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Biology Students Level of Awareness and Utilisation of Artificial intelligence (AI) Tool in Teaching and Learning in Secondary School in Afijio, Oyo State

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Abstract

The study investigated the awareness and utilisation of Artificial intelligence (AI) in teaching and learning among secondary school studets in Afijio Local Government, Oyo State. A descriptive survey research was adopted. The study sampled 300 biology students from five secondary schools in Afijio, Oyo State. Three hypotheses guided the study. Crobah Alpha was used to find the reliability value 0.78. T Test was used to analysis the data collected. The findings of the study revealed that the Biology students are not aware of the existence of Artificial intelligence tools used in teaching and learning and are also not utilizing A. I tools in teaching and learning. Recommendations were made that there should be awareness on the availability of artificial intelligence tools for teaching and learning in secondary schools, and Education Curriculum should be reviewed to accommodate AI in other to prepare biology students into tertiary institutions.

Keywords: Biology Students, Level of Awareness, Utilisation, Artificial intelligence, Teaching and Learning

Introduction

The incorporation of artificial intelligence (AI) into various fields has revolutionized traditional practices, and education is not out of it. In secondary schools, the level of awareness and utilization of AI among biology students is a important area of interest. This connection of AI and biology education has the potential to enhance learning experiences, provide innovative tools for understanding complex biological concepts, and prepare students for future careers in an increasingly tech-driven world. However, the extent to which secondary school biology students are aware and can effectively use AI technologies remains largely unexplored. Understanding their current level of knowledge, the resources available to them, and the barriers they face can offer valuable insights into how AI can be better integrated into biology curricula to maximize educational outcomes and foster a new generation of tech-savvy biologists.

Artificial intelligence (AI) is defined as the capability of a machine to perform tasks that typically require human intelligence. It has revolutionized many fields, and education is no exception. The application of AI tools to biology education has the potential to enhance the learning experience for students and improve their understanding of complex biological concepts (Ugwuoti, et al. 2023). According to a report from the National Science Board, the use of technology in education can increase student engagement, improve learning outcomes, and reduce the achievement gap between students (National Science Board, 2016). AI tools, such as machine learning algorithms and natural language processing techniques, can help educators create personalized learning experiences that cater to the needs of individual students. For instance, AI systems can analyse students' learning patterns and performance, then tailor educational content to fit their unique needs. Furthermore, AI-powered Virtual Reality (VR) or Augmented Reality (AR) tools are being used to create interactive simulations or visualizations of complex biological systems, offering a more immersive and intuitive.

Artificial intelligence (AI) has the potential to revolutionize teaching and learning by providing personalized learning experiences, automating

administrative tasks, and offering advanced data analysis tools. However, the extent to which secondary school biology students are aware of these applications and their implications for their education varies widely. The utilisation of AI in biology education depends on the availability and accessibility of the AI technologies, enabling environment, skills and knowledge on how to use the AI technologies. This was emphasized by Eze (2020) who noted that the successful implementation of educational innovations depends largely on the skills and knowledge of the teachers. The teacher serves as a facilitator, guides the learner to play an active role to get to his or her understanding of the content if AI can be integrated into education, in the form of intelligent books, smart devices, web browsers, education applications, learning platforms and tutoring systems (Masaazi, 2015). Artificial Intelligence in teaching and learning, learners will have access to an unprecedented amount of authentic relevant information to enable them to manage their learning activities as well as explore relevant learning materials and become inquisitive, rather than solely passive recipients of knowledge and information. Thus, enhancing self-learning and active participation in the learning process.

Despite, the benefits of utilising AI to improve the quality and effectiveness of teaching and learning process, According to Adebayo, Oluwaseun, et al. (2021), revealed that majority of the students are not aware of Artificial intelligence for learning and there was no significant difference between male and female university students' awareness of the use of artificial intelligence for learning while Ugwuoti, et al. (2023) revealed that students are aware of the existence of AI tools in education and also have limited experience and comfort level with using them in their coursework. According to Thomas, et al. (2023) reveal that lecturers rarely used AI while Bingimlas, (2009) asserted that the lack of effective utilization to technical tools also acts as a major barrier to the successful use of technology in education. Most schools and teachers do not have access to technical devices such as smart whiteboards and projectors that can be used in classroom visual representations. Some institutions do not have enough computers and even lack internet access which can be of great use in teaching learning.

Statement of the Problem

The integration of Artificial Intelligence (AI) tools into education has transformed teaching and learning processes globally, offering new possibilities for

personalized learning, interactive content delivery, and data-driven instruction. In science subjects like Biology, AI can enhance students' understanding of complex concepts through simulations, virtual labs, and intelligent tutoring systems. Despite these advancements, there is growing concern that secondary school Biology students may lack adequate awareness and utilization of AI tools in their learning processes. In many secondary schools, especially in developing regions, challenges such as limited access to technology, lack of teacher training, and inadequate infrastructure hinder the effective adoption of AI tools in classrooms. Moreover, students' awareness of these tools and their potential benefits remains unclear, raising questions about how well they are equipped to leverage AI for enhanced learning outcomes. Without sufficient awareness and utilization, students risk missing out on the opportunities that AI offers to improve their understanding and engagement in Biology. This gap underscores the need to investigate the level of awareness and utilization of AI tools among secondary school Biology students. Understanding these factors is crucial for developing strategies to promote effective integration of AI in Biology education, ultimately leading to improved teaching practices and better learning outcomes. This study, therefore, seeks to explore the extent to which Biology students in secondary schools are aware of and utilize AI tools in their teaching and learning experiences.

Purpose of the Study

The purpose of the study is to investigate Biology Students level of awareness and utilisation of Artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

Specifically is to:

i. determine biology students level of awareness of artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State
ii. examine biology students utilization of artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.
iii. evaluate male and female teacher utilizing artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

Hypotheses

$H_0$1: There is no significant difference between biology students level of awareness of artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

$H_0$2: There is no significant difference between biology students utilization of artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

$H_0$3: There is no significant difference between male and female teacher utilizing artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

Methodology

The research design for this study was descriptive survey type. The population for the study comprises of biology students in Secondary School in Afijio Local Government Area, Oyo, Oyo State. Simple random sampling techniques were used in other to select students from three Secondary Schools in Afijio Local government which includes, Awe High School, Akinmorin grammar school and Ilora grammar school, A total of twenty (20) respondents, comprising both males and females, were chosen in each designated school. The instrument used for this study were self-structured questionnaire which comprises of ten (10) questions item on Biology Students Level of Awareness and Utilisation of Artificial intelligence (AI) Tool in Teaching and Learning in Secondary School in Afijio, Oyo State. The questionnaire items were devised by the researcher and validated by an expert in the field. This were undertaken to gather precise and impartial data from the participants. The items were scored using a 4-point Likert-type scale, with the following scoring labels: SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree. Once the researcher has distributed the questionnaire to the participants, the gathered data were organised. Cronbach alpha coefficient was used to finding the reliability of the instrument which the value was 0.78..T-test was used to analyse the hypothesis formulated under 0.05 level of significance.

Result

$H_0$1: There is no significant difference between biology students level of awareness of artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

Table 1

S/N	Variables	Mean	Std. Dev	Mean Diff	Df	Sig	Decision
1.	Students level of awareness	11.1500	4.356	8.850	19	.000	Reject
2.	Artificial Intelligence	8.8500	4.356	15.870			

Field Survey, 2024

From the above table, the significant level is .00 which is less than the .05 therefore the data is statistically significant, this means reject the null hypothesis accept alternate hypothesis. Therefore there is significance difference between biology students level of awareness of artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

$H_0$2: There is no significant difference between biology students utilization of artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

Table 2

S/N	Variables	Mean	Std. Dev	Mean Diff	Df	Sig	Decision
1.	Students utilization	8.80	4.408	8.750	19	.000	Reject
2.	Artificial Intelligence	11.20	4.408	11.150			

Field Survey, 2024

From the above table, the significant level is .00 which is less than the .05 therefore the data is statistically significant, this means reject the null hypothesis accept alternate hypothesis. Therefore there is significance difference between biology students utilization of artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

$H_0$3: There is no significant difference between male and female teacher utilizing artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

Table 3

S/N	Variables	Mean	Std. Dev	Mean Diff	Df	Sig	Decision
1.	Male and female teacher utilization	19.15	5.914	19.10	19	.000	Reject
2.	Artificial Intelligence	20.85	5.914	20.80			

Field Survey, 2024

From the above table, the significant level is .00 which is less than the .05 therefore the data is statistically significant, this means reject the null hypothesis accept alternate hypothesis. Therefore, there is significance difference male and female teacher utilizing artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

Discussion of findings

From the findings it was shown that contributor, Ekwe, (2023) revealed that students are aware of the existence of AI tools in education and also have limited experience and comfort level with using them in their coursework. Therefore, the findings negate the hypothesis that there is no significant difference between biology students and level of awareness of artificial intelligence (AI) tools in teaching and learning in secondary schools. This means biology students and level of awareness are different factors on the effective of artificial intelligence.

From the findings, the contribution of the author (Massazi, 2015) stated that utilization of Artificial Intelligence to improve the quality and effectiveness of teaching and learning process. Therefore, from the study, the study negates the hypothesis, there is no significant difference between biology students utilization of artificial intelligence (AI) tools in teaching and learning in secondary schools.

Finally, Bingimlas (2009) revealed that majority of the students are not aware of Artificial intelligence for learning and there was no significant difference between male and female university students' awareness of the use of artificial intelligence for learning. Therefore, the findings negate the hypothesis that there is no significant difference between male and female teacher utilizing artificial intelligence (AI) tools in teaching and learning in secondary schools in Afijio, Oyo State.

Conclusion

The study was concluding that biology students are not aware of the existence of the artificial intelligence tools used in teaching, learning and utilization of it. There are significant differences between the student's utilization and the use of artificial intelligence in secondary schools.

Recommendations

Several recommendations were made for the study; the following recommendations are;

1. There should be more awareness on the availability of artificial intelligence tools for teaching and learning in secondary schools.
2. Students must be adequate reinforce on the use artificial intelligence on the teaching and learning in secondary schools
3. Education curriculum should be reviewed in order to accommodate Artificial Intelligence in other to prepare to prepare biology students in proceeding to tertiary institutions.

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