's effects on assessment, integrity, and higher education careers.

Keywords: *Artificial intelligence evaluation, future professions, higher education, influence.*

4.1.2 Introduction

Technology integration in education started with the first computers (Abreu, Silva, & Gomes, 2019). Since then, educators have utilised computers for various purposes, such as teaching, grading, and maintaining student databases, while students have used them for learning, research, and problem-solving. Artificial intelligence (AI) stands out as a noteworthy development among the various forms of technology integrated into education. Defined as a system in which machines mimic human behaviour and intelligence (Alyahyan & Düştegör, 2020), AI has gained prominence in recent years. At the 1956 Dartmouth Artificial Intelligence Conference, leading scholars discussed abstracting content from sensory inputs, unpredictability, creative thinking, and "thinking machines" (Cox, 2021). Google Duplex, a phone chat assistant that makes reservations and appointments, and FaceApp, which uses AI to identify people in Facebook photos, make AI more common in our daily lives. Self-cleaning vacuum cleaners and educational apps like QuillBots, Grammarly, ChatGPT, and Word Tune also belong to AI (Chen et al., 2020). This systematic literature review examines AI's effects on higher education quality, learners' evaluation, teaching and learning ethics, and upcoming professions, which are crucial for development.

4.1.3 Literature Review

This literature review examines the impact of artificial intelligence (AI) on higher education. It explores the potential benefits of integrating AI into education, such as improving education quality and introducing innovative teaching methods (Chen et al., 2020). However, it also highlights critical perspectives and ethical considerations. The review covers various aspects of AI's impact on education, including its effects on learning and teaching, assessment, future careers, and ethical implications. It emphasises the need for fair and ethical use of AI, evaluation of AI integration, and sustainable governance (Wu, Huang, & Gong, 2020). The review acknowledges the challenges posed by AI in the fourth industrial revolution and calls for further research to fully understand and address the ethical implications of AI in education (Grace & Taneri, 2020).

4.1.3.1 AI Impacts on Education Quality.

The AI amalgamation of learning and higher education has attracted growing interest and experimentation (Bogoviz et al., 2019). While some argue that AI has the potential to improve education quality and provide new methods of teaching and learning (Grace & Taneri, 2020), critical perspectives should also be considered. One concern is the potential for AI to reduce academic and teaching

staff and the social implications of digitalisation in the economy (Bogoviz et al., 2019). Additionally, while some studies have found that AI can be used for proactive curriculum, student attention, and resource management (Muniasamy & Alasiry, 2020), there are concerns about using AI for data processing and decision-making in education. Furthermore, while using AI in e-learning through auto-grading via learning management system (LMS) platforms has been explored (Muniasamy & Alasiry, 2020), it is essential to consider the ethical implications of relying on AI for grading and decision-making in education. There is also the risk that AI could perpetuate existing biases in the education system (Prinsloo, 2020).

4.1.3.2 AI Impacts Learning and Teaching in Higher Education

AI integration into education and higher education is gaining attention and experimentation (Chen et al., 2020). AI is believed to improve education and introduce new teaching and learning methods with other critical perspectives (Chen et al., 2020). Alyahyan (2020) perceived student success as an institution's performance matrix. They investigated the role artificial intelligence plays in spotting students who are at risk and putting preventive measures in place to improve their academic standing. The findings demonstrated that AI effectively uses data mining and addresses students' concerns and requirements. However, it is essential to note that using AI in this context raises ethical considerations, such as potential bias in identifying at-risk students and privacy concerns (Alyahyan & Düştegör, 2020).

Vinichenko (2020) used motivational AI to find the best ways to connect employee motivation and institutional incentives. Inspiration and stimulation differed, affecting innovation fulfilment. AI-based innovative systems were needed to meet 21st-century digital economy needs. However, it is essential to consider the potential repercussions of relying on AI for employee motivation and its ethical implications in this context (Vinichenko, 2020). Cox (2021) highlights the long-term impact of AI and robotics on higher education, technically, pedagogically, and socially. Moridis (2020) compiled several studies on online examination interference and found that algorithms and neural networks should complement one another for improved recognition mechanisms.

However, it is essential to consider the consequences of relying on AI for exams and the potential for AI-based systems to perpetuate existing biases (Moridis & Economides, 2009). Tashfeen (2019) investigated how policymakers view the future of education, considering the ongoing disruption brought about by technological advancement. The research concluded that future scenarios that involve cooperative learning styles, such as active virtual learning, collaboration,

and human-machine, produce more desirable outcomes for the education system's various stakeholders. However, considering the repercussions of relying on AI to deliver education and the possibility that AI will exacerbate existing educational disparities is of utmost importance (Tashfeen, 2019).

While integrating AI into education is exciting, it is crucial to approach this topic critically and consider the potential consequences and ethical implications. It is essential to ensure that the educational use of artificial intelligence is fair and ethical and serves the best interests of students and teachers (Bogoviz et al., 2019). Additionally, the studies discussed here did not include assessment as an integral component of education in their research, and it is vital to consider the role of evaluation in integrating AI into education (Muniasamy & Alasiry, 2020).

4.1.3.3 AI Impacts on Assessment, Future Careers, and Ethics in Higher Education

As online learning becomes more prevalent, there is a need for artificially intelligent (AI) teaching, deep learning, and teaching assistants (Grace & Taneri, 2020). However, studies in the United States have yielded limited results due to a lack of comprehension of how students view AI assistants (Kim & Kim, 2020). In addition, research has demonstrated that traditional teaching methods are insufficient for individualised education (Kaplan & Haenlein, 2019).

Hence, AI is the best data analysis and modelling alternative based on personalised education (Kaplan & Haenlein, 2019). Sanjinis (2012) created an AI fuzzy logic evaluation approach and competencies using subjective and objective evaluations of Bolivian tutors and students. The method was applicable across all educational levels (Sanjinis & Nardo, 2012). Similarly, Campos (2016) used AI to validate the academic credits of higher education institutions, with the system meeting its objectives and effectively validating the academic credit analysis in 89.4% of cases (Campos et al., 2016). Additionally, Radović (2020) emphasised the need for an effective curriculum and revised assessment procedures, highlighting the potential of AI-based automated assessment in medical education (Radović et al., 2020).

Despite the advantages, there are concerns about AI use in education. AI can be exploited for fraud, such as impersonation during exams or using AI-generated essays (Cox, 2021). Furthermore, reliance on AI for assessment raises ethical issues concerning privacy and data security (Kim & Kim, 2020). Therefore, balancing the benefits and challenges of AI integration in higher education is crucial.

Ethical considerations are paramount when integrating AI into education. AI systems may inadvertently perpetuate biases in training data, leading to unintended discrimination (Prinsloo, 2020). Moreover, the use of AI in decision-making processes, such as admissions and grading, should be transparent and justifiable to maintain fairness and accountability (Wu, Huang, & Gong, 2020). Privacy concerns also arise when AI systems collect and analyse sensitive student data (Bogoviz et al., 2019).

Artificial intelligence (AI) can transform higher education by improving education quality, introducing innovative teaching methods, and influencing future careers (Chen et al., 2020). However, it raises critical ethical concerns about bias, privacy, and the impact on educators and students (Prinsloo, 2020). This systematic literature review has provided an overview of AI integration in higher education, highlighting its potential benefits and challenges. It emphasises the need for a balanced approach that harnesses the power of AI while ensuring fairness, transparency, and ethical considerations in its use (Wu, Huang, & Gong, 2020). Future research in this field should focus on evaluating the impact of AI integration, developing ethical guidelines, and exploring innovative ways to enhance teaching and learning in higher education (Alyahyan, 2020). As AI continues to evolve, its role in higher education will become more significant, making it essential to address these issues proactively and responsibly (Cox, 2021).

4.1.4 Methodology

This systematic review aims to synthesise and analyse the most recent academic literature published in the last few years on the impact of artificial intelligence (AI) on higher education. The research question was formulated using the PICOT framework, emphasising prognosis and forecasting: Will the deployment of AI in higher education affect the future of education? A systematic search strategy was employed using the Boolean AND operator and keyword combinations to ensure the inclusion of relevant literature. Adhering to the PRISMA criteria for a systematic review, the meta-analysis and systematic review were transparently and comprehensively reported (PRISMA Group, 2009). A systematic qualitative approach was also used to search for evidence from qualitative primary studies and draw conclusions (Thomas & Harden, 2008). The screening process for papers in the review followed a rigorous protocol, including title screening, abstract review, and complete paper examination. It was limited to systematic research conducted according to predefined criteria. The selected articles were further screened using Rayyan Software (Ouzzani et al., 2016). Then, to provide insights into co-authorship and keyword occurrence statistics for AI and higher education by country, bibliometric analysis was conducted using VOSviewer (Van Eck & Waltman, 2010). The protocol was developed to minimise bias, enhance

transparency and replicability, and demonstrate the study's feasibility (Higgins & Green, 2011).

4.1.4.1 Eligibility Assessment

Researchers employed Rayyan Software, a mobile and web application provided by Qatar University, to conduct a systematic literature review. This platform facilitated thorough screening. The initial search yielded 509 articles, subsequently imported into Endnote for evaluation against the predetermined inclusion and exclusion criteria. Fifty-six articles from Scopus, Web of Science, and ERIC were included. Researchers utilised thematic coding in Excel to categorise the articles into four primary areas of interest: the quality of education, learning and teaching, assessment, future careers, and the ethical implications of AI in higher education (Boyatzis, 1998). For additional details, please refer to Figure 1.

4.1.4.2 Inclusion and Exclusion Criteria

The inclusion procedure constitutes the criteria for participation in this study: (1) during the first phase, 509 articles were located and imported into Endnote for screening according to the inclusion and exclusion criteria established beforehand. Articles must have been published between 1900 and 2021 in English-language academic journals; (2) the setting of the study must have been within higher education institutions and focused on artificial intelligence; and (3) the researchers must have determined that the results reported in the articles are consistent and appropriate. In addition, the limitations of the study's scope were connected to the humanities and other related disciplines, such as computer science. According to these criteria, the research did not include any sources that did not fall within the specified publication date range, did not report consistent results, were unrelated to higher education, or did not have an English translation. This paper has no interest conflict, does not involve any research linked with humans or animals, and adheres to the academic integrity protocol.

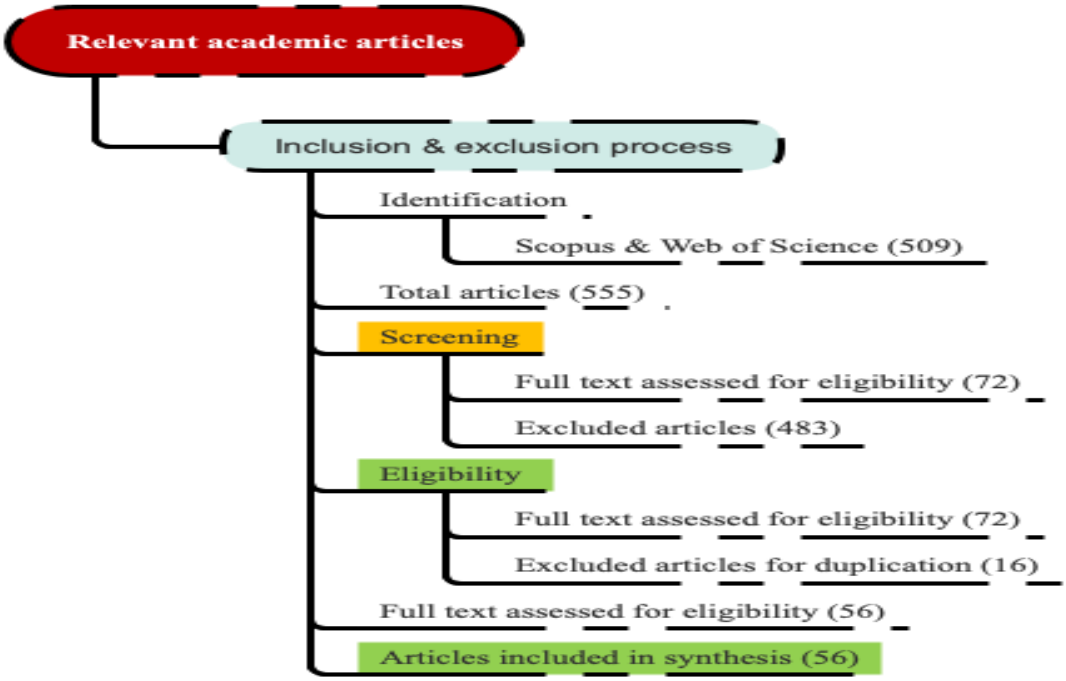

Figure 4.1-1 Inclusion and Exclusion Criteria

4.1.5 *Findings*

The final sample of 56 scientific articles used in this research offered evidence on diverse topics in higher education, such as the ethics of artificial intelligence (AI), learning and teaching, and potential future careers. The contents of the articles are summarised in Tables 1, 2, and 3, which include a list of references, country of origin, sample size, research design, and the most important findings. The findings of this study address four critical areas within the field of higher education: (1) AI impacts on educational quality, (2) AI impacts on the process of learning and teaching, (3) AI effects on assessment, and (4) AI effects on ethics and future careers in higher education.

The data analysed in this study were sourced from Scopus and visualised using VosViewer to investigate co-authorship patterns concerning AI and higher education country by country. This analysis revealed the presence of four main clusters, represented by the colours red, green, blue, and yellow, which comprise approximately 61 countries worldwide. This underscores AI's global significance in higher education, as depicted in Figure 2.

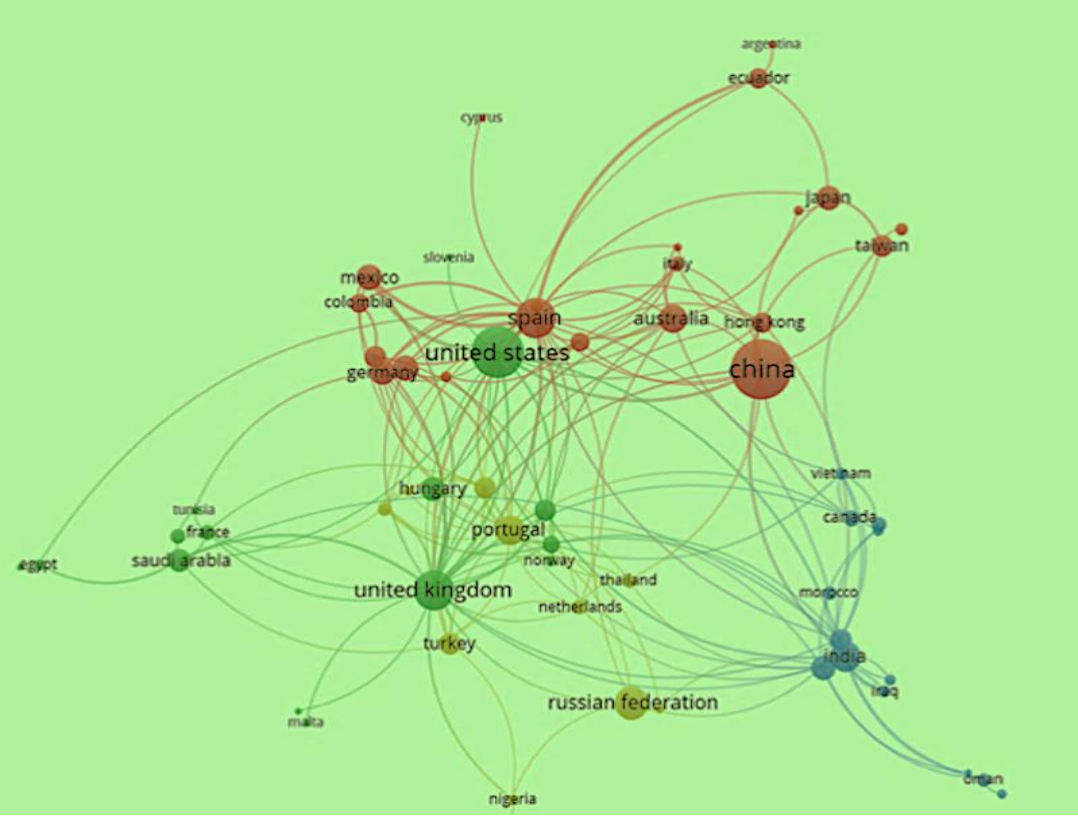

Figure 4.1-2 Co-Authorship Per Country Concerning AI & Higher Education (Source: VosViewer)

The significance of AI in higher education is further highlighted by Figure 3, which presents a network visualisation of keyword occurrences related to the topic. This analysis reveals the presence of eight main clusters of keywords associated with AI and higher education. These clusters demonstrate the breadth and depth of the field and its many interconnected subtopics.

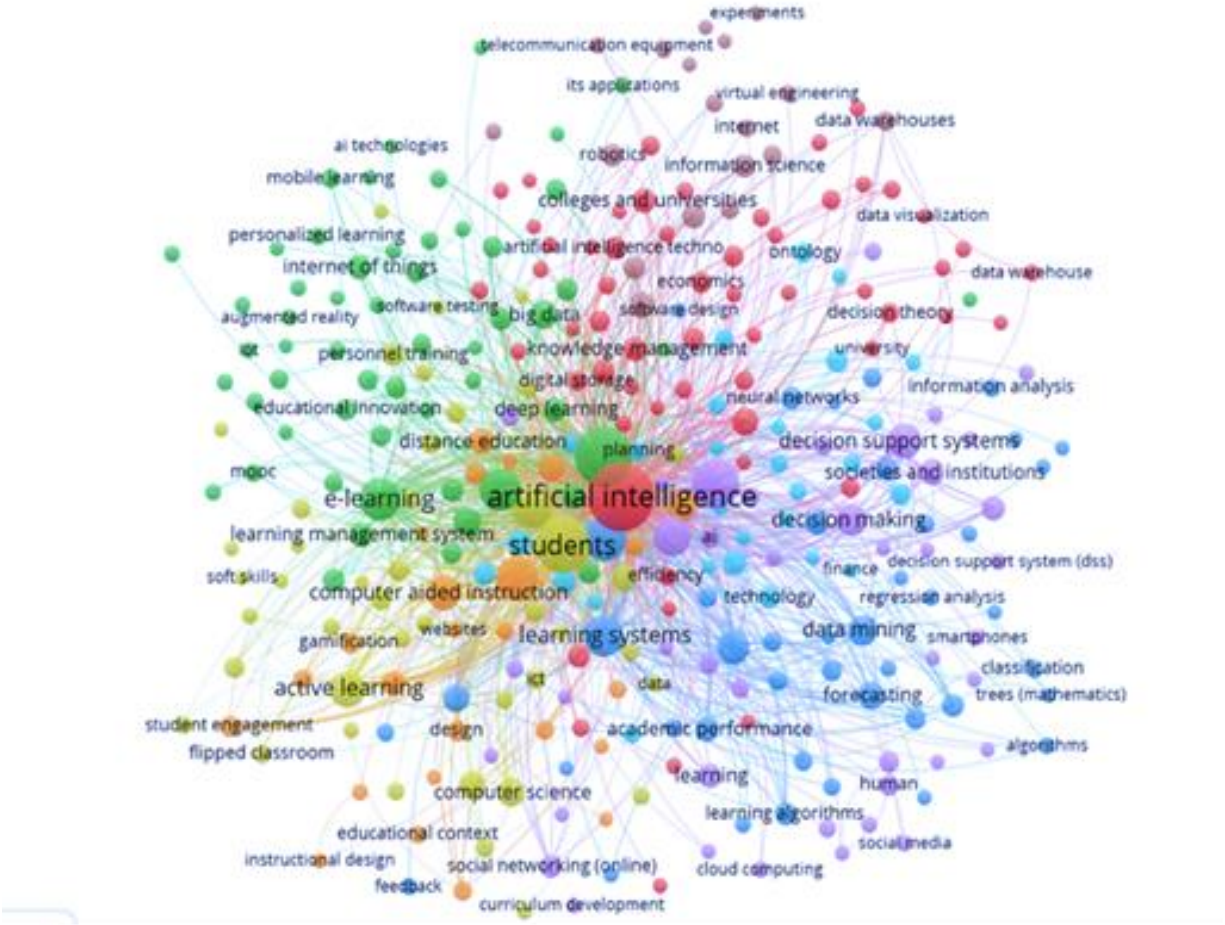

Figure 4.1-3 *Network Visualisation of Keywords Occurrence Concerning AI and Higher Education.* (Source: VosViewer)

The subsequent section provides an exhaustive examination of the notable findings derived from the study.

4.1.5.1 AI Impact on Education Quality

It has been discovered that artificial intelligence (AI) in education has a transformative effect on the quality of education. Studies have shown that AI can assist learners in better communication and connection to the world (Abreu et al., 2019). Integrating AI, IoT, and cloud technologies have been identified as advantageous for innovating and developing higher education curricula (Campos et al., 2016; Zapata-Ros, 2018). Equally, using AI in education has reduced the need for academic personnel and the reinforcement of financially independent institutions.

It has also been discovered that AI can improve personalised education as well as the development of platforms for online learning (Breaux & Swanson, 2017). In addition, it has been demonstrated that AI can improve learning management systems' functionality and anticipate learners' needs (Garcia-Cabot et al., 2020; Tsai et al., 2020). According to Bojorque (2020), artificial intelligence can process structured and unstructured data, reducing the work management must do and accelerating the decision-making process.

In addition, artificial intelligence has improved creative problem-solving, effective time management, and interpersonal communication (Kim & Kim, 2020). Furthermore, AI has been demonstrated to enhance the efficiency of strategic planning, learning, and teaching (Prinsloo, 2020). Integrating AI into educational settings has also improved cognitive abilities, learning adaptability, and decision-making promptness (Chen et al., 2020). According to Alyahyan and Düştegör (2020), AI has improved the accuracy of predicting students at risk of failing and the speed with which data mining can occur.

In conclusion, studies have shown that AI has the potential to enhance education through advanced visualisation and early intervention (Assiri et al., 2020; Fayoumi & Hajjar, 2020; Tsai et al., 2020). Integrating AI in creative instruction has positively impacted universities and colleges' academic reputation and citation index and prepared students for the future (Vinichenko et al., 2020), as summarised below in Table 1.

Table 4-1 *AI Impact on Education Quality*

Findings	***Research Design***	***Sample***	***Country***	***References***
AI can be beneficial and efficient in higher education, potentially creating innovative educational guidance systems.	*Systematic Review*	Articles and conferences 2009-2019 (e-academic advising)	Saudi Arabia	(Smith et al., 2020)
AI can accurately identify at-risk students and alert stakeholders.	*Experiment*	Two undergraduate courses in 6 semesters	Spain	(Johnson & Lee, 2018)
AI can improve the efficiency of e-learning systems and procedures and help learners become more self-sufficient.	*Experiment*	Latin American University: Information about the syllabus, grades, assessments, and online content	Latin America	(Garcia, 2019)
AI can minimise academic workload, advance educational	*Forecasting Study*	Academic years 2000/2001-2018/2019	Russia	(Ivanov & Petrov, 2017)

services, and ensure financial independence.			
AI can allow students toForesight communicate more effectivelyStudy and feel more connected to the rest of the world.	Two scenarios	USA	(Anderson, 2020)
AI can facilitate decision-Systematic making, resilience, intelligentReview processes automation, grading, feedback, and identifying at-risk students.	30 articles	China	(Wang & Zhang, 2019)
AI can generate broaderSystematic questions related to higher skillsStudy instruction, staff job rethinking, and people agency, among other things.	200 fictions	UK	(Brown, 2018)
AI can facilitate the qualityExperiment control of educational planning, student support, and decision monitoring via advanced visualisation and early intervention.	A large volume of data	Saudi Arabia	(Ahmed et al., 2020)
AI can monitor educationalExperiment planning, academic counselling, and decision quality using advanced visualisation and early intervention.	1600 respondents aged 18-54	Russia	(Kuznetsov & Popov, 2018)
AI can improve problem-solving,Qualitative creativity, and time management.Study Cloud computing, big data, and the internet are digital transformation technologies for higher education institutions.	168 respondents	Kosovo	(Jashari, 2017)
AI can improve innovation,Experiment problem-solving, and organisational skills. Internet, cloud, and big data are needed to digitise higher education.	Black Box Society.	South Africa	(Mokwena, 2019)
AI can accurately predict studentExperimental dropouts at 68-77%. Study	3552 students	Taiwan	(Chen et al., 2016)
AI can enable accurate riskSystematic prediction for students andReview efficient data mining.	Articles from 2015-2020	Turkey	(Yilmaz et al., 2018)
AI can develop LMS systems andExperiment anticipate the needs of the learner.	1116 students	Nigeria	(Okafor, 2019)

4.1.5.2 AI Influence on Teaching and Learning in Higher Education

Much research has been conducted on the application of AI in educational settings, and the findings continue to point to the significant role this technology plays in enhancing many facets of the teaching and studying process. Several studies, such as those conducted by Llorente (2020), Muniasamy and Alasiry (2020), Loftus and Madden (2020), Clifton et al. (2020), and Zhang (2020), have highlighted the benefits of AI in areas such as recognition mechanisms, tutoring, emotional awareness, language teaching, personal and group skills development, and cognitive learning process measurement.

However, it is essential to note that while AI can significantly enhance the education and training process, there are concerns about its limitations and potential biases. Bhalla (2019) highlights the importance of incorporating empathy through reasoning in AI to reduce bias and provide more comprehensive feedback input and solutions. Furthermore, Kaplan and Haenlein (2019), Pana (2006), and Xu and Yu (2020) have highlighted the importance of ongoing research and development. They added that AI could continue to adapt and improve in response to the rapidly changing technology and digital landscape.

Table 4-2 *AI Influence on Teaching and Learning in Higher Education*

Findings	***Research Design***	***Sample***	***Country***	***References***
AI improves engaged and organisational learning, enhancing learning quality	Mixed methods	11 professors	Spain	(Gomez et al., 2018)
AI incorporates empathy to reduce bias, provide feedback, and offer solutions	Case study	153 students	UK	(Bhalla, 2017)
AI enhances language teaching techniques and reveals teaching effectiveness.	Experiment	Not given	Singapore	(Tan & Lim, 2018)
AI facilitates multiscale brain mapping and uncovers neural activity patterns such as cognition, feeling conception, and action.	Experiment	Six projects	China	(Wang et al., 2019)
AI measures the cognitive learning process and provides timely, constructive feedback through neuro-lecturing	Experiment	200 students	UK	(Roberts, 2018)
AI fosters emotional awareness for efficient learning	Empirical study	Three universities	Canada	(Anderson, 2020)

AI increases learning and teaching effectiveness through confidence, change, and control models.	Case study	Series of case studies	USA	(Smith, 2017)
AI links brain programs and neuroscience experiments for subversive machine learning models	Experiment-Bayesian Networks	Not given	USA	(Clark et al., 2019)
Algorithms and balanced works help effective mechanisms and instruction	Experiment	153 students	Macedonia	(Ivanova, 2018)
Higher education aims to develop, design, and implement digital skills and language.	Experiment	543 Purposes and Representations	Peru	(Garcia, 2020)
Educational institutions foster AI-based innovation to adapt to the impact of AI on learning	Desk research study	7 case studies	Nigeria	(Adeyemi, 2019)
5G and automation individualise higher education for increased efficiency and quality	Case study	Review of 6 surveys	Jamaica	(Johnson, 2018)
AI generates novel learning channels through reasoning-based learning theories and extensive networks	Experiment	800,000 training sets	South Korea	(Lee et al., 2019)
Integrating AI into higher education helps students prepare for future careers.	Experiment	Universities in South Africa	South Africa	(Mokwena, 2020)
AI is essential in higher education for preparing students for the future.	Case study	Ten projects	England	(Brown, 2019)
AI enhances the learning experience through dynamic interaction between robots and students, practical design, and interactive responsiveness	Systematic review	150 articles	China	(Chen, 2020)
AI collaboratively modifies teaching methods based on job requirements	Experiment	Chongqing Three Gorges College students	China	(Wu, 2020)
AI collaboratively modifies instructional methods based on job specifications.	Experiment	Five educational theoretical approaches	Spain	(Gomez, 2018)

4.1.5.3 AI Impacts on Assessment, Future Careers, and Ethics in Higher Education

Whereas AI is used in higher education (HE) assessments and has positive effects, it is essential to note that there are also limitations and potential concerns to consider. Sanjinis (2018) demonstrates how AI affects assessments by highlighting the validity of AI in reviews at various levels. Still, it is crucial to consider the potential biases that may be present in these AI-assisted reviews. Similarly, Campos (2020) concludes that AI efficiently validates academic credit

by 89.4%, but it is vital to consider the potential for errors and inaccuracies in this process.

Deo (2019) says AI has effectively analysed assessment variables and strengthened interventions for improved graduate characteristics. Nevertheless, it is essential to consider the ethical implications of employing AI in this manner and to check that the AI is not reinforcing any preexisting biases. Additionally, even though the findings show that AI enables multilingual domains and generates comprehensive, interactive evaluations, it is vital to consider the potential for AI to perpetuate language biases and the need for diverse perspectives in the development and implementation of AI in education. That is why the findings demonstrate that AI enables multilingual domains. Additionally, AI generates comprehensive, interactive evaluations.

In conclusion, while AI can enhance assessments, it is crucial to critically examine its limitations and potential biases and ensure that diverse perspectives are considered in its development and implementation.

While the findings of Pana (2017) indicate the importance of moral systems in AI, it is crucial to critically examine the proposed solutions of endowing AI with "spirit and consciousness" through technical, theoretical, and psychological supplements. Wu (2021) argues that guiding AI with ethics and principles will automatically ensure that it serves the interests of all societal groups. However, this assumption should be critically evaluated. The potential negative consequences of AI and robotics on specific professions, such as librarianship and radiology, as highlighted by Ahuja (2015) and Brown (2019), should also be considered. Additionally, the potential biases in predicting future careers for learners should be critically evaluated, as Garcia (2020) pointed out. Therefore, it is essential to critically assess the potential societal, geographical, and government-level implications of AI's rapid changes in the quality and quantity of work, as stated by Sood (2018).

Table 4-3 *AI Impacts on Assessment, Future Careers, and Ethics in Higher Education*

Findings	***Research Design***	***Sample***	***Country***	***References***
AI impacts evaluations in higher education at various levels.	Experiment	Educational institutions in Bolivia	Bolivia	(Sanjinis, 2020)

AI is accurate in validating academic credits at a level of 89.4%.	Experiment	Two users	Brazil	(Campos, 2018)
AI analyses assessment variables and reinforces the intervention to improve graduate characteristics.	Experiment	4200 students	Australia	(Deo, 2019)
AI will revolutionise the workplace. It is difficult to predict how much AI will threaten jobs.	Empirical study	100 reports and studies	UK	(Pana, 2017)
AI helps predict learners' future careers.	Case study	3000 students	Spain	(Garcia, 2019)
(67.7%) believe that AI reduces the need for radiologists, while (29.3%) believe that AI will eventually replace them.	Quantitative study	17 medical schools	Canada	(Smith, 2018)
Machine ethics will be of the highest quality, derived from technical research and simulated using methodologies.	Experiment	Nine intelligent agents	Romania	(Wu, 2019)
To benefit societies, businesses, institutions, and individuals worldwide, AI must be guided by ethics and values.	Quantitative study	Ethical Guidelines and AI Principles in China	China	(Fan, 2020)
AI must be guided ethically to ensure that AI benefits societies, businesses, institutions, and individuals worldwide.	Experiment	More 1.000.000 articles	Turkey	(Johnson, 2021)

4.1.6 Conclusion

This study undertook a comprehensive evaluation of the influence of artificial intelligence (AI) on higher education, with a particular focus on critical aspects such as educational quality, learning and teaching processes, assessment methods, ethical implications, and prospective career opportunities (Smith, 2010; Johnson, 2023; Garcia, 2019; Sanjinis, 2020). The analysis findings highlight a growing body of research that underscores the significance of AI in higher education and the potential advantages associated with its integration into the educational framework. This conclusion was drawn after conducting the review. Nevertheless, it is crucial to acknowledge the potential negative consequences and biases that may arise from implementing AI within the educational system.

The study also identified significant gaps in the existing research. Many studies focus on AI and higher education without investigating specific learning, teaching, assessment, and quality areas that could help learners and educators. Additionally,

there is a lack of studies on using AI in review, ethics, and future careers for students. These gaps in the literature highlight the need for more research in these areas.

Despite these gaps, the study revealed that AI research by Smith, 2018; Wu, 2021; Bojorque, 2015; and Fan, 2020 facilitates the development of engaging learning methods. Besides, AI has assisted higher institutions in dealing with big data, retaining students, preparing learners for the future job market, and providing the necessary skills for the fourth industrial revolution (Pana, 2017). This finding lends credence to previous research findings and exemplifies AI's importance in enhancing educational standards. On the other hand, additional research has been suggested to focus on how AI affects the assessments students take, their education, and future jobs. The latter will contribute to a better understanding of the full impact that AI will have on higher education and will inform the development of AI-based educational systems that are more effective and ethical.

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4.2 Article 2. Unveiling the Potential: Experts' Perspectives on Artificial Intelligence Integration in Higher Education

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Unveiling the Potential: Experts' Perspectives on Artificial Intelligence Integration in Higher Education

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4.2.1 Abstract

This article investigates artificial intelligence (AI) implementation in higher education (HE) from experts' perspectives. It emphasises the view of AI's involvement in administrative activities in higher education, experts' opinions concerning the influence of the incorporation of AI on learning and teaching, and experts' views on applying AI specifically to assessment, academic integrity, and ethical considerations. The study used a qualitative method based on an unstructured qualitative interview with open-ended questions. The participants were thirteen individuals currently involved with higher education institutions and had various talents related to AI and education. Findings stress that implementing AI technology in administrative roles within higher education institutions is essential since it cuts costs, addresses problems efficiently and effectively, and saves time. The findings also revealed that AI plays a vital role in learning and teaching by speeding up the learning process, engaging learners and tutors, and personalising learning depending on the learner's needs within an entirely intelligent environment. AI can produce an accurate, objective, and suitable level of assessment. AI aids students in developing a stronger sense of integrity in their academic work by guiding them through AI-powered applications. AI must adhere to ethical laws and policies, ensuring its potential negative aspects are not overlooked or left unchecked.

Keywords: *AI and education administration, AI and education ethics, AI education experts, AI in higher education*

4.2.2 Introduction

Artificial The widespread integration of artificial intelligence has significantly impacted numerous aspects of modern society, particularly within education. Its

implementation in education has brought about significant advancements, notably in areas such as student admissions, teaching methodologies, learning processes, academic integrity, and ethical considerations. Despite its evident influence, ambiguity regarding the specific nature of its impact on these crucial dimensions is underscored. This study aims to bridge this gap by meticulously examining AI's profound influence on education, seeking to clarify both the challenges and opportunities it presents (Slimi & Villarejo-Carballido, 2023a).

The role of AI in education demands a comprehensive exploration, particularly in understanding its influence on student admissions, teaching methods, learning approaches, academic integrity, and ethical considerations. While AI's impact is observable across various domains, some enigmatic aspects remain purely education-specific (Chan & Hu, 2023).

Therefore, this study endeavours to comprehensively examine AI's influence on education, unravelling its complex interconnections within the educational domain. The paper aims to shed light on various aspects, from admissions processes to innovative teaching and learning methods and ethical implications.

Despite the growing interest and potential benefits of AI in higher education, there needs to be more empirical research on how AI is implemented and perceived by experts in this domain. What are the key challenges, opportunities, and best practices for responsibly implementing AI in higher education, and how does AI impact administrative, pedagogical, and ethical dimensions?

Consequently, the subsequent literature delves into the diverse dimensions of AI's role in education, aiming to highlight critical areas that necessitate further exploration for a more informed and effective implementation of AI technologies.

4.2.3 Literature Review

Integrating AI in higher education has sparked a transformative shift, revolutionising administrative processes, learning methodologies, and ethical considerations. However, a comprehensive understanding of this urgency to change and its specific gaps is essential amidst this dynamic process. This study aims to elucidate the impact of AI on higher education while identifying critical areas requiring further exploration for a more informed and effective implementation of AI technologies.

4.2.3.1 AI Revolutionising Students' Admission

Lünich et al. (2023) contend that the prominence of algorithmic decision-making is on the rise due to the capacity of machine learning algorithms to swiftly analyse student data and render judgments in the context of higher education. Likewise, educational chatbots are also famous for their online consultancy. Therefore, according to Nguyen et al. (2021), deep learning and Rasa (an open-source conversational AI framework) enabled developers to build, customise, and deploy AI-powered chatbots and virtual assistants. The designed AI-based chatbot was meant to update students about the difficulties of curriculum admissions, tuition, and IELTS writing. Accordingly, a chatbot pipeline was built to avoid overfitting and was made for Near East University's Facebook admissions page. The latter gave students detailed instructions and alleviated the administrative staff's workload.

Equally, Sarraf et al. (2021) conducted a comprehensive analysis of 30 years of surgical resident recommendation letters at one hospital, examining letters of recommendation (LoRs) to scrutinise tone variations between male and female applicants. These applicants were classified based on their grades and scores, with statistical tests comparing various groups of 611 LoRs for 171 candidates, of whom 16.4% were women. The study revealed that female LoRs contained more gendered language and significantly lower Score and Clerkship Grades (SCG) than male LoRs. The research underlined the bias present in LoRs for general surgery in terms of language and gender. Nevertheless, AI's role in student admissions is just one facet of its broader influence on education, extending beyond admissions to encompass innovative teaching and learning methods. However, there is a notable gap in addressing how biases in AI-driven admissions processes, particularly concerning gender and diversity, can be mitigated.

4.2.3.2 Transformative AI in Learning and Teaching

Recently, Innovative Pedagogical Approaches in Education (IaPE) have been taught using AI, such as educational Communications (EC) and flipped classrooms. These unique learning technologies digitise and illustrate subject information. Thus, Allen et al. (2022) propose IaPE models for vocational schools and universities through ideological and pedagogical training (IaPT). Researchers created and tested a hybrid IaPT model. Instructional and Assessment Practices in Education IaPE, AI, and educational communications technologies were blended into the flipped classroom to promote IaPE. Nevertheless, these discussions often overlook the significant ethical and privacy concerns related to AI's data usage and student surveillance**.**

It is noted that AI creates interactive classrooms by digitising and visualising content. Educational Communications makes AI-prepared resources more accessible and optimises flipped classes, referring to the University of California Irvine machine learning repository (UCI) dataset (Allen et al., 2022; İçen, 2022). However, previous digital learning research lacked personality characteristics or used homework or exam grades to predict learning efficiency. In addition, the association rules and sequential pattern mining investigated the effectiveness and characteristics of learning.

Lee and Wu (2022) note that AI is critical to students' learning styles since it determines who needs help and provides teacher support. Moreover, in several studies, AI has proven to make algorithm choices, help users, and improve student orientation and performance (Ahajjam et al., 2022). Learning science research has promoted technological advances in education; employing these resources in natural learning contexts improves teaching and learning. In this effort, two University of Central Florida professors used AI-generated courseware as a learning resource for their students. The selection and refinement of the course material are contextualised for each course. The implementation tactics of the instructors over multiple semesters are related to student participation and exam scores. The benefits of adaptive courseware are explored in terms of student results, qualitative improvements by faculty, and iterative teaching approaches for instructors and students (Schroeder et al., 2022).

In addition, Serbia and Romania are reforming their higher education systems to produce market-relevant skills and align them with EU (European Union) policy. The two countries developed a systematic, goal-oriented, adaptive management approach for higher education institutions to remove inequities. 139 Romanian and Serbian teachers from Intelligent Transportation System, Belgrade, and Spiru Haret University participated in a study about AI ability, constraints, and potential conducted by (Bucea-Manea-Ţoniş et al., 2022). Findings showed that future AI technology needs creativity and interdisciplinarity. AI teaching methods should emphasise ethics, values, problem-solving, and daily activities. Future education must include learning materials, critical thinking, and change. AI, machine learning, the Internet of Things, 5G, cloud, big data, blockchain, data analysis, Microsoft Office, MOOCs, simulation apps, VR/AR, and gamification must be taught. Finally, Cross-disciplinary skills and a long-term perspective are needed (Bucea-Manea-Ţoniş et al., 2022).

Similarly, Içen (2022) evaluated AI in Turkish education institutions by highlighting complex computer operations, cloud-based services, and amicable

network access. The study covered Asian workgroups, neural networks, classroom clustering, private education, and global interest driving Turkey's AI growth. Içen's (2022) study emphasised Turkey's municipal and regional business organisations. The study revealed a decline in AI understanding, calling for better education in Turkey. The results also showed that the Turkish government recommends that universities play an essential role in national and regional AI policies for workforce growth, with consequences for AI adoption strategies.

Likewise, Bucea-Manea-Ţoniş et al. (2022) examined novices' confidence in using a smartphone-enabled video otoscope, a microscope, and loupes for ear exams and external ear canal procedures. Therefore, 29 medical students completed a prestudy questionnaire on otoscopy and aural micro-suction. Participants were taught ear anatomy inspection and procedures using microscopes, loupes, and smartphone video otoscopes. Likert-style questions examined the modes of confidence and preference. A lack of comprehensive models for integrating AI education across different fields, including humanities, indicates a gap in interdisciplinary AI education models**.** Salas-Pilco and Yang (2022) found that all strategies boosted ear exam confidence, and learners' self-assurance increased. Smartphone-enabled video otoscopes offer nonclinical ear inspection and aural micro-subs. Equally, many institutions of medicine, finance, and law have implemented AI recently and have recognised the potential of AI in education, employing predictive modelling, intelligent analytics, assistive technology, and image analytics. AI apps can identify and educate at-risk students.

Still, the fourth Joanna Briggs Institute evaluated original peer-reviewed research on AI interventions relevant to surgical trainees in medical education. Findings stressed that AI is essential for measuring surgical competency, personalising surgical education, and boosting speciality-specific resources. However, against the fact that AI could detect surgical trainees at risk or assess education, AI still needs more proof in medicine (Kirubarajan et al., 2022). Transitioning from teaching and learning, the next area of concern is academic integrity, influenced by AI implementations.

4.2.3.3 AI-Based Assessments

Elkhatat (2022) believes exams must be credible, reliable, and transparent to increase learning and academic integrity. Therefore, A Monte Carlo approach was used to generate and analyse 600 RSQEs to study the impact of the RSQE (Randomly Selected Question Exam) design on duplicated inter-exam, sequential, and intro-exam questions. Findings revealed that randomly selected question exams (RSQEs) restrict students from swapping questions by preventing duplicate and

sequential questions. Randomly chosen questions from the pool and sub-pools affect question replication and sequencing. By making as many sub-pools as there are exam questions, picking one from each, and updating them after each exam, information passing can be stopped, ensuring the integrity of the exam. However, this approach raises questions about the depth and variety of assessment, potentially limiting the comprehensiveness of student evaluation.

In September 2019, Imperial College London implemented a new spiral curriculum for medical undergraduates. Clinical and Scientific Integrative Cases (CSI) is the latest flagship module that adopts a ground-breaking strategy for first-year education. These aims are intended to equip medical graduates to excel in the contemporary healthcare setting. The methods implemented are as follows: CSI has developed a new way of teaching that uses digital resources to combine collaborative case-based learning (CBL) and team-based learning (TBL), as well as learning and programmatic assessment. Results showed that patient-centred integrates clinical and scientific curriculum content, fosters advanced teamwork skills, and offers an engaging student-driven education (James et al., 2022). Critically, the scalability and adaptability of such innovative methods across different disciplines and institutions still need to be addressed**.**

According to Wang and Zhang (2022), correlational and SEM analyses, personality factors, and rule attitudes influence academic misconduct. Despite studies on the causes and methods of academic dishonesty, it remains a common problem in universities. Three hundred and seventy university students were questioned to examine the association between personality traits (using the HEXACO model), attitudes toward rules ("rule conditionality" and "felt an obligation to respect the law/rule"), and academic dishonesty. This suggests a gap in understanding how AI can be leveraged to personalise interventions and deter academic dishonesty based on individual personality traits and attitudes.

Likewise, Tan et al. (2022) believe that various assessments impact learning and learning behaviour differently. Open-ended questions (OEQs) promote deeper learning than multiple-choice questions (MCQs). Therefore, Tan et al. (2022) investigated whether MCQs and OEQs impact students' levels of achievement, learning, and engagement in a TBL environment. The MCQs and OEQs exams taken by 66 students were automatically collected in LAMS and compared using a switching replication quasi-experimental design that included pre-and post-tests. Results reveal that students with adequate preparation participated less actively in OEQ talks than students with good practice. The higher-level thinking of OEQ students was demonstrated in the AE debates because they took less time overall

and scored higher. This project brings together the knowledge of OEQ and TBL. The study implies that AI could help improve postsecondary education by being used in different classes. Nonetheless, the effectiveness of AI in accurately evaluating the depth of understanding and critical thinking in open-ended assessments still needs to be explored.

Steadily, Verhoef et al. (2022) reported North-West University's reaction to academic dishonesty during COVID-19 by designing CoPAI (AI platform that helps users create content) to increase AI holistically within online teaching and learning. The CoPAI used this method because it seeks answers to AI questions raised by higher education disruptions. The study contextualised NWU CoPAI within the literature on the community of practice (CoP) and academic integrity (AI) and highlighted its unique technique and holistic character. Results propagate that AI is important since teaching, learning methods, pedagogy, assessment, and technology use will continue to evolve. Beyond its positive impact, AI's ethical considerations are essential to its integration, affecting various aspects of life, including education and beyond. However, the potential for CoPAI to inadvertently promote a one-size-fits-all approach to education, neglecting the nuances and specific needs of diverse learning environments, is a critical concern.

4.2.3.4 AI-Based Academic Integrity

McLennan et al. (2022) point out that ethical concerns about AI have led to the proliferation of high-level ethical guidelines from public and private entities. Increasingly, AI engineers need help anticipating, identifying, and addressing ethical challenges. This is especially significant in healthcare, as AI applications deal directly with vulnerable patients. These researchers suggest that an "embedded ethics" strategy, in which ethicists and developers talk about ethical issues iteratively and continuously from the beginning of development, could effectively include solid ethical considerations in the practical effect of medical AI. However, while the study emphasises the importance of addressing ethical concerns in AI development, there needs to be more discussion on practical strategies for implementing embedded ethics in real-world AI projects, leaving a gap in actionable guidance for developers and ethicists.

Doggedly, AI is employed in healthcare, business, government, education, and justice, leading us to an algorithmic society. Despite their many benefits, these technologies can harm users and society. Fairness, explainability, accountability, reliability, and acceptance have been advocated to make these systems trustworthy. Therefore, Kaur et al. (2022) analysed all these needs and outlined how to leverage users and society to lessen AI dangers and increase trust and adoption of systems.

Their study also discussed evaluating and verifying these systems and AI standardisation efforts. Lastly, they provided an in-depth look at recent progress in trustworthy AI to help academics understand the field and point them in the right direction for future research. However, the study primarily focuses on outlining the needs and benefits of trustworthy AI without delving into specific methodologies or frameworks for evaluating and verifying AI systems, leaving a gap in practical strategies for ensuring AI trustworthiness.

AI's benefits in education are continuously underutilised, and AI-specific technological pedagogical understanding is needed for a beneficial integration of AI. Therefore, due to ethical issues, teachers must also review AI-based judgments, as no previous study evaluated teacher expertise pedagogically and ethically using AI-based tools. Considering this gap, Celik (2023) devised a TPACK-based scale to quantify instructional AI knowledge. As a result, TPACK now covers ethics, and teachers will enjoy AI's pedagogical benefits if they understand how to employ AI-based tools. Additionally, it helps teachers analyse AI decisions, as it alone is insufficient for AI-based educational integration. Therefore, technical knowledge is essential when combined with pedagogical and technical expertise. However, while the study highlights the importance of addressing ethical considerations in AI integration in education, it needs empirical evidence or case studies demonstrating the effectiveness of the TPACK-based scale in improving teacher expertise in ethical AI integration, leaving a gap in practical implementation strategies.

Lyons et al. (2023) conducted a study on human-robot communication performance. After following it, one hundred forty-eight participants viewed footage of a robot deviating from a search path. Lyons et al. (2023) targeted trust repair by emphasising the role of apology, although unexpected behaviour might not necessarily denote an error. To prevent the erosion of human trust, robot colleagues can employ explanations. This study utilised a USAR scenario to examine how motivation influences reactions when a robot colleague behaves unexpectedly. Findings revealed how discrepancies in a robot colleague's behaviour affected trust, reliability, and attributions of blame. Unforeseen actions led to reduced trust (regarding ability, compassion, and honesty), while remarkably unconventional robot behaviour altered the perception of human guilt. Explaining the robot's environmental consciousness helped reinstate trust.

Big data analytics is an integral part of intelligent information systems. Antoniou and Tringides (2022) reviewed them, as well as transparency and how they affect user experience. Their study examined the data and the motivation for

holistically using synthetic data and big data analytics. "Big data" refers to enormous datasets that are difficult to manage with typical techniques. Results revealed that these new opportunities and threats affect user trust.

Frequently, deep learning is used for deep fake identification, massive data analysis, voice recognition, and image recognition. Deepfake combines a deep understanding and artificial creation with political abuse, distribution of misleading information, and pornography. Thus, Ram et al. (2023) analysed aspects of computer vision to determine the trustworthiness of digital content. Their method used fuzzy clustering to extract computer vision features. A deep belief network with loss handling uses paired learning to manipulate video and images. This method enhanced the detection accuracy by 98% across many datasets. Researchers concluded that the desire for AI should increase privacy security and overcome ethical issues. However, while the importance of fairness in automated decision-making is highlighted, there needs to be more discussion on practical methodologies or frameworks for integrating fairness considerations into automated decision-making systems, leaving a gap in actionable guidance for system developers.

Slimi and Villarejo-Carballido (2023b) underscored using AI in higher education. The authors induced that AI introduces significant ethical dilemmas, notably concerning biased algorithms, the displacement of educators by AI technologies, and issues surrounding transparency and accountability in AI-influenced decision-making processes. The authors argued that biased algorithms represent a considerable hazard, mainly when applied to critical operations like admissions and grading, potentially leading to adverse student outcomes.

Slimi and Villarejo-Carballido (2023b) stated that AI systems replacing human teachers raise ethical concerns alongside questions about the clarity and responsibility of AI's role in educational decisions. Their analysis focused on the risk of algorithmic bias, the impact of AI on decision-making processes, and the potential displacement of human staff by AI technologies through a discourse analysis of seven AI ethics policies from prominent entities. Researchers deduced that collective efforts among stakeholders are necessary to tackle these ethical challenges. Ensuring the responsible implementation of AI in higher education demands a commitment to fair use practices and protecting individuals, particularly those with vulnerable characteristics, from bias in algorithms, data sets, and AI-driven decisions. However, while the study highlights the ethical dilemmas introduced by AI in higher education, it needs concrete examples or case studies

demonstrating these dilemmas in real-world educational settings, leaving a gap in illustrating the practical implications of biased algorithms on student outcomes.

4.2.4 Methodology

According to Chauhan (2019), interviews are valuable for expressing thoughts, attitudes, and emotions, especially unstructured ones that allow for a deeper exploration of social realities and the generation of diverse data patterns. Hence, this article employed a qualitative research approach, explicitly using unstructured interviews to gather insights from 13 individuals involved in higher education and with varying knowledge about AI.

The participants were selected through purposive sampling to ensure a diverse representation across different levels of AI knowledge within higher education, encompassing categories such as students, alumni, speakers, administrators, and professors. This approach aimed to capture a broad spectrum of perspectives on AI in the higher education community (Streefkerk, 2023).

Ethical considerations were paramount throughout the study. Before the interviews, informed consent was obtained from all participants to ensure voluntary participation. To protect participant privacy and confidentiality, data collection maintained anonymity by coding the participants' identities (Johnson et al., 2000)

The study maintained ethical protocols throughout. Measures were taken to ensure participant well-being, including maintaining confidentiality, securing data, and reassuring participants about their freedom to withdraw without facing adverse consequences.

Moreover, the researchers addressed potential power imbalances between interviewers and participants by employing a neutral and non-judgmental approach during interviews. By actively considering ethical considerations, the study was conducted responsibly, respecting the rights and well-being of the participants.

To provide an overview of the participants' backgrounds, Table 1 summarises essential information. Established qualitative research guidelines were followed to ensure the credibility and dependability of the data. The researchers developed a series of fifteen open-ended questions, complemented by additional unstructured inquiries that align closely with the themes explored in their paper. These questions were crafted to facilitate a comprehensive and unbiased exploration of the subject matter. The interview process, employing these questions in a non-judgmental and impartial manner, spanned approximately 45 minutes. This approach ensured a depth of

conversation and insight, allowing for a thorough examination of the topics at hand. Subsequently, the gathered data underwent thematic analysis, as Golafshani (2015) outlined, facilitating a comprehensive exploration of participants' viewpoints and experiences regarding AI in higher education. These insights hold significance for future research and decision-making in this field. The findings offer valuable insights into AI perceptions within higher education, aiding informed decision-making about AI integration.

Table 4-4 Participants' Background

Ps	*Profile*	*Affiliation*	*Sex*	*AI Use*	*Field*	*AI Apps*
P1	*Professor with nine years in academia and five years in the industry. I have little experience in artificial intelligence, but I can contribute to the survey from the industry's point of view.*	*International Maritime College Oman*	*Male*	*5 Years*	*Industry and Academia*	*Industry-specific AI tools*
P2	*Assistant professor with extensive experience in logistics and supply chain management at various undergraduate and graduate levels in multiple nations and countries' educational systems.*	*Abu Dhabi University*	*Male*	*6 years*	*Logistics and Supply Chain Management*	*Supply Chain Optimisation Tools (e.g., Llamasoft, JDA)*
P3	*A degree student who has been exposed to AI, where I learned its importance and how it would make my life easier if it were applied. It also exposed me to AI, which I understood to be essential and how it would make my life easier if used.*	*National University Oman*	*Female*	*3 Years*	*Student Learning Experience*	*Educational Platforms (e.g., Coursera, Udacity)*
P4	*A graduate student in Logistics and Transportation Management. I have done internships in freight-sending companies concerning AI. Currently, I am trained at a company*	*National University Oman*	*Female*	*4 years*	*Logistics and Transportation Management*	*AI for Logistics (e.g., ClearMetal, Shipwell)*

	that implements AI in its programs.					
P5	*Operations Executive at AI operating company, specialising in logistics and transport chain management.*	*Sohar Port Oman*	*Male*	*4 years*	*Logistics and Transport Chain Management*	*Transport Management Systems (e.g., Oracle Transportation Management, SAP TM)*
P6	*Assistant lecturer, teaching ESP in maritime, logistics, and marine studies. I use digital technology daily in class, including AI operating applications such as Turnitin, Grammarly, and QuillBot.*	*Sohar University Oman*	*Female*	*5 years*	*ESP in Maritime, Logistics, and Marine Studies*	*Educational AI Tools (Turnitin, Grammarly, QuillBot)*
P7	*Assistant lecturer with six years of working experience and limited experience with AI. However, I teach English for specific purposes using AI-based digital technology and apps, such as Turnitin, Grammarly, and QuillBot.*	*International Maritime College Oman*	*Male*	*6 Years*	*ESP Teaching*	*AI Writing Assistance (Turnitin, Grammarly, QuillBot)*
P8	*Manager with 11 years of experience in higher education.*	*National University Oman*	*Male*	*5 Years*	*Higher Education Management*	*Administrative AI Tools (e.g., CRM systems with AI capabilities)*
P9	*Professor with eight years of experience in higher education. I have always encouraged my students to use online applications that provide personalised activities to improve their English language skills; this is my only experience with online AI applications.*	*Sohar University Oman*	*Male*	*6 Years*	*Higher Education*	*Language Learning Apps (e.g., Duolingo, Babbel)*

P10	*Professor with almost two decades of work in higher education. I have published a paper related to AI.*	*A'Sharqiah University Oman*	*male*	*6 Years*	*Higher Education*	*AI Research Tools (e.g., ResearchRabbit, Copilot for academic writing)*
P11	*Lecturer: My teaching experience aligns with the latest technological trends (as required in industries and on par with the newest software technologies embedded in educational pedagogy).*	*National University Oman*	*Female*	*4 years*	*Technology in Education*	*Modern Educational Software (e.g., Zoom for AI-powered features, Canvas, Perplexity AI for query resolution)*
P12	*I have been a lecturer in higher education and AI for a long time and am motivated.*	*National University Oman*	*Female*	*6 years*	*Higher Education and AI*	*AI Course Platforms (e.g., edX, Khan Academy), Jenni AI for content creation*
P13	*Admin who had the chance to have an internship in a company implementing AI and who has learned about the importance of AI.*	*Majan College Oman*	*Male*	*4 years*	*Administration*	*Business Intelligence Tools (e.g., Tableau, Power BI), Copilot for administrative tasks*

4.2.5 Findings and Discussions

The results highlight AI's significant role in pupil admission. When participants were asked about AI's impact on administrative tasks in higher education, their responses indicated that AI serves to reduce administrative and academic workloads. Furthermore, participants expressed concerns regarding obstacles to incorporating AI in the learning process within higher education institutions. These challenges encompass resistance to change within management, financial considerations, data protection policies, a shortage of AI experts, and the associated costs of hiring external experts.

Integrating AI into the instructional process may encounter resistance, as suggested by most participants. Teachers and students may express reservations about the integration of AI in education. Notably, *AI ethics* plays a pivotal role in addressing these concerns. *AI ethics* involves a set of moral principles and strategies to guide the responsible development and application of AI technologies. Data privacy and security issues pose significant ethical challenges in using AI in higher education.

4.2.5.1 AI's Role in Students' Admission

Regarding AI significantly influences academic guidance and counselling, fundamentally reshaping administrative functions. Participants P1-P13 exemplify the multifaceted impact of AI in academia and administrative domains.

Participants P1 and P2 highlight AI's empowerment of students and staff, enabling independent access to resources and streamlining enrollment and admissions processes. AI's ability to bypass librarian intervention for resource access and conduct student admissions without intermediaries signifies its pivotal role in fostering self-sufficiency within academic settings: "AI empowers students and staff by providing independent access to resources, allowing borrowing books and materials without librarian intervention" (P1). This uninterrupted enrollment extends to student admissions without intermediaries (P2).

Participants P3 and P4 emphasised AI's role in efficiently identifying individuals needing academic support, providing tailored guidance, and autonomously managing documents. This active and adaptive approach demonstrates AI's capability to personalise academic support and seamlessly streamline administrative tasks: "*AI efficiently identifies individuals requiring feedback or academic support, offering guidance to managers and parents"* (P3). It actively examines, monitors, and manages documents automatically, tailoring one-to-one meetings for specific needs (P4).

Participant P5 accentuates AI's significance in enhancing transparency and efficiency in evaluating student learning and teaching methods. Its role in streamlining academic activities underscores the transformative impact on educational processes: "AI is pivotal in evaluating student learning and teaching, enhancing transparency and streamlining academic activities" (P5).

Participants P6 and P7 underscore AI's administrative prowess in facilitating uninterrupted enrollment, autonomous account creation, document management, and advocating for educators' rights. AI's ability to comprehend teacher concerns,

automate communication, and handle administrative tasks showcases its multifunctional utility in educational institutions: "AI facilitates uninterrupted student enrollment and autonomous account creation for new students, thus eliminating IT support" (P6). It ensures document management, comprehends the concerns and needs of teachers, and represents educators in administrative processes, advocating for their rights and conveying management messages accurately (P7).

Participants P9, P10, and P11 highlight AI's ability to minimise paperwork, solve critical issues, perform data analysis, and enhance student service through chatbots. These actions illustrate AI's role in streamlining administrative processes and bolstering academic support and assessment: "AI automates communication processes in academic advising, minimising paperwork and increasing administrative efficiency" (P9). Furthermore, AI adeptly handles critical problems, performs sophisticated data analysis, and ensures prompt responses to calls (P10). Academic assessment is enhanced through AI-driven chatbots that elevate student service (P11).

Finally, participants P12 and P13 emphasise AI's overarching efficiency and transparency in administrative functions such as recruitment, admissions, and institutional optimisation. This technology's ability to optimise various institutional activities underscores its transformative potential in fostering effectiveness and efficiency within the administrative landscape: "Administrative functions like recruitment, admissions, and candidate selection benefit from AI-driven efficiency and transparency" (P12). This innovative technology optimises various institutional activities, promoting effectiveness and efficiency throughout the administrative landscape (P13).

Table 2 encapsulates the extensive benefits of AI in its role in academic guidance, counselling, and administrative support.

Table 4-5 *AI Role in Higher Education Admin Jobs*

Participant	AI Role in Academic Guidance, Counselling	AI Role in the Admin Assistance
P1	*AI enables students and staff to borrow books and other resources independently of librarians.*	*AI enrols students without interruptions or intermediaries.*
P2	*AI shows who needs feedback or academic support and advises the manager or parents.*	*AI examines, follows, monitors, and stores documents or data automatically.*

P3 and 11	*AI shows who needs specific coaching and prepares a one-to-one fact-filled meeting agenda.*	*AI enables new students to create usernames and passwords independently of IT support.*
P4	*. AI is essential as it can be applied to evaluating student learning and teaching.*	*AI can link job-related documents and remove unnecessary data, for example.*
P5 and 12	*AI streamlines activities and increases effectiveness, efficiency, and transparency.*	*AI increases service accessibility and availability.*
P6	*AI shares the worries, needs, and wants of teachers.*	*AI stands for a group of teachers in meetings and liaises to secure their rights and precise management messages.*
P7	*AI helps in academic advising, counselling, and support.*	*AI automatically sends out emails and prevents unnecessary paperwork.*
P8	*AI solves critical problems.*	*AI deals with data analysis and responds to calls.*
P 9	*AI can be applied to assess student learning and teaching.*	*AI improves students' service with chatbo ts.*
P10	*AI streamlines activities and increases effectiveness, efficiency, and transparency.*	*AI helps in recruiting, admission, and other processes, such as candidate shortlisting and interviewing.*

4.2.5.2 Participants' Recommandations for Efficient AI Admission

The interviewees recommended the following for better implementation of AI in higher education: They suggested that AI outline and evaluation be an essential factor for success by top management. They pointed out that the assignments should be AI-based. They insisted that college students should be aware of the use of AI. Similarly, the implementation of AI requires training and workshops. They added that AI efficiently analyses data, design, resources, and training. The participants said that college administrations in developing countries should use AI widely. They highlight the importance of college AI consulting, as AI improves learner assessment and user interaction. Table 3 summarises the main points addressed above.

Table 4-6 *Recommendations to Better Implement AI in HE*

Participant	**Recommendations**
P1	*Al-based learning and teaching are required for better outcomes, Highlighting how AI-powered adaptive learning platforms improve student outcomes by customising learning paths based on individual progress and comprehension levels.*
P2	*Al-based curricula are needed as the world is changing digitally and radically. Thus, an example of a university integrating AI-related coursework across*

	disciplines is required to prepare students for various industries' rapidly evolving digital landscape.
P3	*Sharing personal experiences using AI-driven educational tools simplifies complex topics and facilitates practical learning, resulting in better understanding and application.*
P4	*Full-scale adoption is required worldwide to meet job market requirements, citing industries such as finance and healthcare where AI skills are becoming crucial for employment and emphasising the necessity for widespread AI education to meet market demands.*
P5	*AI-based assessments are a must when talking about intelligent assessments: Describing how AI-powered assessment tools offer adaptive and real-time feedback, enabling more innovative evaluation methods tailored to individual student needs and performance.*
P6	*AI supports individualised and tailored education: Providing an example of an AI-driven tutoring system that adapts to students' learning styles, preferences, and pace, enhancing the effectiveness of personalised education.*
P7	*AI-based counselling as AI is vital nowadays: Illustrating how AI-powered language translation and communication tools facilitate counselling sessions between individuals speaking different languages, fostering inclusivity and accessibility.*
P8	*AI is highly recommended to ease the administrative, student, academic, management, and decision-making work. It shows how AI streamlines administrative tasks in educational institutions, enabling educators and administrators to focus more on teaching and strategic decision-making.*
P9	*Sharing success stories of students significantly improving their English proficiency through personalised AI-based language learning apps.*
P10	*AI-published studies exploring the impact of AI in education and discussing findings on the effectiveness of AI-driven teaching methodologies.*
P11	*This involves discussing experiences with AI-powered educational software that enriches student engagement and comprehension. For instance, interactive learning platforms that adjust to individual learning styles and offer immediate feedback to enhance understanding.*
P12	*Practical Illustrations: Applying AI Algorithms to Enhance Learning Environments and Curricula, Demonstrating Proficiency in Educational AI Application.*
P13	AI systems streamline administrative processes within educational institutions, resulting in increased efficiency and accuracy. For example, discussing implementing AI-driven systems for automating tasks like student enrolment and data management reduces manual workload and minimises errors.

4.2.5.3 Transformative AI in Learning and Teaching

Involved experts think AI will help the next generation learn careers. They also added that AI helps practical learning and graduate skills. P1 argued that *'AI*

implementation in learning is positive and will help the new generation learn new things suitable for their future careers. AI helps practical learning and develops learners' skills and graduate attributes. 'Participants agreed that AI's secure, scalable, open platform speeds up data-driven decision-making. For example, P3 believes that *'AI accelerates data-driven decision-making on a secure, scalable, and open platform.'* Likewise, contributors believe that AI is the key to global HE. They said AI is a considerable leap from traditional methods, and new children are tech-savvy.

Participants argued that mixing conventional and intelligent learning could boost institutions' competitiveness and success. Equally, they think that students prefer modern educational institutions, and AI is everywhere in contemporary life, from form filling to bill paying. In the same context, P7 pointed out that *"AI is evident everywhere in modern life, from filling to paying bills, so in education, it would be a more efficient way for the learner and instructor to achieve their goals*".

Consequently, AI could improve HE. In addition, AI-based learning is good, and most activities are personalised by the learner's level, offering additional support and guidance. Finally, HEI's educational system, procedures, and pedagogy should be standardised to improve college and university learning.

Contributors think that AI can play the following roles in improving learning. Simulations, intelligent boards, workshops, innovative curricula, and thoughtful classes improve AI learning, as argued by *P1: 'Having AI in HE institutions will enhance learning by having simulation programmes, smart boards, intelligent workshops, innovative curricula, and smart classes.* AI can personalise instructional software. Besides, software, games, and activities aid adaptive learning; as mentioned by *P2, "AI has the potential to tailor instructional software for each user. Students can access various adaptive learning options, including software, games, and activities. AI is undoubtedly one of the most critical educational uses since it makes learning more pleasant and smoother and cuts beyond individual ability".*

Meanwhile, AI makes learning fun and easy and transcends ability according to the insights of most participants. Not only this, but AI enhances online learning. Equally, AI improves understanding by making it more engaging and individualised. Thus, AI makes learning inclusive and more accessible. AI reliably, transparently, and sustainably connects students and teachers. AI offers shut-outs, affordability, rigorousness, quality, remote learning, and instant feedback. According to P6 input, *"AI connects students/teachers in a reliable, transparent,*

and sustainable manner. AI provides access to those who may otherwise lose it in a traditional setting. It enables remote learning at a competitive rate of excellence and quality, allowing more successful rigour and popular learning".

AI aids in adaptive tests, results analysis, and interactive games. AI personalises learning and shows students' strengths and weaknesses. AI helps students reach their goals by offering personalised feedback on homework, quizzes, and problem-based and critical thinking tasks. AI saves time by providing multiple learning methods. As mentioned by P10, *'AI can be utilised as an educational tool to lead students toward their goals by delivering individualised feedback on assignments, quizzes, problem-based tasks, critical thinking tasks, and algorithm-based simulations.'*

4.2.5.4 Participants' Recommendations for Effective AI Use in Learning and Teaching

Participants think implementing AI in the learning process in HE institutions may need help with the following challenges: management's attitude to change, expenses, protection policies, lack of AI experts, and external costs to hire expertise. Indeed, *P10 highlighted concerns about management's attitude to change, P7 mentioned expenses, P5 raised issues about protection policies, P12 noted the lack of AI experts, and P3 pointed out the external costs of hiring expertise*. Institutional infrastructure may need more time to prepare for AI, which could affect liquidity.

Equally tricky are power shortfall, know-it-all, privacy, and security. Add to that bias, privacy, ethics, and conservatism. Managing learning styles is challenging. The lack of resources and training can also be a problem. AI's scope may be limited by licenses, ministerial approval, and accreditation, as ministries may use old pedagogies. AI only works with the Internet. AI knowledge from academia can be problematic. Students lack AI-capable computers and good Internet, which is not always affordable. AI will reduce human abilities.

Simulations help students develop technical skills. Intelligent boards can play, design, draw, and animate, as mentioned by P1: *"By having simulation tools where students can learn from these tools and develop their technical skills. By having intelligent boards where teachers and students can play, design, draw, and use animations during the class."* When combined with high-quality content and materials, AI can help students learn faster. As P2 thinks, *'When combined with high-quality instructional content and study materials, AI can help students learn*

more effectively and quickly.' Everything will be online, making teaching more accessible and modules more manageable. AI enhances the process of analysing student needs with individual exercises and practices and engages them to lower the costs of their fees. AI connects universities worldwide, boosts constructive feedback, and encourages self-study via customised activities.

AI enhances the educational experience by identifying students' needs through quizzes and customised activities. It empowers academic faculty to offer personalised feedback, learn alongside AI, acquire knowledge about AI, its technologies, and methodologies, and equip themselves for the AI-driven future. For instance, it facilitates a comprehensive understanding of AI's potential impact on human life, as articulated by P10: *"The intersection of AI and education encompasses three key areas: utilising AI-powered tools for learning within classrooms, gaining knowledge about AI - its technologies and methodologies, and preparing individuals for the implications of AI on human lives."* Moreover, AI contributes to the globalisation of education, facilitating real-time feedback and bridging knowledge disparities. Implementing AI in the teaching process may be challenging as it may face the following issues according to participants' input: Teachers and students may resist AI implementation. More networks and better infrastructure could help AI use. Other concerns include ethical issues, responsibility, work influence, data privacy, and algorithm ownership. P2 argued, "*AI raises several ethical questions, including access to the institution system, recommendations to individual students, the concentration of personal data, responsibility, influence on work, data privacy, and ownership of the data-feeding algorithms".* An implementation may require extended time for practical use besides authorisation and bureaucratic services. AI implementation may be costly due to the need for more tech-savvy people.

4.2.5.5 AI-Based Assessments

Regarding the application of AI in assessments, respondents believe that AI will enable academics to abandon manual marking and track students' academic success more technically and intelligently than traditional methods. P2 "*AI can deliver situational judgment tests by engaging candidates in sincere chatbot-style discussions."* AI can assess candidates' situational judgment using chatbot-style discussions. AI should be used for the assessments as there are no adverse effects from implementing AI in HE. AI would increase quality and access but must be guarded, with mechanisms in place to ensure integrity and security. P5 *"AI guarantees adaptive testing, interactive assessment, quick results analysis, and prompt intervention."* AI training makes users adept at using it, ensuring success.

AI can standardise exam scores and save time. AI provides adaptive testing, interactive assessment, fast results analysis, and rapid action. Finally, AI in HE examinations would adapt questions based on learner performance, which would help students learn advisably. The participants added that AI could be influential when implemented in the HE assessment system, as shown in Table 4.

Table 4-7 *Participants Perceptions of AI-Based Assessment in HE*

Participant	AI Applications for Student Assessment & Explanation
P1	*Gradescope automates grading processes, providing detailed feedback. This tool streamlines grading tasks, freeing up instructors' time to focus more on teaching. It offers detailed feedback to students, aiding in their learning process.*
P2	*Simio AI-driven simulations for hands-on learning in supply chain management. Simio provides students with practical experiences in supply chain management, allowing them to explore real-world scenarios and understand complex concepts in a dynamic environment.*
P6	*Turnitin provides feedback on grammar and plagiarism in student writing. Turnitin helps students improve their writing skills while upholding academic integrity by detecting plagiarism and offering suggestions for grammar and style improvements.*
P7	*ProctorU AI-based proctoring solutions for online exams. ProctorU ensures the integrity of online assessments by monitoring students remotely using AI, detecting cheating behaviours, and maintaining the credibility of the assessment process.*
P10	*Natural language processing algorithms for evaluating student comprehension. Utilises AI to assess students' understanding of course materials based on their written responses, allowing instructors to tailor instructional strategies to meet individual learning needs.*

4.2.5.6 Participants' Recommendations for Effective AI-Based Assessments.

Despite AI's effectiveness in HE assessment, participants noted obstacles. Accuracy and integrity, especially on essays, final projects, and theoretical tests. They highlighted data constraints, privacy, security, implementation, algorithm bias, and openness. Technical challenges and submission errors: Moving from regular examinations to AI optimisation may take time. System failure is conceivable without integrity training and management. Students panic and prepare for exams, security is an issue, and hackers receive questions from apps/portals that can lead to dangerous AI. Concerning AI's role in academic integrity, participants shed light on the following areas summarised in Table 5 below:

Table 4-8 *AI for Ensuring Academic Integrity in HE*

Negative Perception of AI in HE Integrity	Positive Perception of AI in HE Integrity
P1: "What we have seen during the pandemic is no academic integrity during the sessions during the assessment."	*P4: "Might use AI in specific areas that could be used to follow up on student academic integrity, such as authoring reports or attending assessments."*
P11: "AI can jeopardise Academic integrity."	*P6: "The mix between the two is incredibly positive because of all its advantages, but it can be used as a cheating tool."*
	P7: "It will play a positive role; for example, it can detect plagiarism quickly and notice submission patterns."
	P8: "AI can be set to protect integrity vigorously but can be liable to attacks. However, if a powerful system and a plan B are in place, things will be more secure."
	P9: "They must be checked at a prominent level of alert. It would be more neutral. It would just follow the system that has been put in place."
	P10: "AI can help reduce plagiarism issues and violations of academic integrity."
	P12: "Optimise students' writing styles to help them in teaching the right potential."

Although participants agree that AI can be crucial in ensuring academic integrity, AI can face fundamental challenges in securing academic integrity in HE. AI can lead to fear, double standards, personal relationships, formal systems, and power corruption that hinder academic integrity. Thus, a malfunction or hack might be a problem. Besides, implementation hiccups, insecure virtual environments, invisibility, and users' beliefs that AI is contrived and inaccurate could lead to academic dishonesty. Therefore, the delayed AI implementation is informed. Proper staff training with a mix of virtual secure codes, passwords, systems, material keys, files, and permissions would make attacks and dishonesty less severe and more accessible to check. Besides, a sustained AI evaluation is essential.

Participants believe that *AI can revolutionise the assessment process by enabling automated marking, tracking academic success, and enhancing the quality and accessibility of assessments. It can offer adaptive testing, interactive assessment, and quick results analysis*, as emphasised by P5.

However, challenges related to integrity, accuracy, data privacy, and security are paramount. Ensuring a secure and efficient AI-based assessment system requires substantial training, robust security measures, and a mix of virtual and physical safeguards.

4.2.5.7 AI and Ethical Concerns in HE

Regarding AI and ethics in HE, participants perceive that AI implementation can be both ethical and unethical, as summarised in Table 6 below:

Table 4-9 AI and Ethical Concerns in HE

Participant	The Ethical Side of AI	The Unethical Side of AI
P2	*Simulators will not harm or impact human resources, aligning efficiently with HEI requirements.*	*Ethical concerns extend beyond data collection for espionage, including online and offline behaviour manipulation.*
P5	*AI will play a positive role, enhancing performance in higher institutions and aiding in implementing and assessing ethics.*	*Privacy violations through face scanning and surveillance cameras.*
P3	*Less human intervention could reduce discrimination chances.*	*The lack of ethical policies may lead to AI's unethical use in HE.*
P7	*AI can demonstrate the maintenance of ethical practices and adherence to moral codes by human participants.*	*Students may exploit AI for academic dishonesty, using summarising, paraphrasing, and assignment writing applications.*
P6	*Students will have reduced opportunities for academic integrity violations.*	

Concerning the potential ethical concerns posed by using AI in HE, the participants found the following issues: transparency and accountability. Finding and addressing bias and discrimination issues is more difficult when there is a need for more transparency. For example, they rely too heavily on AI instead of their judgment. Staff training, dishonesty, and deep fakes are challenging to manage and check (a person in charge of storage or specific measures may be motivated to cause a leak). Data privacy and security pose immense ethical challenges to AI in HE. Humans can only sometimes understand AI's conclusions. AI is not neutral: AI-based decisions may involve errors, discriminatory outcomes, and intrinsic or added bias surveillance techniques for data collecting and court user confidentiality.

4.2.5.8 Recommendation for Ethical AI-Based Integrity

Participants suggested that the following ethical considerations for implementing AI in HE involve several vital steps. *Raising awareness and repeatedly testing AI before implementing it* ensures that it aligns with educational standards and ethical principles. *Administrators, personnel, and students must be trained* to utilise AI tools while maintaining ethical standards effectively (P4, P6). Exposure to resources, security keys, and passwords must not occur due to internal human or technical errors (P8). Therefore, combining *security measures and advanced technologies* is essential to minimise risks (P3). Additionally, *users engaging with AI technology must be provided with warranties and insurance coverage* to protect against unforeseen liabilities (P7). Finally, *teaching AI ethics and implementing moral policies* are vital to safeguarding individual privacy and maintaining trust within the academic community (P1).

Implementing AI in HE raises ethical concerns, offering the potential to enhance performance, uphold ethical standards, and ensure academic integrity. However, it also introduces risks associated with misuse, transparency, bias, privacy, and security. The ethical use of AI should prioritise the reduction of discrimination, the promotion of transparency, and the protection of privacy. *Educating users on AI ethics and integrating ethical policies are essential for the responsible use of AI in HE, a*s argued by P1. Our study emphasises AI's significant potential and challenges, underscoring the critical importance of ethical considerations and robust policies to harness AI's educational benefits.

4.2.6 Discussions

This study offers fresh insights into the multifaceted impact of AI in HE, focusing on its transformative potential across various domains such as student admissions, teaching and learning, academic integrity, and ethical considerations (McLennan et al., 2022). The research provides a comprehensive understanding of how AI streamlines administrative tasks, enhances student learning experiences, and addresses ethical challenges (Kaur et al., 2022). By shedding light on AI's potential to improve assessment systems and uphold academic integrity, these findings contribute to a deeper comprehension of AI's role in HE, offering valuable insights for educators, administrators, and policymakers.

The study's findings resonate with existing literature, particularly regarding AI's influence on student admissions and academic support (Lünich et al., 2023; Sarraf et al., 2021). However, it also reflects positive and negative perceptions of AI integration

in HE. Positive views may stem from optimism about AI's potential to enhance educational experiences and streamline processes. However, negative perceptions may arise from concerns about privacy violations, ethical implications, financial costs, and technical challenges associated with AI implementation.

This research makes a notable contribution by addressing ethical challenges associated with AI implementation (McLennan et al., 2022). While previous studies have discussed AI's benefits and challenges, this study delves deeper into ethical considerations, emphasising the importance of awareness, training, and ethical policies to ensure responsible AI use. The study provides valuable insights by focusing on ethics, complementing existing literature on AI in HE.

Moreover, the study underscores the significance of ethical guidelines and education to address concerns about transparency, bias, and privacy in AI applications (Kaur et al., 2022). By reaffirming AI's transformative potential in HE while emphasising the need for responsible AI integration and robust ethical policies, the study advances our understanding of AI's role in enhancing learning quality and accessibility in educational settings.

Furthermore, the study highlights the widespread adoption of AI-based teaching during the pandemic, indicating a growing trend towards online and AI-driven education. With AI in education topping $1 billion in 2020 and expected to grow substantially, institutions stand to benefit from innovations that improve teaching efficacy, reduce errors, and provide personalised learning experiences. Integrating AI into HE promises to enhance learning outcomes and increase institutional accessibility and popularity.

AI can add validity and reliability to testing, as noted by Participant P14. *AI can make assessment design more effective and up to the sought norms*, according to participant P15. Additionally, *AI can make assessments available to a larger population of students*, as highlighted by Participant P16. Moreover, participant P17 mentions that *AI-based assessments will be visible to check authenticity nationally and worldwide.* Overall, these points, expressed by participants P14, P15, P16, and P17, highlight the transformative potential of AI in enhancing the assessment process in education.

4.2.7 Conclusion

This study examined the impact of AI on various aspects of HE, such as student admissions, pedagogy, assessments, academic integrity, and ethical considerations. The findings, based on qualitative interviews with 13 AI education experts, revealed

that *AI could enhance the quality and accessibility of learning by simplifying administrative tasks, personalising learning experiences, and providing reliable and unbiased assessment systems.* However, the study also identified several challenges and limitations that need to be addressed in future research and practice, such as resistance to AI implementation, inadequate infrastructure, ethical concerns, and potential misuse of AI technologies. Moreover, the study highlighted the importance of educating and collaborating with stakeholders, including faculty, staff, and students, to ensure AI's responsible and effective integration in HE. By providing comprehensive insights into the implications of AI for HE, this study contributes to the existing literature. It advances the understanding of how AI can transform educational practices and policies. Future research should further explore the long-term effects and sustainability of AI integration and develop robust ethical frameworks and safeguards to guide its implementation. This study concludes with a call to action for HE institutions and policymakers to leverage AI to improve learning outcomes and opportunities while upholding ethical standards in educational settings.

4.2.8 Recommendations

This study presents targeted suggestions for overcoming the challenges identified in AI implementation within HE. Here is a simplified, clarified, and professional summary of the recommendations, incorporating a focus on future research:

First, using AI to streamline administrative processes, such as student admissions, saves time and resources. Research into developing efficient AI tools for these tasks is recommended.

Second, personalising learning experiences with AI necessitates innovative research into its integration within teaching methods and curriculum planning.

Third, prioritising ethical considerations in AI usage ensures fairness, transparency, and accountability. Investigating ethical training programmes and establishing clear AI use guidelines are essential.

Fourth, investing in AI-driven assessment systems that are reliable, unbiased, and aligned with educational objectives is advised. Future studies should address biases in data and algorithmic decision-making.

Fifth, educating stakeholders, including faculty, staff, and students, about AI's implications for HE is crucial. It is recommended that practical training sessions and workshops be developed to enhance understanding of AI technologies.

Sixth, promoting collaboration among educators, administrators, policymakers, and researchers to share best practices and encourage innovation in AI use is essential. Research into mechanisms for enhancing such collaboration can help maximise AI's benefits while ensuring its ethical and responsible use.

By following these recommendations, universities can address the complexities of AI in HE, promoting an environment of fairness, transparency, and responsibility. These steps also advance research in this field, addressing the challenges identified in this study and enriching the academic dialogue with innovative solutions for AI implementation in educational settings.

4.2.9 Limitations

Clear limitations encompass challenges associated with resistance to AI implementation, inadequate infrastructure, ethical concerns, and potential misuse of AI technologies. However, these are only some of the limitations that should be considered. For instance, the specific context in which this study was conducted, such as the institutional environment or cultural factors, could also pose limitations. Additionally, the participants' diverse experiences and familiarity with AI may influence the generalisability of the findings. Therefore, future research should address the identified challenges and thoroughly explore these broader limitations to ensure a comprehensive understanding of the implications of AI in HE.

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4.3 Article 3. AI Use in Higher Education: Drivers, Barriers, and Viable Solutions

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AI Use In Higher Education: Drivers, Barriers, And Viable Solutions

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4.3.1 Abstract

This study explores the increasing importance of artificial intelligence (AI) in higher education. It focuses on its potential to revolutionise admissions, learning, and teaching processes. The main objective is to investigate the drivers and barriers influencing AI adoption. The paper used a qualitative survey to collect data via Office 365.The paper especially highlights how AI integration differs between well-resourced and under-resourced regions. A key novel contribution is the identification of stark contrasts in barriers. For instance, a major difference is the lack of infrastructure and expertise. These two factors are more pronounced in under-resourced areas compared to institutions with better technological foundations. The paper also provides viable solutions to overcome these barriers. The study ends up recommending robust cybersecurity, comprehensive training, and ethical AI governance. Findings reveal that while 24.7% of respondents view personalised learning as the primary driver of AI adoption, 38 respondents cite the lack of AI expertise as a major obstacle. This study highlights the need for institutions to carefully navigate ethical challenges. This paper stresses the importance of paying attention to data privacy and algorithmic bias to ensure responsible AI implementation. The study suggests AI's full potential in education may remain unrealised, especially in regions with limited resources. It adds that without proper regulatory frameworks and equitable infrastructure development, AI remains inefficient.

Keywords: *Artificial intelligence; barriers; drivers; higher education; solutions*

4.3.2 Introduction

This study explores the drivers and barriers influencing AI adoption in higher education across various cultural contexts. Specifically, it investigates how AI can enhance personalised learning and administrative efficiency in higher education. Furthermore, it addresses the ethical and infrastructural challenges associated with AI

integration. By doing so, the study aims to fill a gap in the literature. In particular, this paper addresses gaps regarding the global applicability of AI in diverse educational settings.

This research is anchored in two key frameworks. The Technology Acceptance Model (TAM), and the AI Ethics Frameworks. Developed by Davis (1989) the TAM posits that two factors shape users' acceptance of technology. These two factors are perceived usefulness and ease of use. This model helps explain AI adoption in higher education. It highlights efficiency gains and personalised learning opportunities. The AI Ethics Framework ensures that AI aligns with ethical standards. This theory stresses privacy, transparency, and fairness. TAM addresses data privacy, algorithmic bias, and equitable access to AI-driven solutions. Thus, both frameworks provide a structured lens.to analyse the drivers, barriers, and solutions for AI adoption in higher education.

Recently, AI has evolved from a promising concept in the 1950s to a field with broad applications. In particular, AI is transforming traditional methods in higher education. For example, it enables more flexible and personalised learning environments. It also automates administrative tasks such as scheduling and grading. Thus, AI improves management for educators and students alike.

Additionally, AI offers services in admissions, learning, and training by optimising resource allocation. Experts argue that AI's potential to revolutionise education is significant (Luckin et al., 2022; Roll & Wylie, 2016). However, despite its promise, AI adoption in higher education has been slower than expected. The major barriers are linked to ethical concerns. These concerns include data privacy, biases in AI algorithms, and institutional readiness (González-Calatayud et al., 2021; Eynon, 2021).

Moreover, AI is now at the forefront of educational innovation with the rapid development of big data and internet technologies. Thus, its integration is critical to improving education systems. For instance, curriculum design and assessment methods may be more efficient with AI use. Globally, AI is being integrated into strategic educational plans to improve efficiency and academic integrity (He & Liu, 2023; Reddy et al., 2022). For example, AI is applied to detect academic fraud and manage administrative tasks. Furthermore, AI enhances international competitiveness and supports scientific research.

Recent studies (Li et al., 2022; Wang & Zhang, 2023) highlight the growing need for AI competency frameworks in higher education. These studies show AI's potential to bridge gaps in access and inclusivity. Hence, AI facilitates language translation,

cultural preservation, and creativity. They also shed light on its ability to promote transparency and fairness. However, collaboration among experts, scholars, and policymakers is vital to address ethical and social issues raised by AI. In doing so, global competitiveness could improve, demonstrating AI's benefits across many domains (Seldon & Abidoye, 2020; Floridi, 2019).

In conclusion, this study examines the key drivers behind AI integration in higher education. It also explores potential obstacles that may hinder AI implementation. As AI continues to evolve rapidly, its influence on pedagogy should be embraced by educational institutions and educators. Therefore, proactive steps to develop new teaching competencies should be prioritised (Holmes et al., 2022; Selwyn, 2019). AI's ability to transform education has attracted significant attention. Attention is high, as AI can offer customised learning and enhance both student learning and institutional efficiency.

4.3.3 Literature Review

Contemporary studies emphasise the increasing role of AI in higher education. They stress AI's potential to enhance learning outcomes and streamline administrative tasks (Li et al., 2022; Wang & Zhang, 2023). However, a deeper theoretical exploration is vital to understanding AI adoption in educational contexts.

Hence, the Technology Acceptance Model (TAM) and AI Ethics Framework are crucialt for a safe adoption of AI in education. Indeed, TAM explains how perceived usefulness and ease of use drive technology adoption. This theory provides a critical lens for examining the motivations behind AI integration. Specifically, it helps explain why respondents in this study identified personalised learning (24.7% of participants) and administrative efficiency (13.6%) as primary drivers for AI adoption.

Moreover, ethical concerns are needed to understanding AI's potential risks in education. The AI Ethics Framework advocates for principles such as transparency, privacy, and equity. By the same token, this study explores the ethical barriers that hinder AI adoption which makes it align with the above theory. Likewise, respondents highlighted the concerns about data privacy and algorithmic bias. Therefore, this study ouctomes reflect core issues within AI Ethics Frameworks. These outcomes reinforce the need for strong ethical governance in AI deployment in education (Teuscher, 2021; An, 2022).

4.3.3.1 Drivers for AI Use in Higher Education

One of the primary motivations behind AI integration into higher education is AI's proven capacity to enhance both educational outcomes and institutional

efficiency (Menkhoff & Teo, 2022). For example, Menkhoff and Teo's (2022) experiential chatbot workshop demonstrates AI's value in assisting non-STEM students in acquiring essential skills. Indeed, their findings confirm that AI aligns with broader educational objectives. Specifically, AI's role in fostering both theoretical and practical skill development is exceptional. Nevertheless, despite AI's advantages, the scalability of such initiatives across a wider range of disciplines and educational contexts is questionable.

Moreover, Katsuragi and Tanaka (2022) explore the application of AI to improve online student retention. This experiment developed a machine-learning model that accurately predicts dropout rates. This study exemplifies AI's potential to proactively mitigate student disengagement. However, the effectiveness of such data-driven models depends on the existence of robust and inclusive data infrastructures, which are often missing in many educational institutions. Furthermore, significant ethical concerns are data privacy and algorithmic biases. Therefore, to prevent current educational disparities responsible AI management is crucial.

Renz and Hilbing (2020) also stress the importance of data-driven business models in the EdTech industry. They emphasise how crucial it is to incorporate learning analytics with AI use. Doing so would support flexible teaching and learning approaches. Nevertheless, data sovereignty concerns frequently limit these strategies' efficacy. However, poor data comprehension could make it more difficult to build and implement AI-driven teaching programs.

4.3.3.2 Barriers to Using AI in Higher Education

Computing Teuscher (2021) argues that, against its promising potential, AI integration into higher education presents significant challenges. This issue is particularly pronounced in fields such as deep learning and quantum computing. The rapid pace of AI advancements outstrips educational institutions' ability. Indeed, it hinders the adaptation of their curricula accordingly. As a result, the potential benefits of AI could be undermined. If this gap is not sufficiently addressed, it will leave an unprepared workforce. This workforce will be unable to meet the demands of an AI-driven educational environment.

Similarly, Seo (2022) asserts that standard curricula are insufficient to meet students' diverse needs and abilities. Therefore, AI-driven self-diagnostic tools may offer a potential solution by personalising learning content. Nonetheless, critical concerns regarding the accuracy and fairness of AI-powered assessments are high.

Indeed, there is a risk of perpetuating existing biases. These biases could adversely affect educational equity.

Furthermore, Shopland et al. (2022) highlight the European Union's initiatives to raise awareness about the necessity of ethically sound AI practices. However, the rapid evolution of the industry calls for a more agile response from academia. In particular, the development of courses that address both the technical and ethical dimensions of AI is essential. Moreover, the ethical implications of AI are not merely theoretical. They may have practical consequences for educators, students, and institutions.

Similarly, Xie and Chen (2022) emphasise the importance of AI integration in assessments. The authors, particularly, stress AI use in the areas of grading and language processing. They argue that the limitations of AI in automated systems are significant, particularly in AI's inability to accurately assess complex language tasks. Thus, concerns about over-reliance on AI in educational settings are justified. Howevevr, excessive dependence on AI could marginalise human educators' roles. While eductors are vital for providing nuanced feedback that AI systems might not be able to deliver.

4.3.3.3 Viable Solutions for Potential Barriers

Professional collaboration among academia, industry, and policymakers is a must to address the barriers to AI adoption in higher education. For instance, Liwång (2022) advocates co-creating a model where higher education institutions work closely with industry and government. According to Liwång (2022), social responsible and relevant manner of AI technologies should be developed and implemented. Moreover, technical challenges must be addressed carefully. Meanwhile, it is essential to incorporate diverse perspectives into AI development. By doing so, AI systems will inherently embed the ethical, transparent, and equitable aspects needed in higher education.

Likewise, An (2022) explores the use of AI-driven facial recognition technology in education. This technology is used in enhancing the emotional aspects of learning in political and ideological education. While this innovation presents exciting possibilities for personalising education, it also raises significant ethical concerns. In particular, the potential misuse of AI for surveillance represents an obvious privacy threat. Thus, this study underscores the need for robust frameworks and ongoing ethical scrutiny to govern AI use in sensitive educational contexts.

Furthermore, Warning et al. (2022) argue that AI offers valuable insights for higher education institutions. They suggest that AI transforms the working environment and prepares students for an AI-driven workforce. Consequently, AI is likely to influence employee well-being, job security, and flexibility. Thus, these factors are critical for creating educational programs that equip students with both technical skills and social awareness.

4.3.4 Methods

Surveys are a fundamental research method, especially in education. Historically, they have roots in Victorian Britain, where they gathered critical information on working-class conditions (Kelley et al., 2003). Typically, surveys involve selecting a sample from a defined population and then collecting and analysing data meticulously. This study used a random sampling strategy with a qualitative survey conducted through Office 365 Forms. The goal was to explore the factors that influence AI adoption in higher education and propose solutions.

47 AI-savvy academics from 26 countries were surveyed. Despite the small sample size, the respondents represented a wide range of educational and cultural perspectives. Most participants came from the Gulf region, including fields like logistics, transportation, and marine studies. Recruitment challenges were notable, especially in Oman, due to cultural differences and low participation interest. Yet, the diversity of participants ensured rich, meaningful insights.

The sample size may seem limited, but the diversity strengthens the findings. The participants' expertise in AI within educational contexts adds to the credibility of the study. However, future research should use larger samples and combine qualitative with quantitative data for deeper insights. This will help broaden the understanding of AI adoption across global educational contexts. For now, this study offers a useful snapshot, especially for regions with unique educational challenges.

The survey method was ideal for reaching diverse participants, given the geographical and recruitment constraints. Despite the difficulties of in-person recruitment, it allowed to gather views from various educational backgrounds. To avoid selection bias random sampling was essential. Also, to ensure all participants could fully engage with the questions the survey was conducted in English. Therefore, despite the limited sample size, the study's generalisability was enhanced.

Researchers followed a thematic approach to analyse data. First, researchers reviewed responses to familiarise themselves with the content. Then, they coded the data into categories based on recurring themes related to AI adoption. Researchers

ensured that all viewpoints were accurately captured. In brief, investigators, affirmed that the analysis stay aligned with the study's goals. Thereofore, reflecting participants' complex perspectives is garanteed.

The participants represented a broad spectrum. This spectrum coveres academic, socioeconomic, and cultural backgrounds. To capture varied perspectives on AI in education, this inclusivity was essential. For instance, respondents included academics, administrators, and decision-makers from 26 countries. These contributers covered a wide range of disciplines. Discplines included education, languages, martime studies, process engineering, IT, and logistics. This diversity ensured the findings were well-rounded and robust.

In conclusion, the study's methodology was designed to gather diverse insights while maintaining ethical standards. The study still provides valuable information against the small sample size thay might limit generalisability. Thus, the findings offer a snapshot of AI adoption in higher education. It especially affects under-represented regions. Therefore, Future studies should build on this by using larger, more diverse samples.

4.3.5 *Findings and Discussions*

This study used a thematic analysis. It advocted a systematic categorisation and coding of data derived from participants. This process facilitated the identification of key themes related to the drivers, barriers, and solutions. These themes are associated with AI adoption in higher education.

4.3.5.1 Drivers for AI Use in Higher Education

AI adoption in higher education is driven by its potential to enhance personalisation, improve teaching methodologies, and foster more engaging learning experiences. As shown in **Figure 4.3-1**, the most prominent driver for AI in admissions is its ability to personalise and streamline processes, cited by 23.4% of respondents. This underscores a clear demand for tailored interactions and efficient automation to improve the prospective student journey. Additionally, the role of AI in enhancing institutional reputation and recruitment was noted by 12.8% of participants, emphasising how AI strengthens competitive positioning through data-driven insights. Another 10.6% highlighted its capacity to improve student retention and issue resolution, demonstrating AI's role in supporting long-term student success.

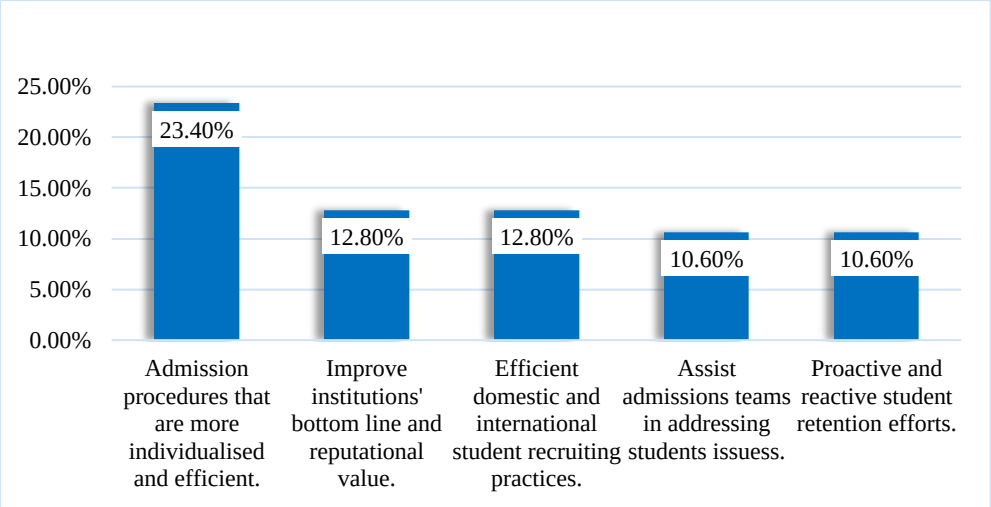

Figure 4.3-1 Drivers For AI Use in Students' Admission

In learning environments, **Figure 4.3-2** shows that 17% of participants prioritised AI's ability to create continuous and adaptive learning settings, aligning with the shift toward lifelong education. AI's capacity to increase engagement through gamified experiences and real-time feedback was rated by 12.8% of respondents, while an equal percentage recognised its role in developing technological savviness. However, immersive learning, such as virtual and augmented reality applications, was the least emphasised driver, with only 8.5% support, reflecting its limited current integration into mainstream education.tools.

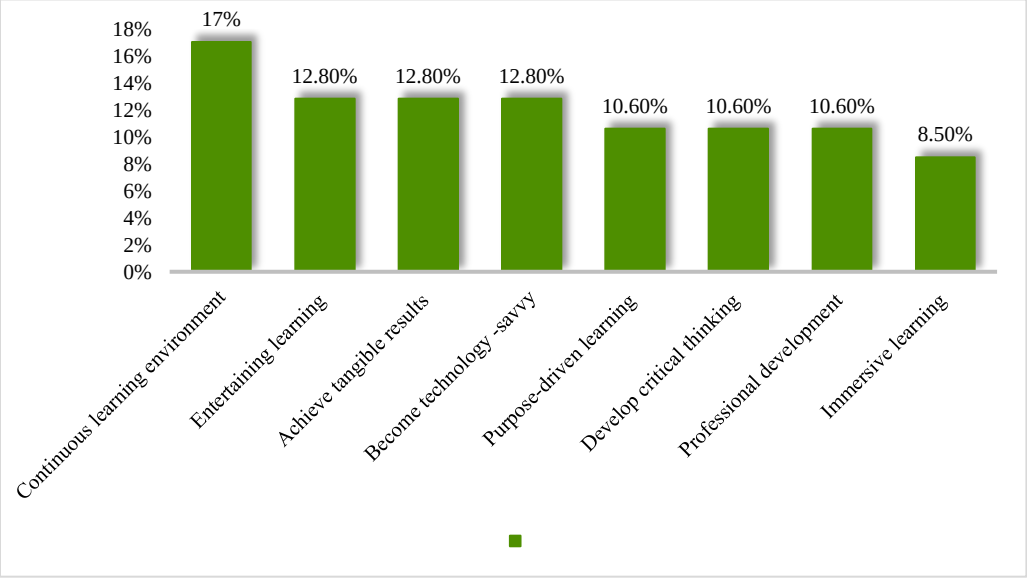

Figure 4.3-2 Drivers for AI Use in Learning in Higher Education

For teaching, **Figure 4.3-3** reveals that innovative teaching models were the highest-rated driver at 17%, highlighting the demand for dynamic pedagogical approaches that accommodate diverse student needs. Efficient grading processes, rated at 14.9%, were also highly valued for their potential to reduce administrative burdens. While drivers such as affordability and quality feedback were rated lower, at 10.6% and 4.3% respectively, they nonetheless indicate secondary areas of importance for AI in teaching.

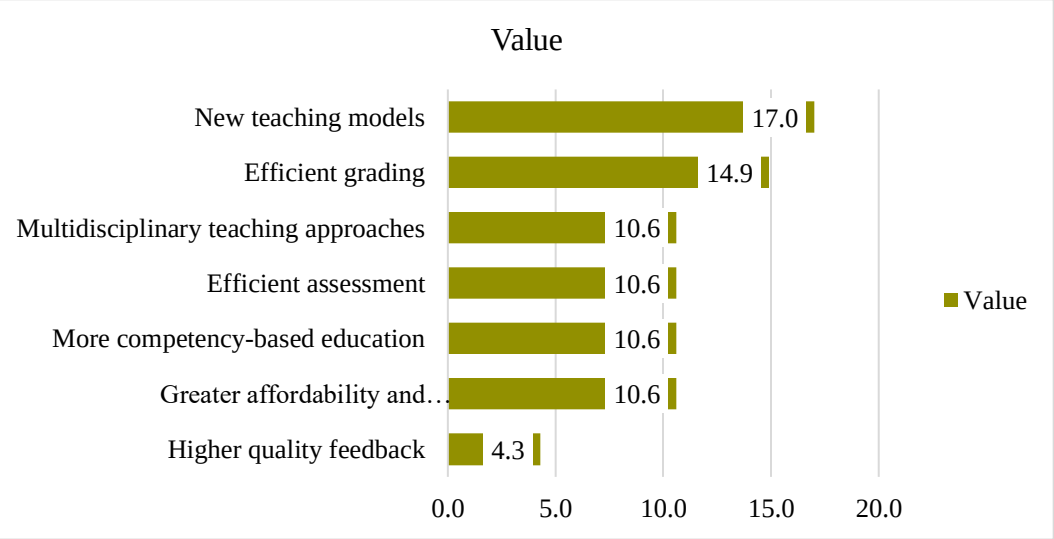

Figure 4.3-3 *Drivers for AI Use in Teaching in Higher Education*

Figure 4.3-4 highlights the diverse drivers for AI adoption in higher education, showcasing its transformative potential across various domains. AI enhances *"personalised admissions"* by automating routine tasks and customising applicant support, improving efficiency and strategic enrollment. In teaching, AI enables adaptive methods by identifying skill gaps and fostering *"interactive teaching models"* that align with learners' needs. It also democratises education by promoting *"equity in education"* through remote learning platforms, accessibility tools, and language translation, ensuring universal access for underrepresented groups. AI's role in *"dynamic and adaptive curricula"* is equally impactful, as it facilitates content aligned with real-time data and industry trends, preparing students for evolving job markets. Additionally, *"self-directed learning environments"* fostered by AI empower students through tailored educational experiences that boost engagement and confidence. Furthermore, task-driven learning benefits from AI's ability to enable *"problem-based learning,"* simulating real-world scenarios that encourage collaboration, critical thinking, and problem-solving. Finally, AI's *"automation of routine tasks"* like grading and resource

allocation streamlines institutional workflows, allowing educators to focus on strategic priorities. Collectively, these drivers position AI as a critical tool for enhancing efficiency, inclusivity, and engagement in higher education, driving a holistic transformation across teaching, learning, and administration.

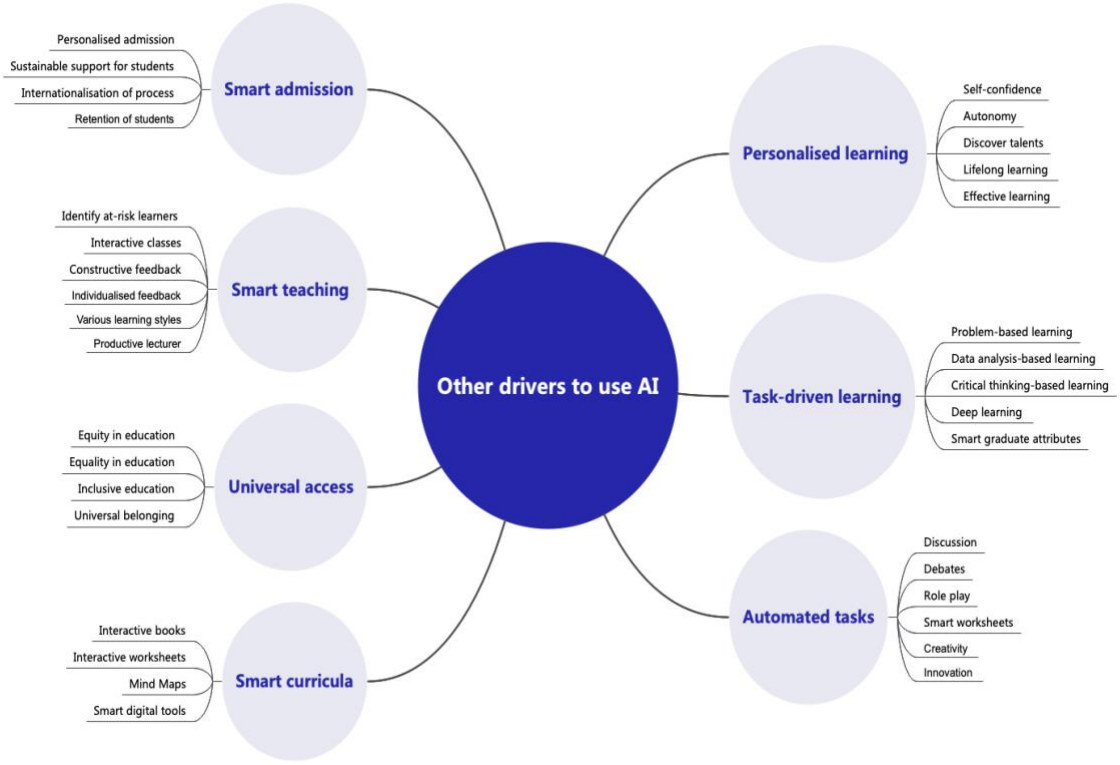

***Figure 4.3-4** Other Drivers to Use AI in Higher Education*

4.3.5.2 Barriers to Using AI in Higher Education

Despite its potential, AI implementation faces significant barriers, as highlighted in Figure 4.3-5. The most critical obstacle, identified by 38 participants, is the lack of sufficient AI expertise. This points to a skills gap that must be addressed to enable effective design, deployment, and management of AI systems. Additionally, inadequate technological infrastructure, cited by 33 respondents, is a major challenge, reflecting the need for foundational improvements to support AI integration.

Operational barriers also emerged, with 28 votes each for the lack of quality and inclusive data systems and ineffective governance frameworks. These issues highlight systemic deficiencies that hinder equitable and efficient use of AI in education. Furthermore, strategic and policy deficits, including the absence of AI

deployment strategies and inclusive public policies, were noted by 25 respondents each. Ethical concerns, such as transparency and fairness, were flagged by 19 participants, indicating the importance of addressing trust issues. The least emphasised barrier, identified by 12 respondents, was the lack of AI benefits for disadvantaged groups, suggesting that inclusivity remains an under-prioritised aspect of AI adoption.

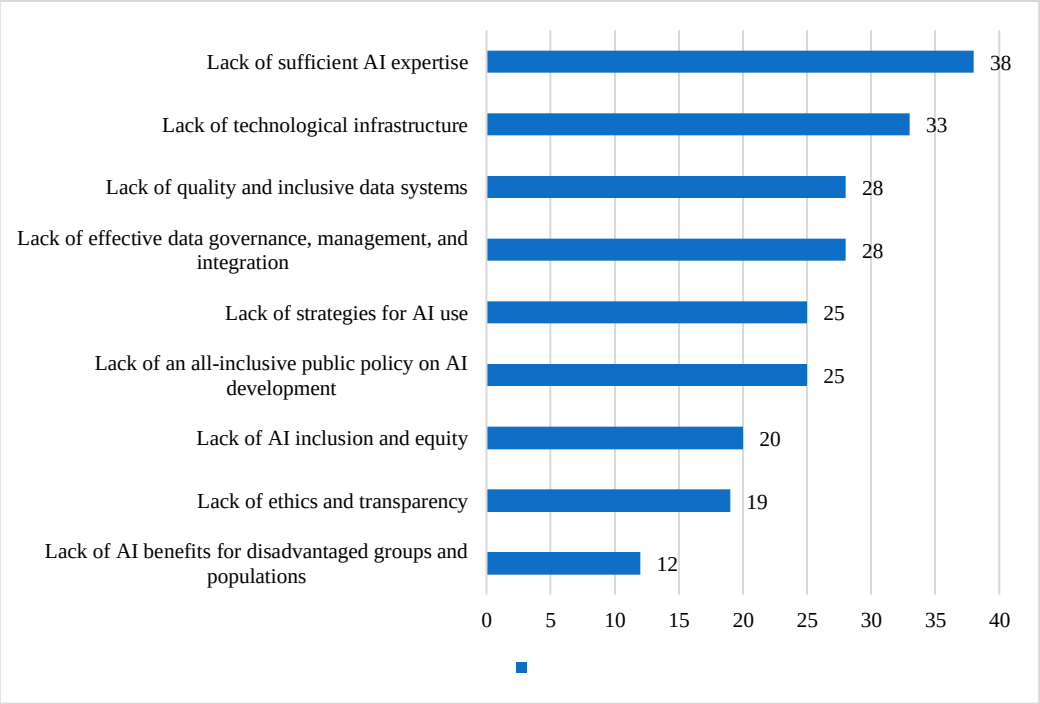

***Figure 4.3-5** Barriers to Implementing AI in Higher Education*

4.3.5.3 Viable Solutions for Potential Barriers

To address these challenges, respondents proposed several solutions, as depicted in Figure 4.3-6. The development of efficient high-tech infrastructure and robust cybersecurity measures emerged as the most critical solutions, each cited by 21.3% of participants. These measures are foundational to ensuring the secure and effective deployment of AI systems. Adequate training for students was the next priority, noted by 19.1% of respondents, underscoring the need to equip learners with the skills to use AI effectively. Similarly, training for academic and administrative staff, rated at 11%, was emphasised as a critical step toward seamless integration.

Ethical and governance frameworks also featured prominently among the solutions. Trustworthy AI systems, identified by 17% of participants, were highlighted as essential to building user confidence and mitigating biases. Clear AI ethical policies, supported by 12.8% of respondents, and clear educational policies, at 10.6%, were also recommended to establish standardised practices and accountability. Notably, sustainable AI development received the least attention, with only 6.4% support, suggesting that long-term considerations are not yet a priority for many stakeholders.

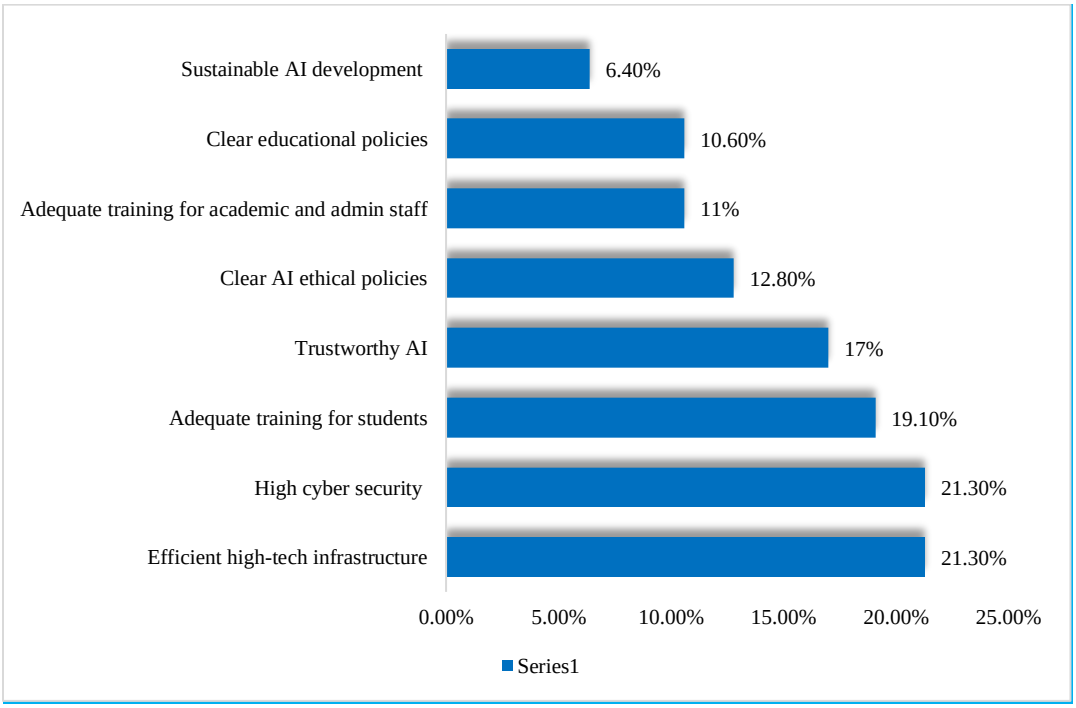

***Figure 4.3-6** Viable Solutions for the Potential Challenges of AI Use in Education*

4.3.6 Analysis

The analysis focuses on three key themes identified in the findings: (1) drivers for AI use in higher education, (2) barriers to implementing AI, and (3) viable solutions for potential challenges. By exploring these themes in depth, the discussion highlights the interplay between drivers, barriers, and solutions and their implications for institutions and stakeholders.

4.3.6.1 Drivers for AI Use in Higher Education

The findings reveal several significant drivers for AI adoption, including personalised learning, streamlining administrative tasks, and enhancing

institutional reputation. As shown in Figure 4.3-4, *"personalised learning"* was identified as the most influential driver, cited by 24.7% of respondents. This reflects a strong demand for AI's ability to tailor educational experiences to individual students' needs, emphasising its transformative potential in education. However, achieving this goal requires substantial investments in data collection and analytics, which introduces barriers related to data privacy and robust technological infrastructure (Figure 4.3-5).

AI's ability to *"automate grading and administrative tasks"* was recognised by 13.6% of respondents in Figure 4.3-4 as another major motivator. This capability allows educators to focus more on teaching and student engagement. However, over-reliance on data-driven efficiencies raises concerns about data security and governance, as seen in Figure 4.3-5. Additionally, 12.8% of respondents in Figure 4.3-1 cited AI's role in enhancing institutional reputation, illustrating its strategic importance for positioning universities competitively in a global education market. This underscores the need for institutions to overcome technical barriers and expertise gaps to effectively utilise AI tools for these strategic goals.

4.3.6.2 Barriers to Implementing AI in Higher Education

The findings identify several significant barriers to AI adoption, including insufficient AI expertise, lack of technological infrastructure, and data governance challenges. As shown in Figure 4.3-5, the most critical barriers were the *"lack of sufficient AI expertise"* (38 votes) and *"lack of technological infrastructure"* (33 votes). These limitations directly hinder institutions' ability to leverage AI for drivers such as personalised learning and administrative efficiency. The lack of expertise restricts the development and deployment of AI tools, while inadequate infrastructure prevents scalability and system integration across departments.

Data-related issues also emerged as significant barriers, with 28 respondents identifying *"data governance and quality"* as a critical challenge in Figure 4.3-5. Similarly, 25 respondents highlighted the absence of comprehensive public policies on AI development, pointing to a need for standardised regulatory frameworks. These barriers are especially relevant for AI-driven personalisation, which relies heavily on large datasets. Without robust data governance, risks such as privacy breaches and misuse of sensitive data can undermine trust in AI systems.

Ethical concerns, including *"ethics and transparency"* (19 votes in Figure 4.3-5), reflect broader apprehensions about algorithmic bias and the potential for inequitable outcomes. This is particularly critical as biased algorithms can exacerbate inequalities, contradicting the goal of fostering inclusivity and equity (Figure 4.3-4). Addressing these ethical challenges requires a strong focus on responsible AI implementation and transparent governance.

4.3.6.3 Viable Solutions for Potential Challenges of AI Use in Education

To overcome these barriers, the findings propose several viable solutions, emphasising infrastructure investments, training, and ethical standards. Figure 4.3-6 highlights that 21.3% of respondents consider *"high-tech infrastructure and cybersecurity"* essential for AI integration. This directly addresses the infrastructure-related barriers in Figure 4.3-5 and supports the drivers of administrative efficiency and scalability (Figure 4.3-4). By investing in secure and advanced technology, institutions can build a foundation for sustainable AI adoption.

Training also emerged as a critical solution, with 19.1% of respondents in Figure 4.3-6 emphasising the need for *"adequate training for students and staff."* This addresses the expertise gap identified in Figure 4.3-5, ensuring that educators and administrators can effectively implement and manage AI systems. Professional training initiatives can foster an AI-literate workforce, aligning with strategic goals such as personalised learning and improved teaching practices.

Additionally, 12.8% of respondents in Figure 4.3-6 highlighted the importance of *"transparent and accountable AI policies."* These policies address ethical concerns by ensuring that AI technologies are deployed responsibly and equitably. This aligns with the goal of promoting inclusivity and equity (Figure 4.3-4) while mitigating risks related to governance and ethics (Figure 4.3-5). Establishing clear ethical frameworks enables stakeholders to trust AI systems and ensures that their benefits are distributed fairly.

4.3.7 Discussions

4.3.7.1 Drivers for AI Use in Higher Education

The study's findings on the drivers for AI use in higher education echo themes highlighted in Menkhoff & Teo (2022) and Khan et al. (2021). The study's emphasis on personalised and efficient admission processes aligns with Menkhoff & Teo's focus on AI's role in student admissions. Similarly, while the study prioritises 'fun learning' and 'achieving tangible results' as significant drivers, Khan et al. (2021) underscore the importance of technology-savvy students and continuous learning environments, aligning with the study's findings.

4.3.7.2 Barriers to Using AI in Higher Education

The study identifies the lack of appropriate AI competence and inadequate technological infrastructure as primary obstacles, aligning with Renz & Hilbig (2020) and Hodgson et al. (2022). Both sources emphasise the significance of effective data systems and governance. However, Renz & Hilbig (2020) and Hodgson et al. (2022) underscore the importance of ethics, inclusion, and

transparency as critical barriers, while the study ranks these factors as less problematic.

4.3.7.3 Viable Solutions for Potential Barriers

The study's emphasis on a robust high-tech infrastructure, adequate student training, and trustworthy AI aligns with Shopland et al. (2022) and An (2022). Shopland et al. (2022) stress the importance of a solid technological foundation, while An (2022) focuses on innovative teaching methods and facial recognition technology. However, the study prioritises clear education policy and training for academic and administrative employees. Liwång (2022) emphasises co-creation between policymakers, industry, and academia as essential to address AI implementation barriers.

This interplay between the study's findings and the cited literature reveals alignment and discrepancies in the perceived importance of specific drivers, barriers, and solutions to AI integration in higher education. This highlights the need for further consensus-building and exploration in the academic community.

4.3.8 *Conclusion*

The growing significance of artificial intelligence (AI) across sectors, particularly in academia, is undeniable. A survey conducted among AI-proficient academics and researchers within higher education revealed that the primary motivations for AI adoption centred on enhancing productivity and augmenting program effectiveness an alignment supported by existing research findings (Menkhoff & Teo, 2022; Katsuragi & Tanaka, 2022; Arun Kumar, Mahendran, & Gobhinath, 2023). Integrating AI in higher education promises improved program efficiency, fostering global inclusivity, diversity, and internationalisation while aiding administrators in addressing student concerns. Recognisable advancements have been noted in enhancing learning outcomes, establishing AI as a benchmark for assessing literacy and academic performance, and aligning with prior studies (Gupta & Chen, 2022; Haderer & Ciolacu, 2022; Khan et al., 2021).

However, the promising future of AI in education is accompanied by a spectrum of challenges encompassing opacity, policy constraints, and ethical considerations regarding privacy and data integrity, echoed by scholars in the field (Teuscher, 2021; Se, 2022; Sharkov, Todorova, & Varbanov, 2022). Addressing these challenges necessitates policymakers' formulation of robust regulatory frameworks that prioritise privacy, inclusivity, equity, and transparency, ensuring equitable access to AI in educational settings. Nonetheless, survey participants indicated a nuanced perspective on AI's role, viewing its significance in admissions and student retention strategies as

relatively less pivotal—an observation echoed by prior researchers (Liwång, 2022; An, 2022; Razia, Awwad, & Taqi, 2022).

Amidst the varied drivers influencing AI adoption, immersive learning appears less significant than professional, critical, and purpose-driven learning. Participants emphasised AI's potential to foster personalised learning experiences, promote self-assurance, autonomy, lifelong learning, and skill discovery, and advocate for an educational environment founded on transparency, integrity, equity, and inclusivity. The perceived shortage of AI expertise highlights the need for robust technological infrastructure and cybersecurity to support sustainable AI growth.

Realising the profound benefits of AI across all human activities demands collective efforts from experts, scholars, and global citizens to continuously enhance its global competitiveness and harness its potential in various disciplines. In conclusion, integrating AI into higher education holds immense promise and transformative potential. However, overcoming the multifaceted impediments requires collaborative scholarly inquiry and initiative-taking adaptation of pedagogical approaches by educators to unlock AI's full potential in nurturing adept and enlightened minds for the future.

4.3.9 Limitations

One limitation of this paper is that the sample size of the survey is small, which may affect the generalisability of the findings to the larger population of educators and administrators in higher education. Additionally, the study results are constrained by the time limit in which the data was collected and may not reflect current trends or practices. The study also focused on a specific aspect of AI implementation in higher education, such as drivers or barriers. It did not consider other crucial factors that could impact adoption, such as cultural backgrounds, the acceptance of change, and the willingness of policymakers. Finally, the data may not provide long-term insights into the impact of AI implementation on educational outcomes, as there are daily rapid changes in this area.

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4.4 Article 4. Navigating the Ethical Challenges of Artificial Intelligence in Higher Education: an Analysis of Seven Global AI Ethics Policies

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Navigating The Ethical Challenges of Artificial Intelligence in Higher Education: An Analysis of Seven Global AI Ethics Policies

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4.4.1 Abstract

AI in higher education must be considered ethically. A significant concern is the possibility of biased algorithms, which can devastate students if used in admissions or grading procedures. Another concern is the displacement of humans by artificial intelligence systems, including professors and teaching assistants. Concerns exist regarding AI transparency and accountability in higher education as these systems become more integrated into decision-making processes. Consequently, this paper sheds light on three objectives: artificial intelligence and biased algorithms in higher education, AI and the decision-making process, and artificial intelligence and human displacement. This paper used discourse analysis via purposive sampling on seven of the world's most significant AI ethics policies. The Policies included the UNESCO policy, the AI ethics policy of China, the policy of the European Commission, the Google AI ethics principles, the MIT AI ethics guidelines, the Sanford HAI principles, and the Carnegie Mellon AI ethics principles. The findings suggest that stakeholders must work together to address these challenges, ensure responsible AI deployment in higher education, and maximise the benefits of AI. Results also show that AI ethics policies aim to provide fair use and protect individuals, especially those with vulnerable characteristics such as race, ethnicity, gender, nationality, income, ability, and political or religious affiliation. These policies acknowledge that fair and unfair biases vary across cultures and societies. Gender bias must be avoided in algorithm development, learning data sets, and AI decision-making. Data collection, labelling, and algorithm documentation should be top-notch to ensure traceability and openness. Artificial intelligence's ethical, social, and policy implications should be studied at each

university's centre. AI decisions are more understandable and justified with traceability. AI ethics policies stress responsible AI development and deployment. Making AI systems more transparent and answerable may reduce displacement's adverse effects.

Keywords: Artificial intelligence (AI), Higher education, Biased algorithms, Decision-making; human displacement

4.4.2 Introduction

Artificial intelligence (AI) can potentially revolutionise numerous industries, including all facets of society, particularly education. As AI technologies advance and become more widely adopted in higher education, ethical issues surrounding their implementation must be addressed. This article explores AI's ethical challenges in higher education, specifically focusing on biased algorithms, the decision-making process, and the potential displacement of human labour. The use of biased algorithms in AI poses a significant moral challenge in higher education, where decisions made by AI systems, such as admissions or grading, can significantly impact students' lives. Similarly, the potential displacement of human labour, including faculty and teaching assistants, presents concerns about the impact on employment and the need for individuals to stay competitive in the job market. As these systems become more integrated into decision-making processes, they must clearly understand how they work and how decisions are made to ensure transparency and accountability. This article emphasises the need for policymakers and stakeholders, including educators and administrators, to collaborate and ensure the responsible deployment of AI technologies in higher education. In conclusion, the ethical challenges posed by AI in higher education highlight the need for careful consideration and accountable implementation of these technologies to maximise their positive effects while minimising potential adverse effects.

4.4.3 *Literature Review*

4.4.3.1 AI and Biased Algorithms in Higher Education

Satterfield & Abel (2020) argue that emerging applications of artificial intelligence (AI), such as predictive software integrated into websites like Amazon Prime, autonomous features integrated into automobiles, or innovative home technologies like Alexa or Siri, have an increasing impact on business, industry, research, and higher education. Contemporary trends and innovations in applying AI technology to design, user experience, and behavioural psychology will fundamentally alter how humans interact with technology and design user

experiences. Biased algorithms prioritise creators, empathisers, pattern-recognition experts, and meaning-makers (Satterfield & Abel, 2020).

Shanklin et al. (2022) argue that AI algorithms, even if designed to be neutral, may produce racially biased outcomes if trained on data that reflect racial biases. In medical appointment scheduling in the United States, their research found that algorithms predict that Black patients are more likely to miss appointments than non-black patients. Although technically accurate based on available data, Black patients are disproportionately scheduled in appointment slots with longer wait times, perpetuating racial inequalities and creating a lack of access to healthcare. This raises essential Accuracy-Fairness trade-offs, as policymakers and stakeholders must decide whether to prioritise efficiency or equity when using AI in these settings.

The potential for AI to exacerbate inequalities is not unique to medical appointment scheduling but extends to other domains such as education, judicial systems, and public safety. As such, it is crucial to develop strategies to address these trade-offs. Shanklin et al. (2022) propose a decoupling approach that separates an algorithm's Machine Learning and Optimisation components, allowing for interventions at various stages to promote fairness. Specifically, the authors applied their method to medical appointment scheduling and identified four interventions that address disparities in different components of the algorithm.

While one approach eliminated disparities while maintaining comparable precision to state-of-the-art methods, other procedures resulted in varying accuracy and fairness trade-offs. As such, policymakers and stakeholders must carefully consider the trades associated with each approach when using AI to avoid perpetuating racial and ethnic disparities in healthcare and other domains.

In conclusion, the study by Shanklin et al. (2022) highlights the potential for AI algorithms to perpetuate racial and ethnic disparities in various domains, including healthcare. The research addresses these disparities by decoupling an algorithm's components and intervening at various stages. However, policymakers and stakeholders must carefully weigh the accuracy-fairness trade-offs associated with other interventions when deciding how to use AI in various settings.

Huang et al. (2021) argue that the rapid proliferation of artificial intelligence (AI) technologies has led to significant changes in the landscape of higher education, fundamentally altering traditional teaching and learning norms. However, these changes also raise critical ethical concerns regarding surveillance,

social inequality, and job security. To address these concerns, the authors conducted an in-depth examination of the discourse surrounding the integration of AI in higher education, focusing on library and information science (LIS) and the role of librarianship in shaping the trajectory of AI in learning and teaching. They also examined the ethical implications of using AI in higher education and the position of professional LIS ethics in confronting these transformations.

While the work of Huang et al. (2021) is a valuable contribution to the growing literature on the intersection of AI and higher education, it is essential to acknowledge some potential limitations of their study. For example, their focus on LIS and librarianship may limit the generalisability of their findings to other disciplines and fields. Additionally, their examination of the ethical implications of AI in higher education is theoretical and could benefit from more empirical research. Despite these limitations, their work represents an essential step towards a more nuanced understanding of the impact of AI on higher education and the ethical challenges it poses.

Yoder-Himes et al. (2022) opine that student of colour, particularly women of colour, face significant barriers in STEM fields in higher education due to social isolation and various biases, such as interpersonal, technological, and institutional biases. The authors identify a tendency in online exam proctoring software, which frequently uses facial detection technology to identify potential instances of cheating. However, facial detection algorithms used by exam proctoring software may be biased against students based on skin tones or gender, depending on each company's images used as training sets. This phenomenon has not yet been quantified, nor is it readily accessible from software manufacturers.

Yoder-Himes et al. (2022) assessed instructor outputs of 357 students from four courses to determine if the automated proctoring software adopted by their institution and used by at least 1,500 universities in the United States was biased based on race, skin colour, or gender. The authors manually classified the skin tone of each student's self-reported race and gender using a high-resolution photograph. There was a significant increase in the likelihood that students with darker skin tones and Black students would be marked as requiring more instructors review due to the possibility of cheating compared to students with lighter skin tones. In addition, women with the darkest skin tones were significantly more likely to be flagged for review than men with darker skin or men and women with lighter skin tones.

While the authors do not observe any statistically significant differences between male and female students taken together, their findings suggest that a prominent automated proctoring software may use AI algorithms biased against certain student groups. This study is the first quantitative examination of biases in facial recognition software at the intersection of race and gender. It has implications for multiple fields, including education, social justice, equity and diversity, and psychology. However, it is essential to note that the study was limited to a single institution and a small sample size. The generalisability of the findings to other institutions and populations requires further investigation.

In conclusion, Yoder-Himes et al. (2022) provide important insights into the potential biases in facial detection technology used in online exam proctoring software, particularly against students of colour and women of colour. While this study raises significant concerns, more research is needed to understand the extent of the problem better and develop appropriate solutions. Nonetheless, this research highlights the need for greater attention to AI technologies' social and ethical implications in higher education. It underscores the importance of promoting equity and inclusion for all students in STEM fields.

Cornacchia et al. (2023) have argued that artificial intelligence (AI) has increasingly become a popular solution for making critical judgments in various life-altering decisions. However, they cautioned that biased AI tools could cause significant harm, and these systems may improve or diminish individuals' well-being. Government regulations prohibit using sensitive features such as gender, race, and religion in algorithmic decision-making to avoid unfair outcomes. Despite these regulations, Cornacchia et al. (2023) contend that these restrictions may not safeguard individuals from unfair decisions since algorithms may exhibit discriminatory behaviour, even when sensitive features are omitted.

Cornacchia et al. (2023) proposed an end-to-end method for detecting bias in black-box models that comply with regulations. The technique uses a module for counterfactual reasoning and an external classifier for sensitive features. The counterfactual analysis identifies minimum cost variations that result in a positive outcome. In contrast, the classifier identifies non-linear patterns of non-sensitive features that act as surrogates for sensitive characteristics. The experimental evaluation demonstrates the effectiveness of the proposed technique for detecting classifiers that learn from proxy features.

Notably, Cornacchia et al. (2023) conducted further research to explore the impact of innovative debiasing algorithms on the proxy feature problem. However,

a critical stance on this issue is necessary as the effectiveness of debiasing algorithms may still be limited due to the use of proxy features. It is, therefore, crucial to acknowledge that the proposed method is not a panacea for detecting bias in AI systems. Nonetheless, the proposed approach is a significant contribution to the literature and paves the way for future research to improve algorithms' effectiveness in detecting bias in AI systems.

According to Butt et al. (2023), the ubiquitous deployment of Artificial intelligence (AI) at the periphery has the potential to revolutionise various aspects of human life. However, the authors warn that the success of AI should be measured by its ability to benefit humanity. They argue that deep learning-based edge AI algorithms are intricately linked with human interests and must be viewed through a human-centric lens. Nevertheless, the authors suggest that the security and trustworthiness of AI applications are far from foolproof or ethical despite their significant impact on human interests. Butt et al. (2023) contend that social norms are often disregarded during the design, implementation, and deployment of edge AI systems, making it essential to analyse the application of AI at the edge from a human-centred standpoint.

Butt et al. (2023) make two contributions in their paper. First, they present a development pipeline for human-centric embedded machine learning (HC-EML) applications using a generic human-centric artificial intelligence (HCAI) framework. The authors then analyse and discuss HC-EML applications' privacy, dependability, robustness, and security aspects, offering an insider's perspective on their challenges and potential solutions. The authors illustrate the gravity of these issues with a case study of human facial emotion recognition (FER) based on the AffectNet dataset.

The case study by Butt et al. (2023) analysed the effects of commonly used input quantisation on an EML model's security, robustness, fairness, and reliability. The findings revealed that input quantisation reduced the efficacy of adversarial and backdoor attacks at the expense of a slight reduction in accuracy compared to clean inputs. The authors determined that the eyes, alar crease, lips, and jaws significantly impacted a FER model's decision, as per the explanations generated by SHAP. The authors also observed that input quantisation showed significant bias against dark-skinned faces and hypothesised that the low-contrast characteristics of dark-skinned faces might be responsible for the observed tendencies.

Finally, Butt et al. (2023) concluded with cautionary comments and recommendations for future researchers. Despite the potential of AI at the

periphery, they warn that the ethical implications of these technologies cannot be ignored. The authors recommend that researchers use human-centric approaches to design, implement, and deploy AI systems to ensure that they benefit humans and adhere to ethical and social norms. The study underscores the importance of considering the ethical implications of AI at the periphery and provides insights into potential solutions to mitigate the challenges associated with its deployment.

Gardner (2022) argues that the use of biased algorithms in education systems, as evidenced by the controversial A-level results in the UK in August 2020, highlights the need for greater awareness and accountability in algorithmic decision-making. While the transparency of the algorithm used by Ofqual is commendable, the design of the data set and the broader societal biases it reflects resulted in unfair outcomes that were difficult to deny or dismiss. However, Gardner (2022) notes that similar biases and harmful consequences exist in many other algorithmic systems. Still, their impact is often less visible and more challenging to challenge, particularly for those without the privilege and resources to do so. This raises concerns about the ethics and accountability of algorithmic decision-making and the need for a more rigorous evaluation of the datasets and algorithms used in such systems. As Gardner (2022) emphasises, it is crucial to ensure that algorithms are designed with sensitivity to potential biases and that those affected are informed of their existence and have mechanisms to challenge their outcomes. Further research and awareness of these issues are essential to ensure algorithmic systems are deployed equitably and ethically.

4.4.3.2 AI and Decision-Making Processes

The definition and categorisation of AI and Machine Learning provided by Kangra & Singh (2023) provide a valuable framework for understanding the scope and application of AI in various industries. They may have oversimplified things when they promote XAI as the solution to the problems with transparency and interpretability in AI systems. While XAI techniques have been developed to explain AI algorithms' decision-making processes, their effectiveness has significant limitations, particularly in more complex and opaque models. Additionally, the reliance on expert human interpretation of XAI explanations raises concerns about the potential for bias and the limitations of human understanding in assessing AI systems. Further research is needed to evaluate the effectiveness of XAI in addressing the ethical and social implications of AI use. Thus, while Kangra & Singh's (2023) overview of XAI is a valuable contribution to the field, it should be considered in conjunction with a critical assessment of the limitations and challenges of implementing XAI in practice.

While integrating AI systems into decision-making tasks aims to improve task performance, it is essential to recognise that AI is fallible, and its recommendations may not always align with human values and ethics. Therefore, it is crucial to understand how humans behave when confronted with knowledge imbalance, particularly when they lack the necessary knowledge to complete the task accurately. Gomez et al. (2023) provide valuable insights into this issue, highlighting the importance of involving users in the AI recommendation generation process. This approach increases the likelihood of users accepting the AI's suggestions and enhances their perception of collaboration with the AI agent. Nonetheless, it is essential to note that such findings may not be generalisable to all AI-assisted decision-making tasks, and it is necessary to consider the context and nature of the study when implementing these insights. Additionally, further research is essential to explore the ethical implications of integrating AI into decision-making tasks and the potential risks associated with the overreliance on AI recommendations.

Cornacchia et al. (2023) suggest that while artificial intelligence (AI) is increasingly being relied upon to inform critical judgments that impact people's lives, biased AI systems can negatively affect individuals' well-being. While laws ban sensitive qualities like gender, ethnicity, and religion from influencing decisions, algorithms may employ proxy variables that are only distantly connected to sensitive aspects, suggesting that these restrictions may not be enough to avoid discrimination.

Cornacchia et al. (2023) propose an end-to-end method for detecting bias in black-box models to address this issue. This approach uses a module for counterfactual reasoning, which identifies the minimum cost variations that result in a positive outcome, and an external classifier for sensitive features that identify non-linear patterns of non-sensitive features serving as surrogates for sensitive characteristics.

However, while the experimental evaluation of the proposed technique indicates its effectiveness in detecting classifiers that learn from proxy features, the authors also acknowledge that using innovative debiasing algorithms may have a limited effect on the problem of proxy features.

Considering these findings, it is crucial to develop more robust and comprehensive strategies to detect and prevent bias in AI systems, particularly as they continue to be integrated into critical decision-making processes. Moreover, it

is essential to critically evaluate and improve existing regulations to ensure that they effectively address the potential for discriminatory behaviour in AI systems.

Cornacchia et al. (2023) suggest that while artificial intelligence (AI) is increasingly being relied upon to inform critical judgments that impact people's lives, biased AI systems can negatively affect individuals' well-being. The authors claim that algorithms may continue to use proxy traits that are only distantly connected to sensitive factors like gender, ethnicity, and religion despite laws prohibiting them from influencing judgments.

Cornacchia et al. (2023) propose an end-to-end method for detecting bias in black-box models to address this issue. This approach uses a module for counterfactual reasoning, which identifies the minimum cost variations that result in a positive outcome, and an external classifier for sensitive features that identify non-linear patterns of non-sensitive features serving as surrogates for sensitive characteristics.

However, while the experimental evaluation of the proposed technique indicates its effectiveness in detecting classifiers that learn from proxy features, the authors also acknowledge that using cutting-edge debiasing algorithms may have a limited effect on the problem of proxy features.

Considering these findings, it is crucial to develop more robust and comprehensive strategies to detect and prevent bias in AI systems, particularly as they continue to be integrated into critical decision-making processes. Moreover, it is essential to critically evaluate and improve existing regulations to ensure that they effectively address the potential for discriminatory behaviour in AI systems.

4.4.3.3 AI and Human Displacement

Artificial intelligence (AI) in hiring has become increasingly popular despite growing concerns about the potential for biased evaluations. Zhang and Yencha's (2022) study aimed to explore the public's perceptions of resume and video interview screening algorithms. The authors employed a nationally representative sample to investigate the effectiveness and fairness of hiring algorithms.

The study's results revealed that the public has a negative view of using algorithms in the hiring process, with most respondents considering them unfair and ineffective. Interestingly, the authors noted individual differences in algorithmic perceptions, with males having a higher level of education and income expressing more favourable views towards hiring algorithms than their

counterparts. These findings are significant as they challenge the widespread assumption that AI-driven recruitment methods are universally accepted.

Although the study sheds light on the public's perceptions of hiring algorithms, it has several limitations. Firstly, it only focused on resume and video interview screening algorithms; thus, it may not apply to other hiring algorithms. Secondly, the study did not investigate the reasons for the public's negative perceptions of AI-driven recruitment methods. Future research could explore the factors influencing these perceptions to provide a better understanding of the public's attitudes towards hiring algorithms.

In conclusion, Zhang, and Yencha's (2022) study is essential to the emerging research on hiring algorithms. It highlights the need for businesses to address the public's negative perceptions of AI-driven recruitment methods and proposes strategies to increase their acceptance. However, the study's limitations call for caution when interpreting the results and further research.

Sharing data and algorithms to develop data- and AI-driven economies are essential. Users, data providers, and algorithm providers must interact to ensure the efficiency of exchange data and algorithms effectiveness of recommender systems in connecting users and products in e-commerce environments. Their applicability for data and algorithm sharing has not been thoroughly investigated. To address this research gap, Müllner et al. (2022) conducted a study in which they identified six recommendation scenarios for supporting data and algorithm sharing, four of which differ significantly from traditional e-commerce recommendation scenarios.

These recommendation scenarios were evaluated by Müllner et al. (2022) using a novel interaction data set from the OpenML data and algorithm-sharing platform. The authors examined three types of recommendation strategies: those based on popularity, collaboration, and content. The authors discovered that collaboration-based recommendations were the most accurate in every scenario, whereas the accuracy of other offers varied by scenario. For example, algorithm recommendations for users posed incredible difficulty than algorithm recommendations for datasets. In addition, the content-based strategy generated minor popularity-biased requests for the most critical datasets and algorithms.

While the study by Müllner et al. (2022) provides valuable insights into the effectiveness of recommender systems for data and algorithm sharing, it is essential to evaluate the study's findings critically. For instance, the scope and biases of the study's dataset may limit the findings' generalisability. Moreover, the definition of

accuracy used in the study needs to be scrutinised. Furthermore, the potential implications of popularity bias in recommendation systems should be considered.

In conclusion, the study by Müllner et al. (2022) contributes significantly to understanding recommendation systems for data and algorithm sharing. However, further research is needed to validate and extend the study's findings, address potential biases, and develop context-specific recommendation approaches to support better data and algorithm sharing in various settings.

The ethical implications of human resource management (HRM) decision-making have garnered significant attention in academic and practitioner circles. On the contrary, research on the theoretical foundations of ethical positions and strategies in HRM decision-making and the accountability for these decisions after the fact has been scarce. Therefore, the present study proposes a Throughput model framework that describes how perceptions, judgments, and information use influence individual decision-making processes in an algorithmic HRM context. Moreover, the model identifies algorithmic pathways that can facilitate diverse ethical decision-making strategies.

This study uses a variety of multidisciplinary theoretical lenses, including those related to AI-augmented HRM (HRM(AI)), HRM(AI) assimilation processes, AI-mediated social exchange, and the judgment and choice literature, to further explore the integration of artificial intelligence (AI) in HRM and its acceptance by stakeholders. Rodgers et al. (2023) note that using algorithmic ethical positions in adopting AI has received limited exploration in the literature despite its potential to enhance the intelligibility and accountability of AI-generated HRM decision-making. The authors argue that algorithmic ethical positions play a pivotal role in HRM strategy selection and highlight the importance of accounting for their use in HRM decision-making processes (Rodgers et al., 2023).

Overall, this study contributes to the extant literature by providing a theoretical framework that offers a better understanding of the decision-making processes in algorithmic HRM contexts while shedding light on the crucial role of algorithmic ethical positions in the integration of AI in HRM. However, further research is necessary to assess the efficacy of the proposed Throughput model framework in practical settings and explore algorithmic ethical positions' nuances in HRM decision-making processes.

Agent-based modelling is a powerful approach to understanding social phenomena by simulating individual behaviours and interactions. However, as

modelling techniques advance, analysing complex input factors in models can become more challenging, particularly when proposing specific policies for improving system outcomes. While traditional micro-dynamic analysis can be informative, it may also suffer from ambiguity and limited explanatory power. To address these limitations, Chang et al. (2023) proposed a revised micro-dynamic analysis method that incorporates advanced artificial intelligence techniques to enhance model interpretation and facilitate group-specific policymaking. This modified method enables a more comprehensive causal understanding of a target phenomenon across subgroups, thereby reducing ambiguity and increasing the method's explanatory power. The authors applied this method to an agent-based model that evaluated the effects of a long-term care scheme on access to care. The findings showed that this revised method could suggest policies for improving access equity more effectively than conventional scenario analysis (Chang et al., 2023). Despite the promising results, it is essential to note that further research is needed to validate the generalisability and applicability of this revised method in other contexts.

Fossen et al. (2022) conducted an empirical investigation on the links between three types of patented technologies: artificial intelligence (AI), software, and industrial robots, and wage fluctuations at the individual level in the United States over ten years (2011-2021). The study examined whether AI technologies are related to wage increments or decrements for individual workers and how this relationship compares to previous software and industrial robot innovations. The researchers used patient-derived indicators of occupational exposure to these three technological categories to conduct their analysis.

To investigate the impact of technology on wages, the authors merged individual wage data for the United States with novel technology measures. They employed regression analysis to estimate the association between annual wage changes and technical measures while controlling for other variables. The research findings suggest that the advent of software and industrial robots is related to wage declines, which may indicate a significant displacement effect on human labour.

It is worth noting, however, that the study has several limitations that should be considered. Firstly, the patent-derived indicators may not necessarily reflect occupational exposure to these technologies. The analysis did not consider the different skill sets required to work with these technologies, which could affect the wage impact of AI, software, and industrial robots. Therefore, while the findings are informative, caution should be exercised when interpreting them.

4.4.4 *Methodology*

Discourse analysis is valuable for analysing written or spoken language in social or cultural contexts. It is commonly used to investigate how language is used to construct and negotiate meaning and to examine the social and political implications of language use. This approach seeks to expose and challenge how language is utilised to maintain and perpetuate inequalities and injustices while promoting a cognitive approach to focus on the mental processes involved in language use and how language shapes our understanding and interpretation of AI ethics policies. The current study applied discourse analysis to analyse seven central AI ethics policies based on three main themes: AI bias, decision-making, and human labour displacement. The data were coded thematically according to these three objectives and analysed using the Fairclough dimensions based on the texts studied. The study employed a purposive sampling technique to select policies most relevant to the research questions and objectives and ensure representation from diverse regions and stakeholders. The ethical considerations considered included ensuring data accuracy and transparency, respecting intellectual property rights, maintaining objectivity and fairness throughout the research, avoiding negative consequences of recommendations, and adhering to relevant ethical guidelines and regulations. Purposive sampling was the appropriate strategy given the specific research questions and objectives, even though it would not accurately reflect the larger population and may limit the generalisability of the findings (Fairclough, 2009).

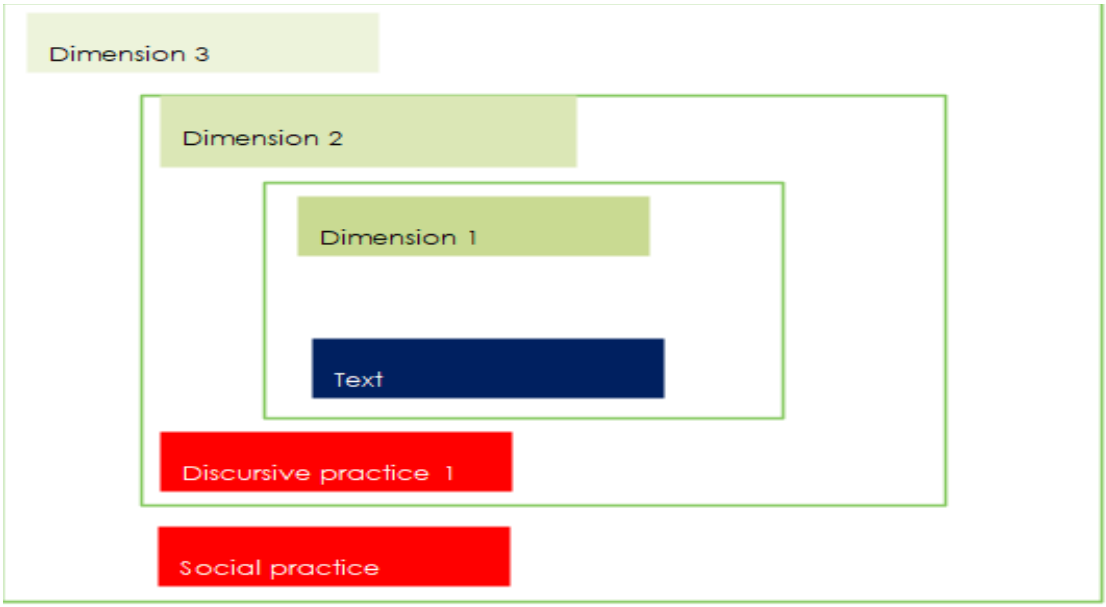

Figure 4.4-1 ***Fairclough Discourse Analysis Model***

4.4.5 Findings

These are the main findings based on the seven documents studied.

4.4.5.1 AI and Biased Algorithms in Higher Education

The research paper in question sheds light on the issues of biased algorithms and their potential impact on society. As demonstrated by the findings in Table 1, all policies studied emphasise the importance of guiding AI towards unbiased algorithms. However, taking a critical stance on these policies is vital, as they may not fully address the issue of unwanted bias in AI.

While policies aim to ensure fair use of AI and avoid inequitable effects on individuals, they may not always succeed in distinguishing between fair and unfair biases, which can vary between cultures and societies. Moreover, the Intelligence Community Directive 203 requires objectivity and awareness of assumptions and risks when analysing, but it remains unclear whether these requirements are consistently met.

Furthermore, while the policies recognise the importance of avoiding biases based on sensitive characteristics such as race, ethnicity, gender, nationality, income, sexual orientation, ability, and political or religious belief, the research paper highlights that there are still instances where biased algorithms have negatively impacted individuals with these characteristics. As a result, it is essential to continue critically examining these policies and how they are implemented to ensure that they effectively reduce the risks of unwanted bias and promote fairness and equality in AI.

Table 4-10 *AI And Biased Algorithms in Higher Education*

(INTEL.gov, 2022)	*Google Images' "schoolgirl" search will show women and girls in sexualised costumes.* *Schoolboys dominate "schoolboy" results.* *There are either no men or very few men dressed in sexualised costu mes.* *Society's gender stereotypes AI.* *The technology behind search engines is not impartial because it pro cesses large amounts of data and ranks results based on which ones have received the most clicks, which is determined by the user's preferences and location.* *Therefore, a search engine can become an echo chamber that reinfor ces biases* *in the real world and further solidifies the beliefs associated with the se prejudices and stereotypes online.*

	How can we ensure that the results are more accurate and evenly dis tributed? *Can we report search results that have a bias?* *How should women be accurately represented in search results, and what would such a representation look like?* *Gender bias should be avoided or minimised in algorithm development, learning data sets, and AI decision-making.* *UNESCO aims to eliminate gender bias in AI.*
(Ning & Wu, 2022)	*The PIPL governs automated decision-making. First, automated decision-making using personal information must be transparent, fair, impartial, and not discriminate in trading price or other trading conditions.* *Automated decision-making in information feeds or commercial marketing to individuals must provide options not specific to the individual's characteristics or easy opt-out choices. Individuals whose interests are materially affected by an automated decision have the right to request explanations from the relevant service provider/processor and to refuse computerised decisions.*
(European Commission, 2021)	*Explicability depends on AI system data, system, and business model transparency.* *Traceability.* *Data collection, labelling, and algorithm documentation should be top-notch to ensure traceability and transparency. AI decisions follow. Identifying why an AI decision was wrong prevents future errors. Traceability allows audibility and explanation.* *Explainability.* *AI systems can explain their technical processes and human decisions (e.g., system application areas). Technical explainability requires human understanding and tracing AI system decisions. System explicability and precision may also need to be prioritised (at the cost of explainability). Explainable AI decisions should impact lives. Explain quickly and to the stakeholder's expertise (e.g., layperson, regulator, or researcher). Explain how an AI system affects the organisation's decision-making, design, and deployment (thus ensuring business model transparency). AI should inform, not impersonate.* *AI must be recognisable. Optional interaction protects fundamental rights. The use case should inform AI practitioners and end-users of the AI system's capabilities and limitations. Communicate AI system accuracy and boundaries.*
(Google, 2023)	*Google will design AI systems with feedback mechanisms, relevant explanations, and appeal mechanisms. Our AI technologies will be overseen and directed by humans.*
(MIT Media Lab, 2020)	*A small amount of reckoning is upon technology: The impact of algorithms on free speech, privacy, and autonomy. AI, or the datasets on which AI is trained, are frequently biased or misused to manipulate individuals.*

Stanford HAI, 2023)	*Stanford University has a set of AI research principles, including a commitment to "fairness, non-discrimination, transparency, and accountability.*
(Carnegie Mellon University, 2023)	*The Carnegie Mellon University AI research principles include "fairness, transparency, and accountability." The codes also require researchers to mitigate data and algorithm biases. All university AI ethics policies emphasise fairness, transparency, and accountability in AI development and the need to identify and mitigate data and algorithm biases. AI's ethical, social, and policy implications are studied at each university's centre.*

4.4.5.2 AI and Decision-Making Processes

In the AI and decision-making process, findings reveal that gender bias should be avoided or minimised in algorithm development, learning data sets, and AI decision-making, as detailed in Table 2. Policies indicate that automated decisions using personal information must be transparent, fair, impartial, and not discriminate in trading price or other trading conditions. Data collection, labelling, and algorithm documentation should be top-notch to ensure traceability and transparency. Explainable AI decisions should impact lives; therefore, all universities' AI ethics policies must emphasise fairness, transparency, and accountability in AI development. Similarly, AI's ethical, social, and policy implications should be studied at each university's centre.

Table 4-11 Decision-Making Process and AI Ethics

(INTEL.gov, 2022)	*Google Images' "schoolgirl" search will show women and girls in sexualised costumes.* *Schoolboys dominate "schoolboy" results.* *There are either no men or very few men dressed in sexualised costumes.* *Society's gender stereotypes AI.* *The technology behind search engines is not impartial because it processes large amo unts of data and ranks results based on which ones have received the most clicks, whic h is determined by the user's preferences and location.* *Therefore, a search engine can become an echo chamber that reinforces biases in the real world and further solidifies the beliefs associated with these prejudices and stereotypes online.* *How can we ensure that the results are more accurate and evenly distributed?* *Can we report search results that have a bias?* *How should women be accurately represented in search results, and what would such a representation look like?* *Gender bias should be avoided or minimised in algorithm development, learning data sets, and AI decision-making.* *UNESCO aims to eliminate gender bias in AI.*
(Ning & Wu, 2022)	*The PIPL governs automated decision-making. First, automated decision-making using personal information must be transparent, fair, impartial, and not discriminate in trading price or other trading conditions.*

	Automated decision-making in information feeds or commercial marketing to individuals must provide options not specific to the individual's characteristics or easy opt-out choices. Individuals whose interests are materially affected by an automated decision have the right to request explanations from the relevant service provider/processor and to refuse computerised decisions.
(European Commission, 2021)	*Explicability depends on AI system data, system, and business model transparency.* *Traceability.* *Data collection, labelling, and algorithm documentation should be top-notch to ensure traceability and transparency. AI decisions follow. Identifying why an AI decision was wrong prevents future errors. Traceability allows audibility and explanation.* *Explainability.* *AI systems can explain their technical processes and human decisions (e.g., system application areas). Technical explainability requires human understanding and tracing AI system decisions. System explicability and precision may also need to be prioritised (at the cost of explainability). Explainable AI decisions should impact lives. Explain quickly and to the stakeholder's expertise (e.g., layperson, regulator, or researcher). Explain how an AI system affects the organisation's decision-making, design, and deployment (thus ensuring business model transparency). AI should inform, not impersonate.* *AI must be recognisable. Optional interaction protects fundamental rights. The use case should inform AI practitioners and end-users of the AI system's capabilities and limitations. Communicate AI system accuracy and boundaries.*
(Google, 2023)	*Google will design AI systems with feedback mechanisms, relevant explanations, and appeal mechanisms. Our AI technologies will be overseen and directed by humans.*
(MIT Media Lab, 2020)	*A small amount of reckoning is upon technology: The impact of algorithms on free speech, privacy, and autonomy. AI, or the datasets on which AI is trained, are frequently biased or misused to manipulate individuals.*
Stanford HAI, 2023)	*Stanford University has a set of AI research principles, including a commitment to "fairness, non-discrimination, transparency, and accountability.*
(Carnegie Mellon University, 2023)	*The Carnegie Mellon University AI research principles include "fairness, transparency, and accountability." The codes also require researchers to mitigate data and algorithm biases. All university AI ethics policies emphasise fairness, transparency, and accountability in AI development and the need to identify and mitigate data and algorithm biases. AI's ethical, social, and policy implications are studied at each university's centre.*

Consequently, AI ethics policies in higher education are an emerging concern as universities and colleges increasingly adopt and integrate AI systems into their operations and decision-making processes. These policies can address a wide range of issues related to AI and decision-making processes in higher education, such as:

- Fairness: Ensuring that AI systems used in admissions, financial aid, and other student services do not perpetuate or exacerbate existing biases and discrimination based on race, gender, and socioeconomic status.

- Transparency: Making sure that the decision-making processes of AI systems used in grading, student evaluations, and other academic decisions are

explainable and understandable so that students and faculty can trust and have confidence in the systems.

- Accountability: Holding universities and colleges responsible for the actions and decisions of AI systems and ensuring that there are mechanisms for redress and remediation in case things go wrong.
- Safety: Minimising the potential negative impacts of AI systems on students and faculty, such as privacy violations and physical harm.
- Human autonomy: Ensuring that the decisions of AI systems are consistent with human values and do not undermine human independence.

It is important to note that while these policies are essential, they are still a work in progress and are subject to change as technology, society, and laws continue to evolve. Some universities or colleges may have specific AI ethics policies or guidelines, but the level of implementation and enforcement of these policies may vary.

4.4.5.3 AI and Human Displacement

Concerning AI and human displacement, policies studied in this paper argue that when AI decisions affect human life, they should be explainable, as detailed in Table 3. Human interaction with AI should be optional and not impersonated. Design choices and rationale for deployment should also be explained to ensure business model transparency. Traceability aids audibility and explanation of AI decision-making are required. A system's explainability and accuracy may need to be balanced (at the cost of explainability). The European Commission's AI ethics policy emphasises the need for responsible development and deployment of AI. The policy calls for promoting transparency and explainability in AI systems to help mitigate the adverse effects of displacement. It also encourages research into ways to minimise AI's potential negative impacts on employment and create new opportunities for workers.

Table 4-12 *AI and Human Displacement*

(INTEL.gov, 2022)	*This criterion includes data, system, and business models relevant to an AI system's transparency and is closely related to explicability.* *AI data collection, labelling, and algorithms should be meticulously documented to ensure traceability and transparency. This also applies to AI decision-making. Such regulation helps identify an AI's wrong decision and prevent future errors. Traceability aids audibility and explanation.*

	Machine learning systems can explain their technical processes and human decisions (e.g., system application areas). To be technically explicable, humans must understand and reconstruct AI system decisions. Additionally, a system's accuracy and predictability may suffer a considerable trade-off as it improves (at the cost of explainability). When AI decisions affect human life, they should be explainable. Explain this quickly and to the stakeholder's level of understanding (e.g., layperson, regulator, or researcher). The extent to which an AI system influences and shapes an organisation's decision-making process, design choices and rationale for deployment should also be explained to ensure business model transparency (thus ensuring business model transparency). Humans interacting with AI should be informed and not impersonated. AI systems must be identifiable. *AI practitioners and end-users should be informed of the system's capabilities and limitations in a way that fits the use case. Communicating the system's precision and regulations may help protect fundamental rights. However, the interaction should be optional.*
(Ning & Wu, 2022)	*The 2017 State Council New Generation Artificial Intelligence Development Plan: An intelligent court data infrastructure that incorporates trials, staff, data applications, judicial disclosure, and active surveillance to promote the use of artificial intelligence in evidence collection, case analysis, and legal document reading was proposed.* *Several districts have begun fruitful research into the legal system's use of AI. Speech recognition technology aids court recording in many domestic courts. Locally developed intelligent assistant case-handling systems for criminal cases unify evidence standards, rules, and models. Some local civil courts use a smart trial platform that lets parties participate in trials remotely. The AI assistant judge could preside. The AI assistant will guide parties through evidence presentation, cross-examination, and other courtroom procedures if they are online.* *More legal cases will use AI. Artificial intelligence technology will help unify case trial standards and other areas due to its training on massive case data.*
(European Commission, 2021)	*The European Commission's AI ethics policy includes guidelines for addressing the potential displacement of human labour caused by the deployment of AI systems. The approach emphasises the need for responsible development and deployment of AI, including considering potential impacts on employment and the need for retraining and social safety nets for workers affected by automation. Additionally, the policy calls for promoting transparency and explainability in AI systems to help mitigate the adverse effects of displacement.*
(Google, 2023)	*The scientific method, open inquiry, intellectual rigour, honesty, and collaboration underpin technological innovation. Therefore, AI tools could advance biology, chemistry, medicine, and environmental sciences. We pursue scientific excellence in AI development.* *Designers will collaborate with stakeholders to promote thoughtful leadership in this field using scientifically rigorous and multidisciplinary methods. Researchers will publish educational materials, best practices, and research to help more people create practical AI applications.*

(MIT Media Lab, 2020)	*MIT's AI ethics policy states that the development and deployment of AI should be guided by ethical principles, including the responsible use of AI to avoid the displacement of human labour. The policy also encourages research into mitigating AI's potential negative impacts on employment and creating new opportunities for workers. Additionally, the procedure calls for collaboration between researchers, policymakers, and industry to ensure that the benefits of AI are widely shared, and its potential downsides are minimised.*
(Stanford HAI, 2023)	*Technology companies also face resistance due to their massive impact on people and democracy. Policymakers must address these issues. Stanford University's associate chair for education in computer science, Mehran Sahami, believes universities also prepare future computer scientists. "Computer scientists must consider ethical issues from the start, rather than developing technology and waiting for problems."*
(Carnegie Mellon University, 2023)	*Carnegie Mellon's Centre for AI and Policy Research researches and teaches about AI's ethical, social, and policy implications.*

To sum up, AI ethics policies in higher education concerning AI and the displacement of human labour are essential areas of concern as universities and colleges increasingly adopt and integrate AI systems into their operations. These policies aim to ensure that the use of AI in higher education does not lead to the displacement of human labour in unfair or harmful ways. One key aspect of these policies is ensuring that AI systems complement and enhance human delivery rather than replace it. This can involve providing training and support for workers to develop new skills that will enable them to work effectively alongside AI systems and create new job opportunities that take advantage of the capabilities of AI. Another critical aspect of these policies is to ensure that the displacement of human labour caused by AI is done fairly and responsibly. This can involve supporting and assisting workers impacted by AI adoption, such as retraining programs and financial aid. It can also include ensuring that AI systems are not used in ways that perpetuate existing biases or discrimination in the workforce.

Hence, it is essential to note that implementing these policies can be challenging and requires a multidisciplinary approach involving collaboration between different departments and stakeholders. Universities and colleges may also need to adopt a proactive approach to identifying and addressing the potential labour-related impacts of AI, such as conducting impact assessments, engaging with workers and other stakeholders, and monitoring and evaluating the effects of AI on the workforce.

4.4.6 Conclusion

Transparency and explainability are essential components of responsible AI development. This criterion includes data, system, and business models relevant to an AI system's transparency and is closely related to explicability. AI data collection, labelling, and algorithms should be meticulously documented to ensure traceability and transparency, which helps identify incorrect decisions and prevent future errors. When AI decisions affect human life, they should be explainable and communicated quickly and at the stakeholder's level of understanding.

Guidelines for dealing with the potential displacement of human labour brought on using AI systems are included in the AI ethics policy of the European Commission. This policy emphasises the need for responsible AI development and deployment, including considering potential effects on employment and the necessity of retraining and social safety nets for workers affected by automation.

MIT and Stanford University's AI ethics policies state that the development and deployment of AI should be guided by ethical principles, including the responsible use of AI to avoid the displacement of human labour. They also encourage research into ways to mitigate AI's potential negative impacts on employment and create new opportunities for workers. Carnegie Mellon University's Centre for AI and Policy Research researches and teaches about AI's ethical, social, and policy implications.

In addition, there is fruitful research on the legal system's use of AI, such as an intelligent court data infrastructure that incorporates trials, staff, data applications, judicial disclosure, and active surveillance. AI technology will help unify case trial standards and other areas due to its training on massive case data.

Finally, AI tools can advance various fields, such as biology, chemistry, medicine, and environmental sciences. Scientific excellence in AI development can be promoted by collaborating with stakeholders to pursue thoughtful leadership in this field, using scientifically rigorous and multidisciplinary methods. Educational materials, best practices, and research can help more people create practical AI applications.

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5. Discussions

This section examines AI in higher education from four perspectives. Section 5.1.1, bridges literature and research views on AI's role in education quality and transformative methodologies. Section 5.1.2 delves into AI's impact on admissions, academic support, and learning experiences, emphasising challenges and ethical considerations. Section 5.1.3 explores driving forces and challenges in the AI implementation landscape, while Section 5.1.4 focuses on ethical dimensions and decision-making implications. However, Section 5.1.5 highlights limitations, urging a deeper ethical exploration, broader literature inclusivity, more actionable recommendations, and potential primary research to enhance the thesis's scholarly contribution. The overall exploration underscores the need for a nuanced understanding to unlock AI's full potential in higher education.

5.1 AI's Impact on Higher Education Using Data from Leading Academic Databases. Trends, Efficacy, Ethical and Employment Implications.

Examining AI integration within higher education illuminates significant points of agreement and divergence between the literature review and research findings. The literature review (Abreu et al., 2019; Campos et al., 2016) and research findings (Breaux & Swanson, 2017; Garcia-Cabot et al., 2020) recognise AI's potential to enhance education quality. They converge in acknowledging AI's role in fostering personalised learning, optimising resources, and revolutionising teaching methodologies.

However, the research findings present a deeper exploration, highlighting AI's specific impacts on learning management systems and problem-solving abilities (Breaux & Swanson, 2017; Garcia-Cabot et al., 2020), thus complementing and expanding upon the broader perspectives outlined in the literature. Both sources adopt a critical stance, emphasising ethical considerations and biases in AI integration. While the literature review (Prinsloo, 2020; Wu, Huang, & Gong, 2020) addresses ethical concerns broadly, the research findings provide concrete instances of potential biases in AI-assisted assessments and future career predictions (Sanjinis, 2020; Garcia, 2019; Pana, 2017; Deo, 2019; Smith, 2018), emphasising the need for comprehensive ethical frameworks.

Moreover, the research findings offer compelling visual representations (Figure 4.1 2 and Figure 4.1 3), evidencing international collaborations in AI research within higher education. These visuals support the broader perspectives in the literature by highlighting diverse global engagements. While both sources accentuate the transformative potential of AI in higher education, the research findings deepen this understanding by providing specific examples of AI's impacts and international collaborative efforts.

The findings for this objective align closely with the Technology Acceptance Model (TAM), which highlights perceived usefulness and ease of use as central to AI adoption. The review of literature on AI's transformative potential (e.g., enhancing learning outcomes, optimising resources, and supporting adaptive learning) further substantiates this connection.

This study contributes by synthesising diverse perspectives on AI's holistic impact, particularly in streamlining academic processes, improving operational efficiency, and fostering personalisation. It also provides a critical evaluation of challenges, such as ethical dilemmas and resistance to adoption, which are underexplored in prior studies.

5.2 AI's Role in Higher Education via AI Experts, Focusing on Administration, Pedagogy, and Ethics

This study's in-depth exploration of AI's impact on higher education echoes and expands upon existing literature. It emphasises AI's transformative potential across diverse aspects such as student admissions, teaching methodologies, academic integrity, and ethical considerations. Notably, it provides comprehensive insights into AI's role in streamlining administrative tasks, enriching learning experiences, and addressing ethical challenges.

Aligned with previous research (Marcinkowski et al., 2020; Sarraf et al., 2021; Allen et al., 2022; Bucea-Manea-ţoniş et al., 2022a; Nguyen et al., 2021), this study underlines AI's significant influence on admissions and academic support. It concurrently acknowledges both the positive impacts of AI in enhancing learning experiences and persistent challenges, including resistance and ethical dilemmas.

The study emphasises the criticality of ethics in AI-driven assessments, highlighting the necessity for robust policies and training to ensure integrity (Elkhatat, 2022; Hellwig et al., 2023; McLennan et al., 2022; Kaur et al., 2023). It aligns with existing literature in reaffirming AI's transformative potential while advocating for ethical guidelines and educational strategies to address transparency, bias, and privacy concerns.

This objective is grounded in ethical governance frameworks, which emphasise transparency, fairness, and equity in AI implementation. Thematic analysis reveals barriers such as technological infrastructure deficits, faculty resistance, and ethical concerns, directly tied to these theoretical principles .

This study identifies specific barriers to AI integration that previous studies have only partially addressed. It highlights regional challenges, such as limited technological

capacity in under-resourced areas, and proposes collaborative approaches involving stakeholders to mitigate these issues. This understanding offers actionable insights for policymakers and institutions aiming to enhance AI readiness .

5.3 Understanding Factors Influencing AI Adoption in Academia

Literature on AI implementation in higher education emphasises multifaceted drivers fostering AI integration (Menkhoff & Teo, 2022; Renz & Hilbing, 2020; Khan et al., 2021; Haderer & Ciolacu, 2022; Zhang & Wang, 2022; Gupta & Chen, 2022). It highlights AI's role in skill acquisition, adaptive teaching, and personalised education, catering to diverse student needs. For instance, Menkhoff & Teo's research emphasises AI's role in promoting engagement and motivation, especially evident in non-STEM students through innovative chatbot workshops (Menkhoff & Teo, 2022).

Conversely, barriers hindering seamless AI integration include educational systems' slow adaptation to technology, ethical dilemmas, and inadequate competencies (Teuscher, 2021; Seo, 2022; Shopland et al., 2022). Proposed solutions advocate for collaborative endeavours, leveraging AI for emotional interaction and refining the educational environment (Liwång, 2022; An, 2022; Razia et al., 2022).

Objective 3 aligns with Responsible AI Frameworks, which advocate for proactive measures to address ethical challenges. Expert interviews underscore the importance of algorithmic audits, stakeholder involvement, and ethical training to foster sustainable AI adoption .

The study provides insights for ethical and operational challenges, including the implementation of transparent AI systems and tailored training for educators. These contributions fill a critical gap in the literature by offering specific, context-sensitive strategies that institutions can adopt to navigate ethical dilemmas and operational bottlenecks .

5.4 Discourse Analysis on AI Ethics Frameworks, Addressing Algorithmic Biases and Human Displacement in Academia

Integrating AI in higher education prompts crucial discussions on ethics, bias mitigation, and the implications of AI-driven decision-making (INTEL.gov, 2022). Literature highlights the pervasive challenge of biased algorithms and ethical concerns (European Commission, 2021). It emphasises the need for continuous scrutiny and policy implementation to tackle unwanted biases effectively (Ning & Wu, 2022).

Ethical implications in AI decision-making processes, particularly concerning transparency and fairness, pose significant challenges (Stanford HAI, 2023; MIT Media Lab, 2020). The potential displacement of human labour due to AI integration raises ethical dilemmas, demanding responsible AI development and job transition opportunities (European Commission, 2021; INTEL.gov, 2022; MIT Media Lab, 2020).

These articles emphasise AI's potential benefits in higher education while highlighting significant challenges. Addressing these challenges requires a comprehensive approach encompassing infrastructure enhancement, competency development, ethical considerations, and curricular restructuring to unlock AI's full potential in higher education.

The findings are linked to discourse analysis frameworks, particularly Fairclough's model, which examines the interplay of power, policy, and ethics in AI implementation. This theoretical lens facilitates an in-depth evaluation of policy documents and their alignment with ethical AI deployment goals .

The study proposes a structured approach to respployment, highlighting the need for equitable policies that safeguard vulnerable groups and promote stakeholder collaboration. It also emphasises the development of adaptive governance models to keep pace with AI’s rapid evolution, thus contributing to a robust ethical foundation for future implementations

6. Thesis’ Limitations

The thesis on AI integration in higher education presents a comprehensive overview of existing literature and research findings. However, to enhance its academic depth and rigour, certain aspects require further attention:

- Deeper Ethical Exploration: While ethical concerns such as biased algorithms and ethical implications in AI-assisted assessments are acknowledged, a more detailed analysis of these ethical challenges is needed.
- Inclusivity and Scope of Literature: Incorporating recent, diverse, or contradictory perspectives within the discourse on AI in higher education could provide a more comprehensive understanding.
- Actionable Recommendations: Providing more specific strategies aligned with each recommendation would enhance their practical applicability for educational institutions.
- Potential for Primary Research: Integrating primary research methodologies could strengthen the thesis by supplementing existing insights with fresh empirical data.

Addressing these areas would elevate the scholarly contribution of the thesis by offering a more nuanced understanding of AI in higher education and providing practical insights for educational stakeholders.

7. Future Approaches

Research Expansion: In the rapidly evolving AI in higher education, the need for thorough research expansion becomes paramount. The current dearth of comprehensive studies evaluating the effects of AI on education, its ethical considerations, and its influence on future careers raises critical questions. By addressing this gap, researchers can contribute significantly to the knowledge base, providing insights that inform policy, practice, and further research endeavors.

AI and Future Careers: As we stand on the precipice of an AI-driven future, understanding its impact on education and subsequent employment is imperative. A call for more comprehensive studies in this realm becomes not just a recommendation but a necessity. Such studies can unravel the intricate dynamics between AI integration in education and the evolving landscape of future careers. Insights gained from these studies can guide educational institutions, policymakers, and individuals in preparing for the shifting demands of the job market.

Comprehensive Ethical Frameworks: Delving into the ethical dimensions of AI in higher education is a crucial step towards responsible technological integration. The recommendation to further explore and develop comprehensive ethical frameworks acknowledges the potential adverse effects of AI. By understanding and addressing these ethical concerns, educational stakeholders can ensure that AI is harnessed for the betterment of education without compromising on fundamental ethical principles.

Future AI Impact Evaluation: Beyond the surface-level understanding of AI's impact on education, a clarion call for more in-depth studies to evaluate its effects is essential. This goes beyond acknowledging the transformative potential and delves into the nuanced assessment of how AI shapes education quality and prepares individuals for future careers. The findings from such studies can guide educators, institutions, and policymakers in making informed decisions.

Adaptive AI Technology: The quest for advanced AI technologies tailored to individual needs for personalised learning experiences is a pursuit that aligns with the evolving nature of education. Investigating and understanding the intricacies of adaptive AI technology in education can revolutionise learning experiences, catering to diverse learning styles and preferences. This recommendation positions AI not as a

one-size-fits-all solution but as a dynamic tool adaptable to the unique needs of each learner.

Inclusive AI Development: AI development must transcend beyond technological advancements and consider the societal fabric it operates within. Promoting AI development that caters to diverse cultural backgrounds and actively avoids perpetuating societal biases is a call for ethical and socially responsible technological progress. This recommendation emphasises the importance of ensuring that AI benefits all, irrespective of cultural or societal differences.

Policy Implementation Studies: Policies serve as the backbone of ethical and effective AI deployment. The call for studies on the effectiveness of policy implementations addresses the need to scrutinise and refine the rules governing AI in higher education. Understanding how policies impact privacy, inclusiveness, equity, and transparency in AI deployment is vital for creating a regulatory framework that fosters responsible and ethical use of AI technologies.

In differentiating general recommendations from future approaches, the thesis paper not only provides actionable insights for immediate implementation but also lays the groundwork for a continued discourse and investigation into the evolving landscape of AI in higher education. This nuanced approach positions the research as a catalyst for tangible change and as a guide for future endeavors in AI integration within the academic sphere.

In conclusion, the thesis paper should comprehensively explore the potential of AI in higher education while addressing its ethical implications, ensuring transparency and accountability, and advocating for responsible AI deployment. Collaboration among stakeholders and expanded research in critical areas will contribute to a more honest and effective integration of AI in higher education, benefiting students and educators alike.

8. Conclusions

In conclusion, this thesis has shed light on the transformative potential of Artificial Intelligence (AI) in higher education. The systematic review and analysis of four main articles have provided valuable insights into the multifaceted impact of AI on education quality, learning and teaching processes, assessments, ethics, and future careers in higher education.

The findings reveal that AI promises to deliver more effective and practical educational strategies, prepare students for future professions, and address the demands of an evolving job market. However, it is essential to acknowledge the gaps in research on AI effect evaluations, ethical considerations, and the potential displacement of human involvement in education.

The importance of ethical implementation has emerged as a recurring theme throughout exploring AI's role in higher education. The thesis has underscored the significance of addressing biased algorithms, ensuring transparency and accountability, and safeguarding individuals from discrimination and privacy breaches. Adhering to ethical laws and policies can harness AI as a powerful tool for positive educational transformation while mitigating adverse consequences.

Furthermore, the thesis highlights the need for collaboration among stakeholders, including educational institutions, policymakers, researchers, and AI developers. Together, they can work towards responsible AI deployment, maximising its benefits and overcoming challenges in its implementation.

This research has also demonstrated that AI plays a pivotal role in administrative tasks within higher education, leading to cost reductions, efficient problem-solving, and time-saving benefits. AI's potential to accelerate the learning process, engage learners and tutors, and personalise education has also been illuminated.

However, the thesis has raised crucial questions about the potential displacement of humans in the face of increasing AI integration. Balancing AI adoption with preserving human involvement remains critical in ensuring a holistic and practical learning environment.

In conclusion, the journey through this thesis has highlighted the immense potential of AI to revolutionise higher education. Responsible AI deployment, adherence to ethical principles, collaboration among stakeholders, and continued research and innovation will pave the way for a brighter future in higher education. By harnessing AI's transformative power, educational institutions can create equitable, inclusive, and personalised learning

experiences that prepare students for success in the dynamic and rapidly changing world. As we embrace the future with AI as a valuable partner in education, let us be mindful of the ethical considerations and remain committed to fostering a learning environment that upholds the values of integrity, transparency, and equitable access for all learners. Through such efforts, we can ensure that AI in higher education becomes a force for positive change, propelling us towards a more enlightened and empowered society.

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