Stakeholder Perspectives on The Impact of Ai in Higher Education

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Abstract: Nowadays, AI has boomed in every sector, particularly in the education sector, where it plays a vital role in learning. This may have some impact on the higher education sector. This study investigates stakeholder perceptions of a university that is equipped with 10 higher-level pedagogues in the context of the vital opportunities and challenges that pedagogies have in adopting AI's impact on higher education through a thematic analysis of audio-recorded interviews and discussions, converting those audios into text by using Audacity software. By examining the insights of pedagogues, the analysis uncovers key themes that highlight both the transformative potential and challenges of AI integration. The findings suggest that AI facilitates personalized learning and supports data-driven decision-making. However, concerns persist regarding ethical considerations, data privacy, and the shifting role of Pedagogies in AI-driven environments. Thematic evolves, developing from stakeholder facts, provides insightful insights into the greater general institutional and pedagogical repercussions of AI usage. This research contributes to a nuanced understanding of AI's role in higher education, giving suggestions for making effective strategic implementations.

Keywords: AI, higher education, stakeholder perspectives, Pedagogues, thematic analysis, personalized learning

INTRODUCTION

In the fast-evolving 21st century, there was growth in many sectors, especially in the education sector, which was enhanced from traditional level learning to the AI (Artificial Intelligence) level. Artificial Intelligence: It is a technology to performs the human values by the computer coding's. Artificial Intelligence (AI) is defined as the ability and development of computer systems or other high-tech machines to execute tasks that naturally demand human intelligence, logical reasoning, and problem-solving [27]. This creates an impact for the stakeholders in higher education. Artificial intelligence is a quickly growing technological field that has the probability of transforming every feature of social interactions. In education, AI is pouring the development of advanced teaching and learning solutions, which are presently being verified in various settings [24]. The growing influence of artificial intelligence (AI) across nearly all aspects of human life has made it essential for individuals to grasp the fundamental principles of how this technology functions [27]. This study deals with the effect of artificial intelligence in higher education on its stakeholders (Pedagogues). The efficiency of AI education is powerfully linked to the preparedness of pedagogies. For student participants, existing fiction emphasizes the importance of considering their standpoints and knowledge needs, principally when introducing a new course or focus area. [10,16]. For this study, the researchers took a beginning, to approach some middle-level and high-level Pedagogues of a deemed university for conduct the study and to analyse the influence of AI in higher education. The primary objective of this study was to analyse how the stakeholders, particularly Pedagogues,

distinguish the incorporation of Artificial Intelligence in higher education and how it can be effectively executed. Specified the essential part of Pedagogies in formative higher education, it is vital to recognize their perspectives, concerns, and readiness to be involved with AI-driven learning. To attain this goal, the study aims to discover the following research enquiries, drawing insights from retorts provided by certain participants.

What are the vital opportunities and challenges that pedagogies have recognized with the espousal of AI?
From this question, the researchers took Qualitative methods were widely used in learning and teaching research and scholarship [9]. To address the research questions, researchers conducted in-depth, one-on-one interviews with 10 key education stakeholders (Pedagogies). Exploiting a thematic analysis approach, researchers explored their insights into AI, the validation for integrating AI into the curriculum, the challenges allied with its adoption in colleges, and the support mechanisms needed to enable its effective implementation.

REVIEW OF LITERATURE

The study was enhanced with the help of previous study references to explore this study in a wider manner. Investing in professional pedagogy expansion programs and access to AI-specific training stages is crucial for addressing this issue. An intricate application of technology is associated with advanced training concepts.[7] According to Pijl & Frissen [25], Education policymakers bear the responsibility of enhancing and maintaining educational quality, implementing

innovations, and managing financial resources. This innovation emphasizes the incorporation of AI learning modules into the existing school curriculum. This initiative provides students and educators with access to AI tools and resources, facilitating hands-on learning experiences essential for comprehending the practical applications of AI (NITI Aayog, 2020). These actions are underpinned by the necessity for educational policies to integrate and adopt AI as an essential element of modern education. [12] and too a stipulation aimed at future workforce readiness and education ingenuities provide a comprehensive assurance for the integration of AI within institutions, as emphasized in the Future of Jobs Report by the World Economic Forum. [21,2]. The literature highlights the transformative potential of AI in education, particularly through adaptive learning platforms and intelligent education systems that personalize learning and address diverse educational needs. [17,19]. Preparing students for the challenges and opportunities presented by AI is essential as it continues to influence the society. Numerous countries and educational institutions have made AI-related studies a prerequisite in their curriculum [12,3]. The countries continue to participate in AI in their curriculum, it is significant to highlight that Pedagogies require adequate training and professional expansion opportunities to deliver AI education effectually. Numerous projects have been initiated to provide pedagogical and artificial intelligence knowledge. The "AI For Education" programme of the European Union provides training courses for educators to enhance their understanding of AI and its implications.[14]. Furthermore, the Computer Science Pedagogies Association (CSTA) and the Association for the Advancement of Artificial Intelligence (AAAI) offer pedagogical guidelines for introducing students at various evaluation levels to AI perceptions as well as five key concepts in AI education.[29]. Pedagogies frequently lack the necessary knowledge and training to accurately instruct subjects related to artificial intelligence [4]. Analysis of student involvement reveals that online learning has produced both positive and negative effects. Students indicated that their confidence in writing as the primary mode of communication in online learning prompted deeper cognitive engagement compared to verbal responses. [15]. Although students may benefit from the flexibility, individuality, and expediency of online learning, the student-centered approach necessitates greater accountability in the learning process. This implies that students are likely to be self-regulated, self-motivated, and self-disciplined. [18,22]. Thematic analysis was employed for the analysis of this study. The purpose of thematic analysis is to identify themes, or patterns within the data that are significant or intriguing, and to utilize these themes to inform the research or provide insights into a particular issue. This extends beyond mere data summarization; an ethical thematic analysis interprets and contextualizes the information. The essential interview questions can serve as the primary themes. (Clarke & Braun, 2013). Thematic analysis is the procedure of finding patterns or themes within qualitative data [8]. It is recommended as the primary qualitative method because it offers essential skills applicable to various other forms of analysis (p.78). Thematic analysis (TA) is a qualitative analytic method commonly employed in healthcare, psychology, and other fields. Insignificant details are frequently provided to validate the process of data analysis, particularly in the field of education. In addition to outlining the stages of conducting TA, this text presents other practical examples that have been undertaken. [6,13,23], A good thematic code effectively captures the qualitative essence of the phenomenon. An additional benefit, especially regarding learning and teaching, is that it represents a method rather than a methodology. [6,8]. This indicates that, in contrast to many qualitative methodologies, it is not associated with a specific epistemological or theoretical framework. This method is highly flexible, which is a significant advantage considering the diverse nature of work in learning and teaching.[20]

METHODOLOGY

This study is working on a qualitative research approach, exploiting the audio-recorded interviews to examine the perspectives of education stakeholders on AI in higher education, their concerns, and strategies for effective integration. Among these stakeholders were Pedagogues, whose insights were pivotal to the research. A group of ten participants was carefully selected to provide a comprehensive survey of their acuities and the underlying reasons behind them. The interview technique was preferred for its ability to offer a deeper consideration of participants' practices and viewpoints on the subject. Succeeding the interview meetings, all audio footages were transliterated and systematically analysed using Audacity software. Additionally, a thematic analysis was conducted to identify recurring patterns and insights within and across the collected data.

Interview conducting process

The interview was directed with pedagogues from a Deemed University using the ZOOM platform. Pedagogues were primarily approached through informal dialogs on various social media platforms to measure their willingness to share their viewpoints. Once they expressed their interest in participating, the interviewer and interviewees synchronized suitable times for the sessions. The study proposed to gather various stakeholder perspectives across plentiful academic disciplines, encircling both STEM (Science, Technology, Engineering, and Mathematics) and non-STEM (Science, Technology, Engineering, and Mathematics) fields. The negotiations were carried out online considering the possibilities of the participants, and audio was documented. The individual's interview took about 25 to 40 minutes, and all audio footages were recorded via Audacity software.

Data Analysis

The technique of analysis proceeded in an inductive analysis direction. [28] The authors developed a data analysis protocol employing Structured Tabular Thematic Analysis (ST-TA) as originally suggested by Robinson.[26] ST-TA offers a methodical structure to explore qualitative data, allowing for a thorough interpretation of text data ranging from tiny to somewhat big in size. Particularly regarding specific research, this approach is seen to be effective because A fairly large and

somewhat diversified sample was used to gather qualitative data, which consisted of brief interviews. Primary themes might have existed upon which codes deriving from text data might have been constructed, according to the ST-TA principles. Furthermore, the research questions are formulated in this study to subordinate with former themes, which makes the data coding concise for concrete analysis. The writers got together to figure out what the first themes should be, and they all agreed, that include i) Personalization and Inclusivity in AI-driven learning ii) Challenges and Ethical Considerations in AI Integration iii) AI as a Support System for Pedagogies iv) AI-Enhanced Assessment and Academic Integrity. The authors developed a coding manual to enable independent coding and made it available to their co-authors. The writers congregated once the coding round was ended to talk about the codes, specifically how they joined, what subjects overlapped, and if any codes overlain with many preceding themes. While researchers were talking about it, researchers merged some of the codes, deleted others that weren't needed, and enhanced others. The writers regrouped, exploiting triangulation principles to conduct a second round of peer reviews, cross-comparisons, and code log creation, all to enhance the research's integrity and internal validity. Notably, the previous themes proposed through the ST-TA are operative techniques to thoroughly analyse the data to find pertinent codes. Regarding this research, every previous topic formed multiple codes that are examined and shown in the part on results.

RESULT

The Researchers offer the significant results as theme models on the four areas of absorption derived from an examination of the interview data from the ten research subjects. The four areas of attention are Personalization and Inclusivity in AI-Driven Learning, Challenges and Ethical Considerations in AI Integration, AI as a Support System for Pedagogies, and AI-enhanced Assessment and Academic Integrity in Higher Education, as depicted in Figs. 1–4. Notable is the variety of respondents, including pedagogues. Consequently, the outcome presentation will sometimes highlight the general impression of the stakeholders. The diverse points of view of every participant, their shared perceptions, and instances of their common opinions follow up in Figs. 1–4.

Personalization and Inclusivity in AI-Driven Learning.
In personalization and inclusivity in AI, AI-driven learning some viewpoints were coded and into the common theme, which follows: AI is converting education by making learning more personalized and inclusive for students with miscellaneous needs. From the viewpoint of student performance data, AI can adapt content delivery, guaranteeing that trainings bring into line with individual learning paces.

This adaptive approach helps students hold concepts in their own haste, preventing them from feeling stunned or left overdue, said to Pedagogy 3.

Adaptive learning stages take this a step further by endorsing personalized learning paths founded on a student's strengths and weaknesses.

These platforms use AI-driven acumens to identify areas where a student shines and where they may need additional support, producing a customized roadmap for academic achievement said by Pedagogy 5.

AI-driven content curation further improves this experience by providing students with additional resources personalized to their learning predilections. Whether a student learns best through videos, interactive exercises, or text-based materials, AI can curate relevant content to optimize comprehension and engagement.

To make learning even more dynamic, AI-generated quizzes and interactive exercises adjust their difficulty levels based on student progress, said to Pedagogy 6.

This confirms that students are incessantly challenged without feeling unsatisfied, fostering a more charming and effective learning practice. Additionally, AI-powered multilingual provision assists students who may scrap with language barriers, certifying they have access to educational materials in their favoured language.

This feature is particularly beneficial in diverse classrooms where students come from various linguistic backgrounds. Inclusivity in AI-driven learning extends to students with disabilities as well said by pedagogy 9.

Voice and text recognition AI tools help these students engage more effectively by providing alternative methods of interaction with learning materials. AI-powered speech-to-text and text-to-speech tools further enhance accessibility, enabling students with disabilities to participate fully in educational activities. Moreover, AI-driven accessibility tools cater to students with learning challenges such as dyslexia and ADHD(Attention-Deficit/Hyperactivity Disorder), offering tailored support to help them stay focused and retain information. By integrating AI into education, institutions can create a more inclusive and personalized learning environment that meets the unique needs of every student, ensuring that no one is left behind.
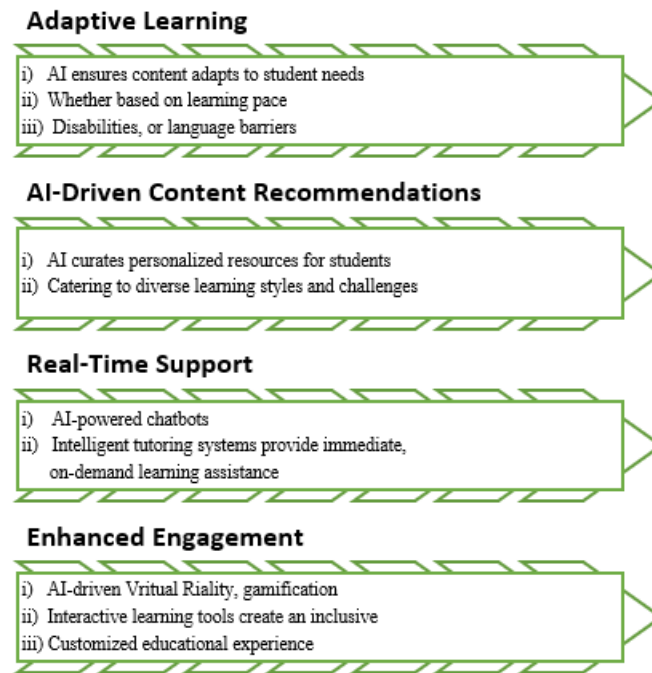
Adaptive Learning

i) AI ensures content adapts to student needs
ii) Whether based on learning pace
iii) Disabilities, or language barriers

AI-Driven Content Recommendations

i) AI curates personalized resources for students
ii) Catering to diverse learning styles and challenges

Real-Time Support

i) AI-powered chatbots
ii) Intelligent tutoring systems provide immediate, on-demand learning assistance

Enhanced Engagement

i) AI-driven Vritual Riality, gamification
ii) Interactive learning tools create an inclusive
iii) Customized educational experience

Fig. 1

Challenges and Ethical Considerations in AI Integration

Integrating AI into education offers numerous chances to enhance learning practices, but it also comes with substantial challenges and ethical apprehensions. pedagogies, as the prime facilitators of learning, face numerous hurdles when acclimating to AI-driven tools. One of the most prominent challenges is resistance to change.

Many pedagogies may be unfamiliar with AI-based tools, leading to scepticism and reluctance to adopt these technologies, said by Pedagogy 2

Without proper exposure and training, they may view AI as a disruptive force rather than a supportive one. An additional main concern is the high cost of execution. Deploying AI setup requires an extensive financial investment, which may not be possible for all educational institutions, predominantly those with inadequate budgets.

Several universities scuffle to allocate resources for innovative AI-driven tools, creating discrepancies in access to AI-enhanced education, Said by pedagogy 8

Additionally, combination problems with existing Learning Management Systems (LMS) pose extra obstacles. AI-powered explanations may not seamlessly fit into current LMS platforms, leading to technical difficulties and requiring wide-ranging customization, which can be mutually time-consuming and expensive. Also, the need for constant professional training is grave. As AI technologies progress, pedagogies must stay updated on the latest advancements to efficiently integrate AI into their education methodologies. Without enduring professional development, pedagogies may struggle to force AI tools effectively, fading their potential benefits. Elsewhere, these practical challenges are faced by most of the pedagogies.

Every pedagogy said that AI integration also promotes serious ethical considerations that must be noted to ensure its responsible use in education.

Data privacy and security anxieties are at the forefront as AI-driven tracking systems gather vast amounts of student data. Without severe safeguards, sensitive student info could be misused or accessed without proper consent, raising stern ethical and legal implications. Additionally, bias in AI algorithms is an insistent issue. AI models are trained on remaining datasets, which may inadvertently replicate societal biases.

According to all pedagogies, this can lead to biased assessments, recommendations, or learning pathways, suspiciously affecting certain groups of students.

Ensuring that AI systems are advanced and regularly audited for justice is essential to prevent these biases from persuading educational outcomes. Another ethical dilemma spins around over-reliance on AI, which could unintentionally weaken students' critical thinking and problem-solving abilities. If AI handles most characteristics of learning, from content delivery to assessment, students may become passive customers rather than active learners who are involved in analytical and creative thinking. Moreover, concerns arise when AI begins to replace human decision-making. While AI can assist in grading,

personalized endorsements, and administrative tasks, it should not make independent decisions without human input. Education is innately human-centric, and AI must be used as an accompanying tool rather than an auxiliary for Pedagogies.

Need for Educator Training

i) Educators must be equipped with skills to integrate AI effectively while maintaining pedagogical integrity.

Data Privacy & Security

i) Ensuring student information is protected from misuse and unauthorized access.

Bias & Fairness

i) Addressing potential biases in AI algorithms to ensure equal opportunities for all students.

Human Oversight

i) AI should supplement not replace
ii) Pedagogies roles in instruction, assessment, and decision-making.

Fig. 2

AI as a Support System for Pedagogies

Another viewpoint of the discussions is that Artificial Intelligence (AI) is transforming the educational scenery, offering important support to Pedagogies by mechanizing tasks, enhancing instructional methods, and cultivating student engagement. As AI technology continues to advance, it offers Pedagogies advanced tools to streamline administrative work, tailor learning experiences, and gain deeper insights into student concert.

One of the greatest impactful ways AI provisions Pedagogies is by handling administrative works, such as grading assignments, handling attendance, and forming course materials said by pedagogy 4.

By automating these monotonous activities, Pedagogies can dedicate more time to personalized training, student mentorship, and curriculum advancement pedagogy 1.

AI-driven real-time analytics additionally assist Pedagogies by tracking student rendezvous, recognizing patterns in learning behaviour, and noticing potential academic deceit. This data-driven approach permits Pedagogies to intervene proactively, confirming that students receive the essential support before falling behind. AI-generated acumens are also transforming how Pedagogies modify interventions for besieged students. Predictive analytics tools can measure student performance trends and classify those at risk of academic hitches. With this evidence, Pedagogies can design battered support strategies, whether over personalized lesson plans, further tutoring sessions, or adaptive assessments that regulate difficulty levels based on student development. By leveraging AI-powered adaptive learning podia, Pedagogies can offer adapted instruction that caters to individual learning styles, ensuring that no student is left overdue. Association and peer review processes are also improved through AI-powered peer review systems, which facilitate productive feedback and improve student alliance. These structures analyze writing quality, coherence, and dispute strength, providing students with immediate feedback while agreeing Pedagogies to focus on higher-order valuations. Moreover, AI-driven plagiarism detection tools play a vital role in preserving academic veracity, ensuring that students acquiesce to original work while also educating them on appropriate citation and research practices. Contempt AI's potential, its amalgamation into education requires cautious oversight. Human moderation in AI-generated feedback confirms reliability, fairness, and contextual suitability. AI should serve as a complement rather than an auxiliary for human Pedagogies, continuing a balance where technology enhances, rather than reduces, the personal contacts that are vital to effective teaching and learning. By merging AI with human assessment, Pedagogies can certify that grading and feedback are both objective and contextually relevant. To maximize the reimbursements of AI in education, institutions must capitalize on professional expansion and training programs for Pedagogies. Hands-on workshops, certification programs in AI mastery, and online courses can help Pedagogies participate in AI efficiently in lesson planning and student assessment. Furthermore, combined forums and mentorship programs relating Pedagogies with AI experts can facilitate knowledge sharing and best-practice enactment. Admittance to AI research and acquaintance to real-world applications through corporations with technology companies will ensure that Pedagogies stay restructured on emerging trends and revolutions. By strategically integrating AI, Pedagogies can enhance teaching competence, improve student engagement, and generate more inclusive and

personalized learning environments. However, it is crucial to maintain ethical guidelines, ensure transparency in AI decision-making, and stand-in a balanced approach where AI supports rather than prescriptions educational practices. With the right implementation, AI can become a valuable supporter in shaping the upcoming of education.
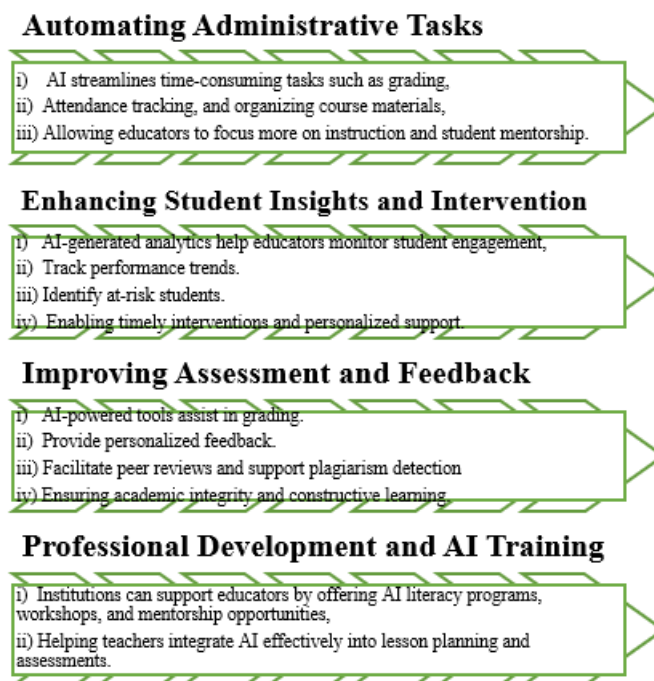

Automating Administrative Tasks

i) AI streamlines time-consuming tasks such as grading,
ii) Attendance tracking, and organizing course materials,
iii) Allowing educators to focus more on instruction and student mentorship.

Enhancing Student Insights and Intervention

i) AI-generated analytics help educators monitor student engagement,
ii) Track performance trends.
iii) Identify at-risk students.
iv) Enabling timely interventions and personalized support.

Improving Assessment and Feedback

i) AI-powered tools assist in grading.
ii) Provide personalized feedback.
iii) Facilitate peer reviews and support plagiarism detection
iv) Ensuring academic integrity and constructive learning

Professional Development and AI Training

i) Institutions can support educators by offering AI literacy programs, workshops, and mentorship opportunities,
ii) Helping teachers integrate AI effectively into lesson planning and assessments.

Fig. 3

AI-Enhanced Assessment and Academic Integrity.
The integration of AI in education is revolutionizing assessment methods while simultaneously upholding academic integrity. *AI-driven assessment tools not only streamline the evaluation process but also help Pedagogies maintain fairness and accuracy in grading said by pedagogy 10.*

One of the most significant contributions of AI in this domain is AI-driven plagiarism detection tools, which ensure originality in student work said by pedagogy 5.

These tools analyze written submissions against vast databases, detecting instances of copied content and preventing academic misconduct. Elsewhere plagiarism detection, AI plays a crucial role in providing computerized yet personalized feedback on assignments.

As a replacement for generic comments, AI can analyze student replies and offer targeted suggestions, helping learners realize their mistakes and recover their work said by pedagogy 7.

This level of personalization improves the learning experience, ensuring that students receive appropriate and relevant feedback. Adaptive assessments further subsidize to individualized learning by animatedly adjusting question difficulty based on student recital. These AI-powered assessments encounter students at the right level, preventing hindrance for those who struggle while confirming advanced learners remain engaged. AI also aids in tracking student engagement and detecting signs of cheating or dishonesty. By analyzing patterns in student behaviour, AI can identify unusual activity during assessments, such as sudden changes in response patterns or excessive reliance on external sources. This practical approach enables Pedagogies to intercede when necessary, ensuring a fair evaluation process. Moreover, AI-generated insights help Pedagogies adapt interventions for besieged students, allowing them to provide battered support where it is required most. Association and peer learning are also improved through AI-powered peer review systems, which simplify constructive feedback among students. These systems ensure that peer valuations are structured, fair, and aligned with learning objectives, developing a deeper understanding of the subject matter. However, validating AI-generated feedback with human moderation remains decisive in ensuring reliability. Pedagogies play a vital role in the supervision of AI-generated feedback to preserve the quality and accuracy of assessments. To strengthen academic integrity, AI can generate unique question sets for each student, tumbling opportunities for cheating and ensuring assessments accurately reflect distinct understanding. Real-time analytics afford Pedagogies with valuable perceptions into student progress, engagement levels, and performance trends, qualifying data-driven decision-making. Finally, a combination of AI with human assessment ensures a stable and impartial grading process. While AI offers competence and scalability, human omission guarantees that nuanced features of student work—such as creativity and critical thinking—are exactly evaluated. By leveraging AI responsibly, Pedagogies can create a more translucent, equitable, and effective assessment system that maintains academic integrity while attractive the overall learning practice.
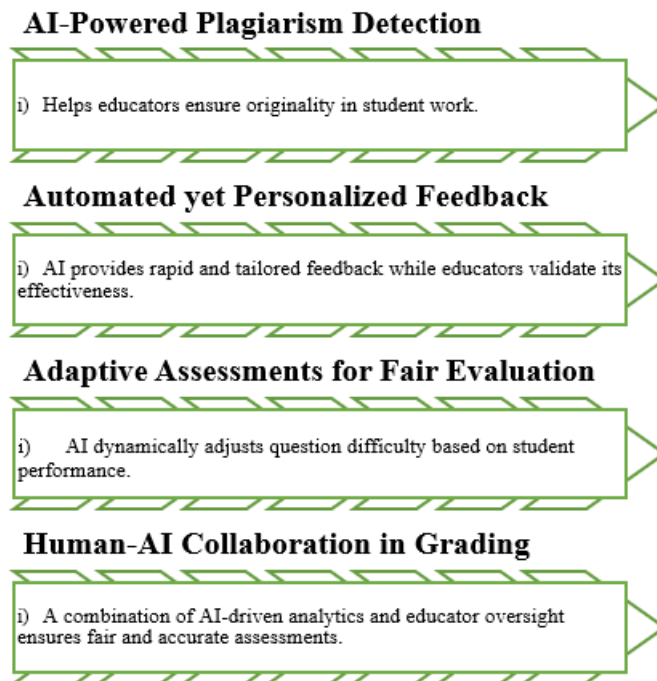
AI-Powered Plagiarism Detection

i) Helps educators ensure originality in student work.

Automated yet Personalized Feedback

i) AI provides rapid and tailored feedback while educators validate its effectiveness.

Adaptive Assessments for Fair Evaluation

i) AI dynamically adjusts question difficulty based on student performance.

Human-AI Collaboration in Grading

i) A combination of AI-driven analytics and educator oversight ensures fair and accurate assessments.

Fig. 4

Thoughts

The study discloses that stakeholders, mainly Pedagogies, perceive AI as a transformative force in higher education. AI enables personalized learning experiences, familiarizing content to meet miscellaneous student desires and enhancing inclusivity for students with disabilities and language barriers. Stakeholders prompt anxieties regarding resistance to change among Pedagogies, high implementation costs, incorporation issues with prevailing systems, and ethical dilemmas associated to data privacy and algorithmic bias. AI is seen as a valuable provision system that mechanizes administrative tasks, enhances instructional methods, and delivers real-time analytics to progress student engagement and performance. AI-driven tools streamline assessment processes, make available personalized feedback, and help to maintain academic veracity through plagiarism detection and adaptive assessments.

CONCLUSION AND BOUNDARIES

The amalgamation of AI in higher education presents important opportunities for enhancing learning exposure and supporting Pedagogies. However, it also having some challenges that require vigilant consideration, predominantly regarding ethical allegations and the need for ongoing professional development for Pedagogies. The study emphasizes the reputation of balancing AI's capabilities with human oversight to ensure operative teaching and learning. The study is restricted by its qualitative approach, which depend on a small sample size of ten Pedagogies from a single institution. This may not abundantly represent the diverse perspectives of all stakeholders in higher education. Moreover, the findings are constructed on self-reported data, which may be subject to bias. Forthcoming research could develop the sample size to include a broader range of stakeholders across numerous institutions and disciplines. Longitudinal studies could also be directed to assess the long-term impacts of AI integration in higher education. Moreover, exploring specific strategies for addressing ethical concerns and biases in AI systems would be useful for developing best practices in AI enactment.

Appendix
Interview Questions for Pedagogies
Pedagogues (Pedagogies)

- How can AI assist in personalizing learning experiences to meet diverse student needs?
- What are the challenges in integrating AI-driven tools into traditional teaching methodologies?
- How can Pedagogies guarantee that artificial intelligence supports human-led teaching instead of supplanting it?
- What strategies can be implemented to address biases in AI-generated content and recommendations?
- How can AI support assessment and feedback while maintaining academic integrity?
- What professional development opportunities are needed to help Pedagogies effectively use AI?
- How can AI facilitate inclusive and equitable learning experiences for all students?

REFERENCES

1. Allam, F. C., & Martin, M. M. (2021). Issues and challenges in special education: A qualitative analysis from Pedagogy's perspective. Southeast Asia Early Childhood Journal, 10(1), 37-49. https://doi.org/10.37134/saecj.vol10.1.4.2021
2. Anon. The Future of Jobs Report 2023. World Economic Forum. Retrieved May 17, 2023,

from https://www.weforum.org/reports/the-future-of-jobs-report-2023? gclid=CjwKCAjw04yjBhApEiwAJcvNoZE Y5iNIj4qvPsWvpwSyBzBKXNT8f VCl631EhjbdQy5.vUVWpqDQqxBoCD0g QAvD_BwE.

3. Aruleba K, Dada OA, Mienye ID, Obaido G. Demography of machine learning education within the K-12. Innovations in bio-inspired computing and applications: proceedings of the 12th international conference on innovations in bio-inspired computing and applications (IBICA2021) held during december 16–18, 2021. Cham: Springer International Publishing; 2022. p. 467–74.

4. Ayanwale MA, Sanusi IT, Adelana OP, Aruleba KD, Oyelere SS. Pedagogys' readiness and intention to teach artificial intelligence in schools. Comput Educ Artific Intell 2022;3:100099.

5. Boyatzis, R. E. (1998). Transforming qualitative information: Thematic analysis and code development. Sage.

6. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101.

7. Chen M, Chai CS, Jong MSY, Jiang MYC. Pedagogys' conceptions of teaching Chinese descriptive composition with interactive spherical video-based virtual reality. Front Psychol 2021;12:591708.

8. Clarke, V. & Braun, V. (2013) Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. The Psychologist, 26(2), 120-123.

9. Divan, A., Ludwig, L., Matthews, K., Motley, P. & Tomlienovic-Berube, A. (2017). A survey of research approaches utilised in The Scholarship of Learning and Teaching publications. Teaching & Learning Inquiry,[online] 5(2), 16.

10. Dixon RA, Eitel K, Cohn T, Carter M, Seven K. Identifying essential fisheries competencies to link to school curriculum: supporting Nez Perce students' STEM Identity. J Res Tech Careers 2021;5(1):66–77.

11. Eguchi A, Okada H, Muto Y. Contextualising AI education for K-12 students to enhance their learning of AI literacy through culturally responsive approaches. KI- Künstliche Intelligenz 2021;35(2):153–61.

12. Eguchi A, Okada H, Muto Y. Contextualising AI education for K-12 students to enhance their learning of AI literacy through culturally responsive approaches. KI- Künstliche Intelligenz 2021;35(2):153–61.

13. Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. International Journal of Qualitative Methods, 5(1), 80–92.

14. Foffano F, Scantamburlo T, Cort´ es A, Bissolo C. European Strategy on AI: are we truly fostering social good? arXiv preprint 2020. arXiv:2011.12863.

15. Hrastinski, S., Keller, C., & Carlson, S. (2010). Design exemplars for synchronous e-learning: A design theory approach. Computers & Education, 55(2), 652–662. https://doi.org/10.1016/j.compedu.2010. 02.025.

16. Huang X. Aims for cultivating students' key competencies based on artificial intelligence education in China. Educ Inf Technol (Dordr) 2021;26:5127–47.

17. Kem D. Personalised and adaptive learning: emerging learning platforms in the era of digital and smart learning. Int J Soc Sci Human Res 2022;5(2):385–91.

18. Kemp, N., & Grieve, R. (2014). Face-to-face or face-to-screen? Undergraduates' opinions and test perfor mance in classroom vs. online learning. Frontiers in Psychology, 5, 1278. https://doi.org/10.3389/ fpsyg.2014.01278.

19. L Mousavinasab E, Zarifsanaiey N, Niakan Kalhori R, Rakhshan S, Keikha M, Ghazi Saeedi M. Intelligent tutoring systems: a systematic review of characteristics, applications, and evaluation methods. Interact Learn Environ 2021;29(1):142–63.

20. Maguire, M., & Delahunt, B. (2017). Doing a Thematic Analysis: a practical, Step-by-Step guide for learning and teaching scholars. In Dundalk Institute of Technology, *AISHE-J: Vol. Volume 8* (Issue Number 3, pp. 3351–3354). http://ojs.aishe.org/index.php/aishe-j/article/view/335

21. Ng DTK, Leung JKL, Chu SKW, Qiao MS. Conceptualising AI literacy: an exploratory review. Comput Educ Artific Intell 2021;2:100041.

22. Northrup, P. T. (2002). Online learners' preferences for interaction. Quarterly Review of Distance Educa tion, 3(2), 219.

23. Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. International Journal of Qualitative Methods, 16(1). https://doi. org/10.1177/1609406917733847

24. Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). Artificial intelligence in education: challenges and opportunities for sustainable development. (1)

25. Pijl SJ, Frissen PH. What policymakers can do to make education inclusive. Educ Manage Administr Leadership 2009;37(3):366–77.

26. Robinson OC. Conducting thematic analysis on brief texts: the structured tabular approach. Qualitat Psychol 2022;9(2):194.

27. Sanusi, I. T., Agbo, F. J., Dada, O. A., Yunusa, A. A., Aruleba, K. D., Obaido, G., Olawumi, O., Oyelere, S. S., & Innovation, N.

C. F. M. R. A. (2024). Stakeholders' insights on artificial intelligence education: Perspectives of Pedagogys, students, and policymakers. *Computers and Education Open*, *7*, 100212. https://doi.org/10.1016/j.caeo.2024.100212

28. Thomas DR. A general inductive approach for analyzing qualitative evaluation data. Am J Eval 2006;27(2):237–46.

29. Touretzky D, Gardner-McCune C, Breazeal C, Martin F, Seehorn D. A year in K-12 AI education. AI Mag 2019;40(4):88–90.

30. Xu, W., & Zammit, K. (2020). Applying Thematic Analysis to Education: A hybrid approach to interpreting data in practitioner research. *International Journal of Qualitative Methods*, *19*. https://doi.org/10.1177/1609406920918810.