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THE DYNAMICS AND TRANSFORMATIVE POWER OF ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION TEACHING AND LEARNING: PERCEPTION OF LECTURERS IN EBONYI STATE

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ABSTRACT

Artificial Intelligence (AI) has become prevalent across all levels of education. Understanding teachers' beliefs about the dynamics and transformative power of AI is essential for its effective integration into the educational system. This study investigated the dynamics and transformative power of artificial intelligence in higher education, examining Ebony State lecturers' view on the significant role of AI in improving the quality of teaching and learning in higher education. Two

research questions and one hypothesis guided the study. A descriptive survey design was adopted for the study, using a structured questionnaire to collect data from 71 lecturers using a Google forms. Data were analyzed using Mean and standard deviation. The results revealed that the respondents agreed that AI has great potential to improve the quality of higher education and that AI will play a significant role in higher education in the future by enhancing the quality of learning in the coming years. The result also revealed that there is no significant gender difference in their mean response to the transformative power of AI in higher education in that t-test (df = 69, alpha = 0.05) = 0.532 is not significant at p = 0.596. The findings of the study have implication for the modification of higher education teaching and learning process towards integrating AI tools in the classroom. The researchers hereby recommend that AI should be integrated in the teaching and learning process by lecturers for improving the quality of teaching and learning in the higher education.

Keywords*:* Dynamics, transformative power, Artificial Intelligence, higher education, teaching, learning, Ebonyi State

Introduction

The advent of Artificial Intelligence (AI) and its integration into educational paradigms have catalyzed a significant evolution in the landscape of higher education. The history of education is marked by a series of evolutions, from traditional rote learning methods to contemporary, technology-enhanced approaches. In recent years, the rapid advancement of technology, particularly AI, has brought about a paradigm shift. This shift is characterized by a transition from teacher-centered to learner-centered environments, where the focus is primarily on personalized learning experiences (Chu et al., 2022). Understanding the historical progression and theoretical foundations of educational practices is paramount for comprehensively grasping the impact of contemporary innovations like Artificial Intelligence (AI) in education (Volansky, 2023).

AI in education offers significant advantages, such as personalizing learning experiences to suit individual student needs, automated administrative assistance for educators, and data-driven insights to enhance student performance evaluation.

Artificial Intelligence (AI) is revolutionizing higher education by transforming teaching methods, administrative processes, and learning experiences. AI algorithms analyze student data to tailor educational content, enhancing student comprehension and retention. AI also facilitates predictive analytics, identifying students at risk for academic failure and implementing early intervention strategies. AI streamlines administrative tasks, improving resource allocation and grading processes. It also aids research by analyzing vast texts and predicting trends. However, challenges include data security, ethical implications, and ongoing teacher training. Despite these, AI

promises a future where learning is personalized, administrative tasks are more efficient, and research is accelerated, enriching the educational experience (Saaida & Kamak, 2024).

AI plays a significant role in higher education and those roles are:

AI in Curriculum Development: AI helps curriculum developers in analyzing vast amounts of educational data to identify learning gaps and predict future trends, ensuring that curriculums are both relevant and forward-thinking. For instance, AI algorithms can assess student performance data to pinpoint areas where students struggle the most, allowing educators to tailor content accordingly. Moreover, AI-driven tools such as adaptive learning platforms customize educational materials to meet individual student needs, enhancing learning outcomes. Schools utilizing AI in curriculum development have seen a significant improvement in student engagement and retention rates. Furthermore, AI enables continuous curriculum improvement through real-time feedback and data analysis (Tarisayi, 2024). Therefore, the integration of AI in curriculum development is not only transforming educational methodologies but also ensuring that they are more personalized and effective. Thus, the significance lies in AI's ability to create dynamic, data-informed curriculums that adapt to the evolving educational landscape, ultimately leading to better educational outcomes and preparing students for future challenges.

AI in enhancing classroom experiences: AI tailor lessons in real-time, ensuring students remain engaged and challenged at appropriate levels. Additionally, AI-driven analytics provide educators with detailed insights into student performance, enabling timely interventions and support. Moreover, AI facilitates administrative efficiency, allowing teachers to focus more on interactive and creative aspects of teaching. As an example, automated grading systems like Gradescope significantly reduce the time spent on grading, thus freeing up educators to engage more directly with students (Magash & Saaida, 2024). Therefore, the integration of AI tools in classrooms not only enhances the learning experience through personalized and efficient teaching methods but also allows educators to devote more time to fostering student engagement and creativity, thereby transforming the educational landscape.

AI-Driven Personalization in Education: AI-driven personalization in education revolutionizes learning by tailoring educational experiences to individual student needs, thereby enhancing engagement and academic performance. This approach leverages machine learning algorithms to analyze students' learning styles, strengths, and weaknesses. For instance, adaptive learning

platforms such as DreamBox and Knewton provide customized lessons and practice problems, ensuring that students receive the right level of challenge. Moreover, AI tools like chatbots and virtual tutors offer real-time feedback and support, enabling students to progress at their own pace. Ultimately, the integration of AI-driven personalization in education signifies a profound shift towards more individualized and effective learning experiences, emphasizing the need for equitable access to these transformative tools (Kamak, Debo & Saaida, 2024).

Redefining Teacher Roles through AI Integration: AI redefines teacher roles by transforming them from knowledge dispensers to facilitators of personalized learning experiences. For example, AI systems like intelligent tutoring software can analyze individual student progress and adapt content to meet their specific needs, allowing teachers to focus more on mentoring and less on routine tasks. "The role of the teacher is evolving to one of a learning guides, where they facilitate and enrich the learning process rather than just deliver content." Therefore, the significance of AI integration lies in its potential to enhance educational experiences, making learning more personalized and efficient, and ultimately better preparing students for the future (Adıgüzel, Kaya & Cansu, 2023).

Assessing Student Progress with AI Analytics: AI can analyze vast amounts of data to identify patterns and trends that traditional assessment methods might overlook. For instance, AI tools can track student performance in real-time, offering immediate feedback and highlighting areas where students may need additional support. AI analytics can differentiate instruction by adapting to each student's learning pace, ensuring a more personalized learning experience. Ultimately, the integration of AI analytics in assessing student progress not only enhances the accuracy of evaluations but also fosters a more adaptive and individualized educational environment (Judijanto, Atsani & Chadijah, 2024). This demonstrates the profound potential of AI to transform traditional educational practices, leading to improved outcomes and a more equitable learning experience for all students.

AI's Role in Distance and Online Learning: Firstly, AI enhances the personalization of learning experiences through adaptive learning technologies Furthermore, AI-driven analytics provide educators with insights into student performance, enabling timely interventions and support. Additionally, AI-powered tools like virtual tutors and chatbots offer real-time assistance, making education more accessible to students worldwide, regardless of time zones or physical barriers. By

addressing the accompanying ethical challenges, AI has the potential to revolutionize the future of learning, making it more inclusive and effective (Akgun & Greenhow, 2022).

Transforming Special Education with AI Innovations: AI innovations are revolutionizing special education by providing personalized learning experiences tailored to individual student needs. Specifically, AI tools can assess the unique abilities and challenges of each student, creating customized learning plans that enhance engagement and understanding. For instance, AI-driven platforms like IBM Watson have been used to develop adaptive learning programs that adjust content and pacing based on real-time student performance. For example, speech recognition software can assist students with speech impairments by providing immediate feedback, while AI-powered text-to-speech tools can help those with reading difficulties (Debo, 2024). In conclusion, AI's role in special education is not just transformative but essential, as it equips educators with the tools needed to meet diverse learning needs effectively. Thus, AI innovations not only enhance educational accessibility but also foster a more inclusive learning environment, highlighting the critical intersection of technology and education.

Ethical Considerations in AI-Enhanced Education: In today's rapidly evolving educational landscape, ethical considerations in AI enhanced education have become paramount. As technology integrates deeper into classrooms, the ethical implications of AI adoption must be carefully navigated. One key concern is the potential for bias in AI algorithms used for educational purposes. Studies have shown that AI systems can inadvertently perpetuate societal biases, leading to unequal treatment of students based on factors such as race, gender, or socioeconomic status (Akgun & Greenhow, 2022). For instance, an AI-powered grading system may unknowingly favor certain demographic groups over others, exacerbating existing inequalities in education. Moreover, the collection and use of student data by AI systems raise significant privacy concerns. Students' personal information must be safeguarded to prevent misuse or unauthorized access. Additionally, the ethical use of AI in education involves ensuring transparency and accountability in decision making processes. Educators and policymakers must establish clear guidelines for the development and deployment of AI technologies in educational settings to uphold ethical standards and protect student welfare. Ultimately, addressing these ethical considerations is essential to harnessing the full potential of AI in education while minimizing risks and promoting fairness and equity for all learners.

Future Prospects of AI in Educational Environments: While traditional classrooms have served as the cornerstone of education for centuries, the future of learning is poised for a dramatic shift with the integration of Artificial Intelligence (AI). AI has the potential to revolutionize educational environments by fostering personalized learning experiences, providing educators with invaluable insights, and ultimately, optimizing the process of knowledge acquisition for all students.

Firstly, AI-powered tutors can tailor educational materials and delivery methods to individual student needs. Imagine a program that analyzes a student's strengths and weaknesses, then curates a personalized study plan with adaptive exercises and targeted feedback mechanisms. This not only caters to different learning styles but also empowers students to progress at their own pace, fostering a deeper understanding of the subject matter. Imagine a system that flags students who are struggling with a specific concept, allowing teachers to intervene and provide targeted support. This not only streamlines the identification of learning gaps but also empowers educators to adjust their teaching strategies to better address the needs of their students. By leveraging AI's analytical capabilities, teachers can transition from instructors to facilitators, fostering a more collaborative and personalized learning experience.

In conclusion, the future of education is undoubtedly intertwined with the advancements in AI. From personalized learning paths to data-driven teaching strategies, AI has the potential to transform educational environments by catering to individual student needs and empowering educators to become more effective facilitators of knowledge acquisition. This integration promises a future where learning is no longer a one-size-fits-all approach, but a dynamic and personalized journey for all students.

This corroborates the constructivist theory of learning by Piaget and Vygotsky. The constructivist learning theory, rooted in the works of Piaget and Vygotsky, posits that learners construct knowledge through experiences and interactions with the world (Bhatia & Hesse, 2023; Burton, 2014). In the context of AI in education, this theory emphasizes the role of AI as a facilitator of such experiential learning. AI technologies, like intelligent tutoring systems and adaptive learning environments, offer personalized experiences that align with the constructivist approach (Lin et al., 2023). These technologies allow learners to interact with content adaptively and at their own pace, fostering a deeper understanding and construction of knowledge.

The significance of constructivist learning theory in the context of AI in education lies in its emphasis on learner-centered experiences (Lin et al., 2023). It champions the idea that learning

should be tailored to individual needs, abilities, and interests (Burton, 2014; Grassini, 2023), precisely what AI technologies aim to achieve. Recent studies have shown that AI-driven personalized learning environments significantly enhance student engagement, motivation, and academic performance, thus validating constructivist learning principles (Bhutoria, 2022). AI in education aligns well with the constructivist framework by facilitating environments where students actively construct their knowledge, leading to more effective and meaningful learning experiences. The constructivist learning theory is not without critique and drawbacks.

While some educators view AI as a promising tool for enhancing teaching and learning, others express concerns about its impact on human interaction and holistic development. There are critiques for AI in education. Despite its benefits, AI in education raises concerns regarding diminished human interaction in learning environments, potential privacy issues, and the risk of a generalized approach that might only suit some learners. Haseski (2019) noted that Turkish pre-service teachers hold diverse views on AI in education, ranging from negative emotions to recognizing its potential benefits and risks. Recent literature, including works by McDonnell (2019), has delved into AI's diverse applications and policy implications in various educational contexts, from English teaching to workforce training (McDonnell, 2019). This exploration has highlighted the transformative potential of AI in reshaping curricular content and pedagogical approaches, offering insights into how these technologies can be harnessed to enhance learning outcomes and engage students more effectively.

The integration of data-driven insights signifies a transformative shift towards more efficient and targeted educational practices, exemplifying the profound impact of AI in education (Saaida, 2023). Additionally, AI plays a pivotal role in fostering accessible education, promoting inclusivity by breaking down barriers to learning. Through AI-powered assistive technologies, students with disabilities can access educational materials in formats tailored to their needs, as reported by UNESCO. This ensures that every learner, regardless of their abilities, has equal opportunities to thrive academically (Michel-Villarreal, Vilalta-Perdomo, Salinas-Navarro, Thierry-Aguilera & Gerardou, 2023). Thus, the integration of AI in education signifies a transformative step towards a more equitable and accessible learning environment, underscoring its role in promoting learning in higher education teaching.

Purpose of the study

The main purpose of this study was to investigate the significant role of AI in improving the quality of teaching and learning in the higher education.

Research Questions

The following research questions guided the study:

1. What are the potentials of AI in improving the quality of teaching in higher education?
2. What is the significant role of AI in improving the quality of learning in the higher education?

Hypotheses

The following hypothesis was formulated and tested at alpha level of 0.05.

Ho: There is no significant gender difference in their mean response to the transformative power of AI in higher education.

Method

A descriptive survey design was used for the study. The area of this study was Ebonyi State. A sample size used in this study were seventy-one (71) lecturers (43 male and 28 female) who responded to the Google form instrument sent to two universities (AEFUNAI and EBSU) lecturers' WhatsApp platform. The instruments adapted from Rediie for data collection in this study was a structured questionnaire which was validated by experts. It is a four-point rating scale with the following four response options to which numerical value were assigned thus: Strongly Agree (SA) = 4, Agree (A) = 3 Disagree (D) = 2 and Strongly Disagree (SD) = 1; with an internal consistency reliability coefficient of 0.86 arrived at using Cronbach's alpha formula when tested with 31 lecturers from ESUT. All the research questions were answered using mean and standard deviation while independent sample t-test was used to test the hypothesis at 0.05% level of significance. The decision was to reject the null hypothesis if the P-value is less than 0.05 alpha levels, otherwise do not reject.

Results

The results were presented in accordance with the research questions and hypothesis that guided the study.

Research Question 1: What are the potentials of AI in improving the quality of teaching in the higher education?

Table 1: *Responses on potentials of AI in improving the quality of teaching in the higher education.*

S/N	Items	Mean Score (ẋ)	Std. Dev. (SD)	Decision
1	Artificial intelligence has great potential to improve the quality of higher education	3.96	.492	Agreed
2	I believe AI can positively transform higher education	2.99	.486	Agreed
3	AI can personalize students' learning experiences	3.68	.466	Agreed
4	I have experienced concrete benefits in higher education due to the use of AI	4.01	.500	Agreed
5	AI is used in research or data analysis in my area of study	3.60	.491	Agreed
6	In my experience, the impact of AI on higher education has been positive	3.96	.505	Agreed
	Composite score	**3.65**	**.493**	Agreed

N = 71, Criterion mean = 2.50

From the findings in **table 1**, the majority of the respondents agreed that items 1, 2, 3, 4, 5 and 6 are items related to potentials of AI in improving the quality of teaching in higher education. It was revealed that they agreed to potentials of AI in improving the quality of teaching in higher education. This is evident in their composite mean score value (ẋ = 3.65) which is greater than the criterion mean value of 2.50.

Research Question 2: What is the significant role of AI in improving the quality of learning in the higher education?

Table 2: *Responses on the significant role of AI in improving the quality of learning in the higher education*

S/N	Items	Mean Score (ẋ)	Std. Dev. (SD)	Decision
1	I fully believe that AI will play an even more significant role in higher education in the future	2.89	.405	Agreed
2	I greatly hope that AI will enhance the quality of learning in the coming years	4.10	.504	Agreed
3	I have high expectations of how AI could make higher education more accessible	2.95	.476	Agreed

4	I fully believe that AI will be essential in online education in the future	3.47	.501	Agreed
5	I largely think specific areas of higher education will benefit from AI development	2.89	.437	Agreed
	Composite score	**3.26**	**.460**	Agreed

N = 71, Criterion mean = 2.50

T**able 2**, shows that majority of the respondents agreed that items 1, 2, 3, 4 and 5 are items related to the significant role of AI in improving the quality of learning in the higher education. It was revealed that they equally agreed to the significant role of AI in improving the quality of learning in the higher education. This is evident in their composite mean score value ($\dot{x}$ = 3.26) which is greater than the criterion mean value of 2.50.

Hypothesis Ho: There is no gender disparity in their mean response to the transformative power of AI in higher education.

Table 3: Independent sample t-test of difference in the mean ratings of the transformative power of AI among male and female lecturers in higher education.

Items	Gender	N	X	SD	t-value	df	Sig. (2-tailed)	Decision
Composite AI Potential	**Male**	43	3.64	.461	.532	69	.596	Not Significant
	Female	28	3.66	.435				

N = 71, X = Mean score, SD = Standard Deviation, Alpha = 0.05, df = Degree of Freedom

The result of the t-test presented in table 3 revealed that there is no gender disparity in their mean response to the transformative power of AI in higher education in that t-test (df = 69, alpha = 0.05) = 0.532 is not significant at p = 0.596. The decision rule is not to reject the null hypothesis when the sig. value is greater than alpha value of 0.05. Therefore, since p = 0.596 is greater than 0.05 level of significance, the null hypothesis is not rejected. The study concludes that there is no statistically significant difference in the mean ratings of the transformative power of AI among male and female lecturers in higher education. This implies that transformative power of AI in higher education is not gender-based.

Discussion of Findings

This study recorded the following findings:

1. Artificial Intelligence has great potential to improve the quality of higher education. This finding is in line with the findings of Saaida, (2023) and Michel-Villarreal, et. al, (2023) who exemplified the profound impact of AI in education which signifies a transformative shift towards more efficient and targeted educational practices, revealing that the integration of AI in education signifies a transformative step towards a more equitable and accessible learning environment, underscoring its role in promoting learning in higher education teaching. This shows consistency of the potentials of AI in improving the quality of higher education revealing that AI has come to stay especially in higher education teaching.
2. Artificial Intelligence will play a significant role in higher education in the future by enhancing the quality of learning in the coming years. This finding is in line with the findings of Saaida and Kamak, (2024) who revealed that AI promises a future where learning is personalized, administrative tasks are more efficient, and research is accelerated, enriching the educational experience. It is also in line with the findings of Saaida, (2023) and Michel-Villarreal, et. al, (2023) who equally revealed that AI plays a pivotal role in fostering accessible education, promoting inclusivity by breaking down barriers to learning and that through AI-powered assistive technologies, students with disabilities can access educational materials in formats tailored to their needs. This ensures that every learner, regardless of their abilities, has equal opportunities to thrive academically. This shows consistency of significant role of AI in higher education in the future by enhancing the quality of learning in the coming years.
3. The transformative power of AI in higher education is not gender-based. This by implication shows that both male and female lecturers agreed to the transformative power of AI in higher education teaching and learning. This finding is in line with the findings of Chu et al., (2022), Haseski (2019) and McDonnell (2019) who discovered no gender disparity in the response of the respondents towards AI application in education and learning. This consistency and conformity to the finding of this study reveals that the AI transformation power will not be gender biased as all both gender will be affected equally.

Conclusion

The dynamics and transformative power of artificial intelligence in higher education teaching revealed that Artificial Intelligence has great potential to improve the quality of higher education, that Artificial Intelligence will play a significant role in higher education in the future by enhancing the quality of learning in the coming years and that the transformative power of AI in higher education is not gender-based. These have implication for the modification of higher education teaching and learning process towards integrating AI tools in the teaching and learning process. The researchers conclude that AI should be integrated in the teaching and learning process by lecturers for improving the quality of teaching and learning in the higher education. In essence, the future of education is undoubtedly intertwined with the advancements in AI. From personalized learning paths to data-driven teaching strategies, AI has the potential to transform educational environments by catering for individual student needs and empowering educators to become more effective facilitators of knowledge acquisition. This integration promises a future where learning is no longer a one-size-fits-all approach, but a dynamic and personalized journey for all lecturers and students.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Inclusion of AI driven Programs and training for Teacher Education
2. The government and educational stakeholders should make available AI-enabled educational technologies.
3. Lecturers and students alike, irrespective of their gender, should be encouraged to participate in AI trainings via webinars, online courses, and professional learning groups.
4. Promotion of Gender-Inclusive Training on Artificial Intelligence in higher institutions.

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