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EXAMINING THE ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN BRIDGING EQUITY GAPS IN HIGHER EDUCATION IN DELTA STATE

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Abstract
The study examined the role of artificial intelligence (AI) in bridging equity gaps in higher education in Delta State. The descriptive survey research design was employed in carrying out the study. The population for the study comprised 3,478 300level undergraduate in Faculty of Education in Delta State University, Abraka and University of Delta, Agbor. The sample of the study consisted of 377 300level undergraduates in Delta State University, Abraka and University of Delta, Agbor. The sample size was obtained using Krejcie and Morgan (1970) sample size determination table.A questionnaire titled "Role of Artificial Intelligence in Bridging Equity in Higher Education, RAIBEHE" was used for data collection in this study. The face validity of the questionnaire was established by three experts and the reliability of the instrument was established using Cronbach Alpha to obtain a reliability coefficient of 0.81. Data collected were analysed using weighted mean with a criterion mean of 2.50 due to the utilisation of a four-point likert scale.Results showed that equity gaps exist in higher education in Delta State caused by disparities in funding, socio-economic background, location and gender.It was therefore concluded that AI technologies offer promising opportunities to bridge equity gaps in higher education by promoting inclusive education, increasing access to educational resources, and personalizing learning experiences. However, there are also challenges such as limited funding, lack of infrastructure, lack of experts among others that need to be addressed in the implementation of AI in higher education in Delta State. The study recommended among others that the government and other stakeholders in education should provide equal access to scholarship, financial aids and educational resources to students irrespective of socio-economic background, location and gender.

Keywords: Artificial Intelligence (AI), Equity Gaps, Higher Education, Challenges of AI

Introduction
Artificial intelligence (AI) is a field within the realm of computer science that seeks to develop autonomous computers capable of emulating human intelligence and executing activities that conventionally necessitate human intelligence, including but not limited to visual perception, speech recognition, decision-making, and language translation. AI systems are specifically engineered to acquire knowledge from data, adjust to novel inputs, and execute tasks independently, without the need for human involvement (Smith et al., 2020). Machine learning is a fundamental element of AI, encompassing the process of training algorithms to identify patterns within datasets and subsequently generate predictions or make decisions based on this data. Deep learning, which falls under the umbrella of machine learning, employs neural networks including multiple layers to examine intricate patterns within datasets. Recent developments in AI have resulted in notable advancements across several domains, encompassing healthcare, finance, transportation, and entertainment. For instance, the utilisation of artificial intelligence in medical imaging systems has the potential to enhance clinicians'

ability to identify diseases with more precision and efficiency. Similarly, AI algorithms in the field of finance can scrutinise market patterns and facilitate investment decision-making (Johnson & Brown, 2019). AI is a swiftly progressing domain that has the capacity to revolutionise various sectors and enhance our everyday existence. AI technologies could persistently progress and influence the future of technology through continuous study and development.

AI possesses the capacity to significantly transform the field of education in Delta State through the provision of tailored learning experiences, the enhancement of student achievements, and the augmentation of instructor efficacy. AI technologies, including machine learning, natural language processing, and predictive analytics, have the potential to analyse extensive datasets in order to detect patterns and trends. This capability empowers educators to customise instruction according to the unique needs of each student. Intelligent tutoring technologies have the potential to revolutionise education in Delta State. These technologies have the potential to offer students customised feedback and assistance, thereby facilitating their acquisition of complex concepts and enhancing their academic achievements. Smith et al. (2020) conducted a recent study which revealed that students who utilised an intelligent teaching system in mathematics attained notably superior marks on standardised examinations in comparison to their counterparts who did not utilise such a system. Moreover, AI has the potential to analyse student performance data and detect pupils who are at danger and may require supplementary assistance. Through the anticipation of students who are prone to academic difficulties, instructors can promptly intervene to offer focused interventions and avert student attrition. The research conducted by Williams et al. (2021) provided evidence that AI algorithms possess the capability to make precise predictions regarding student performance, hence facilitating more efficient resource allocation and enhancing student outcomes inside educational institutions. In summary, AI possesses the capacity to revolutionise the field of education in Delta State through the provision of tailored learning experiences, enhancement of student achievements, and augmentation of instructor efficacy. These advancements have the ability to foster equity within the realm of higher education.

AI possesses the capacity to enhance equity within the realm of higher education in Delta State through the provision of tailored learning experiences, identification of students who are at risk, and enhancement of accessibility to educational resources. AI has the potential to mitigate gaps in educational achievements by customising instruction to meet the specific needs of each student, therefore creating equal opportunities for students from various backgrounds. Adaptive learning systems can be utilised by AI to foster equity in higher education. These platforms employ AI algorithms to analyse data on student performance and offer tailored recommendations for educational courses. An empirical investigation conducted by Kizilcec et al. (2017) revealed that students who engaged with an adaptive learning platform exhibited noteworthy enhancements in their scholastic achievements in contrast to their counterparts who did not utilise such a platform. AI could also aid in the identification of students who are at risk and may require supplementary assistance to excel in higher education. Through the examination of data pertaining to student behaviour, engagement, and performance, artificial intelligence algorithms possess the capability to identify students who are encountering difficulties and offer timely interventions to mitigate their academic setbacks. Arnold et al. (2018) conducted a study that showcased the efficacy of AI-powered predictive analytics in properly identifying students who are at risk and enhancing retention rates inside higher education institutions.

Moreover, AI has the potential to enhance the availability of educational resources for students in Delta State, especially those residing in remote or underserved regions. Through the utilisation of AI-driven chatbots and virtual assistants, students can conveniently access information and support services at any time and from any location. This could alleviate the digital divide and guarantee equal opportunities for all students to excel in higher education. Consequently, AI has the capacity to foster equity in higher education in Delta State by offering tailored learning experiences, identifying students at risk, and improving access to educational resources. By harnessing the potential of AI, educational institutions in Delta State could establish a more inclusive and equitable learning environment for all students. It is against this background that this study examined the role of AI in bridging equity gaps in higher education in Delta State.

Statement of the Problem

Higher education in Nigeria faces numerous challenges, including limited access, inadequate resources and disparities in educational outcomes. These challenges are particularly pronounced in Delta State, where students from marginalized communities often face barriers to accessing quality education. As a result, there is a need to explore innovative solutions to address equity gaps in higher education in the state. In recent times, AI has emerged as a potent instrument for revolutionising diverse industries, including the field of education. AI technologies possess the capacity to significantly transform the landscape of higher education through the provision of tailored learning experiences, enhancement of student achievements, and augmentation of resource accessibility. In Delta State, like many other regions, there are significant equity gaps in higher education, with marginalized and underrepresented groups facing barriers to access and success. The problem of the study, therefore, is: what is the role of AI in bridging equity gaps in higher education in Delta State?

Purpose of the Study

The primary purpose of the study was to examined the role of AI in bridging equity in higher education in Delta State. Specifically, the study was designed to determine:

1. the current equity gaps in higher education in Delta State;
2. how AI can be used to address equity gaps in higher education;
3. the potential challenges of implementing AI in higher education in Delta State.

Research Questions

The study was guided by three research questions:

1. What are the current equity gaps in higher education in Delta State?
2. How can AI be used to address equity gaps in higher education in Delta State?
3. Wha are the potential challenges of implementing AI in higher education in Delta State?

Research Methods

The study utilised a descriptive survey research design. Descriptive survey design is a research method used to gather information about a population or group by asking questions and collecting data (Smith et al., 2020). This type of survey design aims to describe the characteristics of a population or group, such as demographics, attitudes, behaviours or opinions. The population for the study comprised 300level undergraduate in higher institutions offering educational courses in Delta State. Specifically, the estimated population of the study comprised 3,478 300level undergraduate in Delta State University, Abraka and University of Delta, Agbor. The sample of the study consisted of 1,739 300level undergraduates in Delta State University,

Abraka and University of Delta, Agbor. The sample size was obtained using Krejcie and Morgan (1970) sample size determination table.

A questionnaire titled "Role of AI in Bridging Equity in Higher Education, RAIBEHE" was used for data collection in this study. The questionnaire was made up of four sections. Section A sought respondents' bio-data. Section B contained statements that sought the current equity gaps in higher education. Section C contained statements that sought the role of AI in bridging the equity gaps in higher education, while section D contained statements the challenges in implementing AI in higher education. The responses for all the items in section B to D were framed on a four point-likert scales of Strongly Agree (SA = 4), Agree (A = 3), Disagree (D = 2) and Strongly Disagree (SD = 1).

The face validity of the questionnaire was established by three experts from the Department of Science Education, Delta State University, Abraka. For the experts to do their work, the instrument and the research questions were made available to them. They were asked to find out if the instruments would be able to generate data to answer the research questions. The experts were asked to make corrections, recommendations and suggestions where appropriate. Thereafter, their corrections and suggestions of the experts were incorporated in the final draft of the instrument. The reliability of the instrument was established using Cronbach Alpha. The rationale behind the use of Cronbach Alpha is predicated on the fact that it is most appropriate for polytomous items. In this method, the instrument was administered to 30 300level undergraduates in Faculty of Education, University of Benin, who were outside the area of study. The response of the students was scored and subjected to Cronbach Alpha analysis using SPSS version 23. On analysis, a reliability coefficient of 0.81.

The researcher gathered the data with the assistance of two research assistants. Prior to initiating data collection, the researcher and research assistants thoroughly reviewed the contents of the instrument to ensure their comprehension of the specific data to be collected. This allowed them to effectively instruct the respondents. Data collection lasted for four weeks. The first step in the collection of data was to ask for permission from the school head of the sampled higher institutions to distribute questionnaire to the 300level undergraduate students in the Faculty of Education in the school. Subsequently, the questionnaire was disseminated among the participants in order to elicit their responses to the presented items. The participants were instructed to refrain from seeking clarification from individuals other than the researcher and research assistants while completing the questionnaire items. The questionnaire was promptly administered to the participants without delay. Subsequently, the participants' responses were gathered and examined using a weighted mean. The criterion mean was established at 2.50 due to the utilisation of a four-point Likert scale to frame the items in the questionnaire ($\frac{4+3+2+1}{4} = 2.50$). Thus, for any item with mean score of 2.50 to 4.00, signified agreement, while below 2.50 signified disagreement.

Results

✓ What are the current equity gaps in higher education in Delta State?

Table 1

Mean Responses on the Current Equity Gaps in Higher Education

S/n	Items	Mean	Decision
1	Access to higher education opportunities in Delta State is not equitable for all socio-economic backgrounds.	3.78	SA
2	Funding for higher education institutions in Delta State is not distributed	3.75	SA

	fairly among all institutions.		
3	Students from marginalized communities in Delta State did not have equal access to scholarships and financial aid for higher education.	3.77	SA
4	Students from rural areas in Delta State did not have the same opportunities for higher education as students from urban areas.	3.79	SA
5	The curriculum in higher education institutions in Delta State is inclusive and representative of diverse perspectives.	3.72	SA
6	Gender disparities in enrollment and graduation rates in higher education institutions in Delta State have not been effectively addressed.	3.78	SA
7	The dropout rates among students from disadvantaged backgrounds in Delta State are significantly higher than those from privileged backgrounds.	3.75	SA
	Grand Mean	**3.76**	**SA**

The data presented in Table 1 indicates a grand mean score of 3.76, surpassing the criterion mean score of 2.50. Furthermore, it is noteworthy that all of the items exhibited a mean score that is above the criterion mean. It may be inferred that the participants expressed consensus regarding the current equity gaps in higher education, namely in relation to items 1 to 7. Hence, it can be concluded that the current equity gaps in higher education is Delta State include disparities in funding, unequal access to higher education opportunities for students from different socio-economic background, unequal access to scholarships and financial aids for students from marginalized communities, gender disparities in enrollment and graduation rates and high rates of dropout among students from disadvantaged background.

✓ How can AI be used to address equity gaps in higher education in Delta State?

Table 2

Mean Responses on the use of AI to Address Current Equity Gaps in Higher Education

S/n	Items	Mean	Decision
1	AI can be used to identify and target at-risk students for intervention programmes.	3.63	SA
2	AI can be used to personalize learning experiences for students from diverse backgrounds.	3.71	SA
3	AI can be used to provide real-time feedback and support to students facing academic challenges.	3.69	SA
4	AI can be used to analyze and address systemic barriers to equity.	3.62	SA
5	AI can be used to increase access to educational resources and opportunities for marginalized communities.	3.70	SA
6	AI can be used to track and measure progress towards closing equity gaps.	3.64	SA
7	AI can be used to promote diversity and inclusion in curriculum development and teaching practices.	3.70	SA
8	AI can be used to support faculty and staff in creating a more inclusive and equitable learning environment.	3.66	SA
9	AI can be used to facilitate communication and collaboration among stakeholders working towards equity in higher education.	3.75	SA

10	AI can be used to identify and address bias and discrimination in admissions and enrollment processes.	3.70	SA
	Grand Mean	**3.68**	**SA**

The data presented in Table 2 indicates a grand mean score of 3.68, surpassing the criterion mean score of 2.50. Furthermore, it is noteworthy that all of the items exhibited a mean score that is above the criterion mean. It may be inferred that the participants expressed consensus regarding the role of AI in addressing equity gaps in higher education, namely in relation to items 1 to 10. Hence, it can be concluded that the role of AI in addressing equity gaps in higher education are as follows: facilitating communication and collaboration among stakeholders, personalizing learning experiences, promoting diversity and inclusive curriculum, increase access to educational resources, provision of real-time feedback and tracking progress towards closing equity gaps.

✓ Wha are the potential challenges of implementing AI in higher education in Delta State?

Table 3

Mean Responses on the Potential Challenges of Implementing AI in Higher Education

S/n	Items	Mean	Decision
1	Lack of technical expertise in AI implementation	3.79	SA
2	Resistance to change from staff	3.71	SA
3	Limited funding for AI technology and training	3.89	SA
4	Concerns about data privacy and security	3.52	SA
5	Difficulty in integrating AI with existing systems	3.77	SA
6	Lack of awareness and understanding of AI benefits	3.67	SA
7	Inadequate infrastructure to support AI implementation	3.78	SA
8	Limited availability of AI experts	3.76	SA
	Grand Mean	**3.74**	**SA**

The data presented in Table 3 indicates a grand mean score of 3.74, surpassing the criterion mean score of 2.50. Furthermore, it is noteworthy that all of the items exhibited a mean score that is above the criterion mean. It may be inferred that the participants expressed consensus regarding the potential challenges of implementing AI in higher education, namely in relation to items 1 to 8. Hence, it can be concluded that the potential challenges of implementing AI in higher education in Delta State are; limited funding for AI technology and training, lack of technical expertise, inadequate infrastructure, difficulty in integrating AI with existing systems, limited availability of AI experts, resistance to change from staff, lack of awareness and understanding of AI benefits, and concerns about data privacy and security.

Discussion

The study revealed that the current equity gaps in higher education is Delta State include disparities in funding, unequal access to higher education opportunities for students from different socio-economic background, unequal access to scholarships and financial aids for students from marginalized communities, gender disparities in enrollment and graduation rates and high rates of dropout among students from disadvantaged background. This finding supports that of Perna et al. (2019) and Jones et al. (2020) who reports on equity gaps in higher education consistently shown disparities in access, retention and completion rates among different

demographic groups. These disparities are often based on factors such as race, ethnicity, socioeconomic status and gender.

The study also revealed that the role of AI in addressing equity gaps in higher education are as follows: facilitating communication and collaboration among stakeholders, personalizing learning experiences, promoting diversity and inclusive curriculum, increase access to educational resources, provision of real-time feedback and tracking progress towards closing equity gaps. This finding corroborates that of Means et al. (2019) who found that AI-powered adaptive learning systems can help students from underrepresented groups improve their academic performance by providing targeted support and feedback. This finding further corroborates that of Anderson et al. (2020) who demonstrated how AI algorithms can analyze large datasets to identify patterns of inequity in admissions processes and recommend policy changes to promote diversity and inclusion.

The study again revealed that the potential challenges of implementing AI in higher education in Delta State are; limited funding for AI technology and training, lack of technical expertise, inadequate infrastructure, difficulty in integrating AI with existing systems, limited availability of AI experts, resistance to change from staff, lack of awareness and understanding of AI benefits, and concerns about data privacy and security. This finding concurs with that of Siemens (2019) who reported that many faculty members lack the necessary skills and knowledge to effectively integrate AI tools into their teaching practices. This lack of training can hinder the successful implementation of AI in higher education. This finding further aligns with that of Selwyn (2019) who emphasized the need for ethical guidelines to govern the use of AI in educational settings to ensure that student data is protected and that decisions made by AI systems are fair and transparent.

Conclusion

Based on the findings this study, it was concluded that equity gaps exist in higher education in Delta State caused by disparities in funding, socio-economic background, location and gender.It was also concluded that AI technologies offer promising opportunities to bridge equity gaps in higher education by promoting inclusive education, increasing access to educational resources, and personalizing learning experiences. However, there are also challenges such as limited funding, lack of infrastructure, lack of experts among others that need to be addressed in the implementation of AI in higher education in Delta State.

Recommendations

Based on the findings of the study, the following were recommended:

1. The government and other stakeholders in education should provide equal access to scholarship, financial aids and educational resources to students irrespective of socio-economic background, location and gender.
2. School administrators should provide access to AItechnologies and training for educators to effectively integrate AI technologies into the curriculum.
3. School administrators should ensure that data privacy and security measures are in place to protect student information and maintain trust in AI technologies.

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