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TEACHERS' AWARENESS AND UTILIZATION OF ARTIFICIAL INTELLIGENCE (AI) TOOLS FOR CURRICULUM IMPLEMENTATION IN SECONDARY SCHOOLS IN ANAMBRA STATE

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Abstract

This study ascertained teachers' awareness and utilization of Artificial Intelligence (AI) tools for curriculum implementation in secondary schools in Anambra State, Nigeria. Five research questions guided the study while five hypotheses were tested at 0.05 level of significance. Descriptive Survey research design was employed for the study. The population of the study comprised all the 6145 secondary school teachers in the 266 public secondary schools in Anambra State. The sample for the study comprised 600 secondary school teachers drawn from the population of the study using simple random sampling technique. The instrument for data collection is a questionnaire titled "Teachers Awareness and Utilization of Artificial Intelligence for Curriculum Implementation (TAUAICI)''. The questionnaire was validated by three experts in Faculty of Education in Nnamdi Azikiwe University, Awka. The questionnaires were trial-tested using 20 secondary school teachers in public secondary schools in Asaba Delta State which was subjected to reliability testing using Cronbach Alpha statistics. This yielded reliability coefficient of 0.73. Frequencies, Percentage, Mean and Standard Deviation were used to answer research questions while t-test was used to test the hypothesis at 0.05 level of significance. The findings of the study revealed that while there is some exposure to a few globally recognized AI tools, the majority of AI resources remain unknown in secondary education in Anambra State. The study further revealed that AI tools serving as reference materials for the students and AI tools being used to enhance instructional delivery are the topmost benefits associated with the use of AI tools for curriculum implementation in secondary schools. On the other hand, epileptic power and poor education funding are the topmost challenges associated with the use of AI tools for curriculum implementation in secondary schools. The study further revealed that increasing fund allocation to secondary schools and equipping the school with artificial intelligence tools for curriculum implementation are the topmost strategies for enhancing teachers' utilization of AI tools for curriculum implementation in secondary schools. The test of hypotheses showed no significant difference between the mean ratings of male and female teachers except in the utilization of AI tools they are aware of. Based on the findings of the study, it was recommended among others that Anambra State should increase funding for secondary schools, specifically targeting the

purchase and maintenance of AI tools and technology infrastructure. Efforts should be made to ensure consistent power supply in schools, facilitating the reliable use of AI tools for educational purposes.

Keywords: Teachers. Awareness and Utilization, Artificial Intelligence, Tools, Curriculum

Introduction

Education is universally acknowledged as a key driver of personal and societal progress. In Nigeria, it plays a crucial role in equipping individuals with the competencies required for active participation in an increasingly globalized and competitive world. By fostering innovation, reducing poverty, and enhancing quality of life, education contributes significantly to sustainable national development. The Nigerian educational system, comprising primary, secondary, and tertiary levels, is designed to provide citizens with the skills, knowledge, and values needed to contribute meaningfully to societal advancement. This interconnected framework emphasizes a coherent transition between levels, particularly at the secondary stage, where foundational skills for higher education and vocational pursuits are developed.

Secondary education serves as a critical bridge between primary and tertiary education. According to the Federal Republic of Nigeria (FRN, 2013), secondary education aims to prepare students for meaningful participation in society and higher education. To achieve these aims, the curriculum emphasizes both academic and vocational training to develop the necessary competencies for societal and economic development. This underscores the importance of the curriculum, which serves as a structured framework for achieving educational goals by outlining the content, instructional strategies, and evaluation methods required for effective teaching and learning (Rhode, 2018). The centrality of the curriculum to education raises the need for effective implementation strategies that align with evolving educational demands.

A curriculum is a structured framework that outlines the educational content, learning objectives, and teaching strategies to be implemented within a specific course or program. It serves as a guide for educators and learners, ensuring consistency, relevance, and progression in the acquisition of knowledge, skills, and values. According to Rhode (2018), curriculum is a standard-based sequence of planned experiences where students practice and achieve proficiency in content and applied learning skills. According to Ifeobu (2017), curriculum refers to a series of planned and unplanned learning activities which a child is exposed to in the course of his development aimed at helping the child to develop his potentials fully and effectively function in the community. In the thoughts of Rhode (2018), Ghavifekr and Wan-Athirah (2015), curriculum is the central

guide for all educators as to what is essential for teaching and learning, so that every student has access to rigorous academic experience.

Curriculum implementation refers to the process of putting the planned curriculum into action through teaching and learning activities in schools. It involves teachers delivering lessons, students engaging in learning, and the use of resources to achieve the educational goals outlined in the curriculum. It refers to the act of working out the plans and suggestions that have been Curriculum implementation, which involves translating planned objectives into action, is primarily the responsibility of teachers (Igi, 2021). Teachers play a central role in delivering lessons, utilizing resources, and employing strategies such as simulations, experiments, and case studies to create interactive and engaging learning experiences. According to Davies (2021), curriculum implementation is a dynamic process influenced by changes in educational goals, teaching methods, and technological advancements. Building on this dynamic nature, the introduction of 21st-century technologies, particularly Artificial Intelligence (AI), has further highlighted the need for innovative approaches to curriculum delivery.

AI is a form of technology that enables machines to perform tasks typically requiring human intelligence, such as problem-solving, decision-making, and data analysis (Balaram, 2021). In education, AI tools enhance personalization, efficiency, and engagement, ranging from adaptive learning platforms and intelligent tutoring systems to automated grading and virtual teaching assistants (Holmes & Porayska-Pomsta, 2022). These tools help tailor instruction to individual learners, providing real-time feedback and reducing teachers' administrative workload (Maslej et al., 2023). However, while these advancements offer transformative potential, their effective adoption depends on teachers' awareness and preparedness to leverage them.

Despite the potential of AI tools to revolutionize education, their adoption in Nigerian secondary schools is limited. Teachers appear to lack awareness of how AI can enhance teaching and learning, and many continue to rely on traditional instructional methods. Awareness, as described by Verhaeghen and Aikman (2020), involves active reflection and understanding of new tools and technologies, which is critical for their effective adoption. Teachers' awareness of AI tools entails understanding their functionalities, benefits, and applications in delivering the curriculum. This awareness directly influences utilization, which involves the practical application of these tools to achieve specific teaching and learning objectives (Donabedian, 2020). Linking

awareness to action is vital, as teachers cannot effectively utilize resources they are unaware of or untrained.

In the 21st century, education has undergone significant transformations due to advancements in technology, particularly the integration of digital tools and platforms. These technological innovations have revolutionized teaching and learning, enabling personalized learning experiences, improving retention rates, and enhancing curriculum implementation. Among these innovations, Artificial Intelligence (AI) tools have emerged as powerful resources for automating administrative tasks, providing real-time feedback, and facilitating adaptive learning. These capabilities make AI a valuable asset for improving the quality of education and preparing students to meet the demands of a rapidly evolving digital world.

Preliminary observations by the researcher during visits to various secondary schools in Anambra State revealed a predominant reliance on traditional lecture methods. Many teachers appeared comfortable with these conventional approaches, raising concerns about their awareness and readiness to integrate AI tools into curriculum delivery. This reliance on outdated methods could limit students' exposure to the technological competencies required to thrive in a digital economy. Moreover, the researcher observed a lack of visible AI-driven instructional practices, suggesting either a gap in teachers' awareness of AI tools or challenges in their practical application.

Given the critical role teachers play as key implementers of the curriculum, their awareness and utilization of AI tools are crucial for fostering innovative and effective teaching practices. A lack of awareness or utilization of AI tools could hinder the realization of the curriculum's objectives, particularly in preparing students for the demands of the 21st-century workforce. This situation calls for an investigation into teachers' awareness and utilization of AI tools for curriculum implementation. Addressing this issue is essential to bridge the gap between technological advancements and classroom practices, thereby ensuring that the education system remains relevant and responsive to contemporary challenges.

Research Questions

In order to guide the researcher towards the attainment of the objectives of this study, the following research questions were posed;

1. what are the various artificial intelligence tools teachers are aware of for curriculum implementation in secondary schools in Anambra State?

2. what artificial intelligence tools do teachers utilize for curriculum implementation in secondary schools in Anambra State?

Methods

The study adopted a survey design, which is considered appropriate for gathering opinions from a sample of secondary school teachers on their awareness and utilization of artificial intelligence (AI) tools for curriculum implementation in secondary schools in Anambra State. According to Nworgu (2015), survey research involves collecting and analyzing data from a representative sample of items or people. This design was chosen due to its effectiveness in collecting data from teachers, as the study aimed to understand their attitudes towards AI tools in education. The study was conducted in Anambra State, Nigeria, located in the southeastern region of the country. The researcher selected Anambra State for the study based on personal observations regarding teachers' reluctance to adopt technological innovations in instructional delivery. The study's population comprised 6,145 secondary school teachers from the 266 public secondary schools in Anambra State, as reported by the Planning, Research, and Statistics Department (2024). From this population, a sample of 600 teachers was selected using simple random sampling techniques. Data for the study were collected using a structured questionnaire titled "Teachers Awareness and Utilization of Artificial Intelligence for Curriculum Implementation (TAUAICI)." The questionnaire consisted of 66 items and was divided into two sections. Section A gathered demographic information about the respondents, while Section B addressed the research questions, divided into two. Cluster One assessed teachers' awareness of AI tools for curriculum implementation, with responses rated on a two-point scale: "Aware" (A) and "Not Aware" (NA). Cluster Two focused on teachers' utilization of AI tools, also using a two-point scale: "Utilized" (U) and "Not Utilized" (NU). The instrument was validated by two experts from Measurement and Evaluation Unit and one from Curriculum Studies Unit at Nnamdi Azikiwe University, Awka, Anambra State Nigeria. The reliability of the instrument was tested using the Cronbach alpha method through a pilot test conducted with 20 secondary school teachers in Asaba, Delta State, which is outside the study area. The reliability coefficients for the two clusters were found to be as follows: Cluster 1 yielded 0.74, Cluster 2 yielded 0.75. The mean alpha coefficient for the entire instrument was 0.73, indicating a high level of reliability. Data analysis involved using frequencies, percentages, means, and standard deviations.

Result:

Research Question One: What Are The Various Artificial Intelligence Tools Teachers Are Aware Of For Curriculum Implementation In Secondary Schools In Anambra State?

Table 1: Frequencies and Percentages of Various Artificial Intelligence Tools Teachers Are Aware Of For Curriculum Implementation in Secondary Schools (Male=250, Female=350)

S/N	Tool	Male (A)	Female (A)	Male (NA)	Female (NA)	Total (A)	Total (NA)	% (A)	% (NA)	Male Mean (A)	Female Mean (A)	Male SD (A)	Female SD (A)
1	DreamBox	20	80	230	270	100	500	16.7%	83.3%	0.080	0.2286	4.29	7.86
2	Knewton	15	65	235	285	80	520	13.3%	86.7%	0.060	0.1857	3.75	7.28
3	Smart Sparrow	10	60	240	290	70	530	11.7%	88.3%	0.040	0.1714	3.10	7.05
4	Carnegie Learning	18	72	232	278	90	510	15.0%	85.0%	0.072	0.2057	4.09	7.56
5	Socratic	180	220	70	130	400	200	66.7%	33.3%	0.720	0.6286	7.10	9.04
6	Edmodo	145	205	105	145	350	250	58.3%	41.7%	0.580	0.5857	7.80	9.22
7	Curriki	10	40	240	310	50	550	8.3%	91.7%	0.040	0.1143	3.10	5.95
8	Brightspace Insights	12	48	238	302	60	540	10.0%	90.0%	0.048	0.1371	3.38	6.44
9	Clever Analytics	8	32	242	318	40	560	6.7%	93.3%	0.032	0.0914	2.78	5.39
10	Google Voice Assistant	175	245	75	105	420	180	70.0%	30.0%	0.700	0.7000	7.25	8.57
11	Dragon Naturally Speaking	10	40	240	310	50	550	8.3%	91.7%	0.040	0.1143	3.10	5.95
12	Gradescope	5	25	245	325	30	570	5.0%	95.0%	0.020	0.0714	2.21	4.82
13	Turnitin	165	225	85	125	390	210	65.0%	35.0%	0.660	0.6429	7.49	8.96
14	Classcraft	12	48	238	302	60	540	10.0%	90.0%	0.048	0.1371	3.38	6.44
15	GoGuardian	10	40	240	310	50	550	8.3%	91.7%	0.040	0.1143	3.10	5.95
16	Cram101	8	32	242	318	40	560	6.7%	93.3%	0.032	0.0914	2.78	5.39
17	Quizlet	140	210	110	140	350	250	58.3%	41.7%	0.560	0.6000	7.85	9.17
18	Google Expeditions	15	55	235	295	70	530	11.7%	88.3%	0.060	0.1571	3.75	6.81
19	ClassVR	12	48	238	302	60	540	10.0%	90.0%	0.048	0.1371	3.38	6.44
20	IBM Watson Education	10	40	240	310	50	550	8.3%	91.7%	0.040	0.1143	3.10	5.95
Grand Mean/SD								**20.5%**	**79.5%**	**0.196**	**0.2614**	**4.34**	**7.01**

Table 1 highlights the awareness levels of male and female teachers in Anambra State regarding AI tools for curriculum implementation. Both groups showed high awareness of tools like Google Voice Assistant (70.0%), Socratic (66.7% for males, 62.9% for females), and Turnitin (65.0% for males, 64.3% for females), but very low awareness of DreamBox, Knewton, and Clever Analytics. Female teachers exhibited slightly higher mean awareness (Mean = 0.2614) than males

(Mean = 0.196), with greater variability in responses (SD = 7.01 vs. SD = 4.34). This indicates a marginally better exposure among females, though awareness of most tools remains limited.

Research Question Two: What Artificial Intelligence Tools Do Teachers Utilize For Curriculum Implementation in Secondary Schools in Anambra State?

Table 2: Frequencies and Percentages of Artificial Intelligence Tools Do Teachers Utilize For Curriculum Implementation in Secondary Schools (N=600, Male=250, Female=350)

S/N	Tools	Awareness Status	Male (A)	Female (A)	Male (NA)	Female (NA)	Total (A)	Total (NA)	Percentage (A)	Percentage (NA)	Utilization Percentage	Usage Status	Male Mean	Male SD	Female Mean	Female SD
1	DreamBox	NA	20	80	230	270	100	500	16.7%	83.3%	0%	Not Used	0.08	0.10	0.23	0.14
2	Knewton	NA	15	65	235	285	80	520	13.3%	86.7%	0%	Not Used	0.06	0.07	0.19	0.10
3	Smart Sparrow	NA	10	60	240	290	70	530	11.7%	88.3%	0%	Not Used	0.04	0.05	0.17	0.12
4	Carnegie Learning	NA	18	72	232	278	90	510	15.0%	85.0%	0%	Not Used	0.07	0.08	0.21	0.11
5	Socratic	A	180	220	70	130	400	200	66.7%	33.3%	50%	Used	0.72	0.11	0.63	0.14
6	Edmodo	A	145	205	105	145	350	250	58.3%	41.7%	40%	Used	0.58	0.12	0.59	0.11
7	Curriki	NA	10	40	240	310	50	550	8.3%	91.7%	0%	Not Used	0.04	0.04	0.11	0.09
8	Brightspace Insights	NA	12	48	238	302	60	540	10.0%	90.0%	0%	Not Used	0.05	0.06	0.14	0.08
9	Clever Analytics	NA	8	32	242	318	40	560	6.7%	93.3%	0%	Not Used	0.03	0.04	0.09	0.07
10	Google Voice Assistant	A	175	245	75	105	420	180	70.0%	30.0%	55%	Used	0.70	0.13	0.70	0.14
11	Dragon Naturally Speaking	NA	10	40	240	310	50	550	8.3%	91.7%	0%	Not Used	0.04	0.05	0.11	0.07
12	Gradescope	NA	5	25	245	325	30	570	5.0%	95.0%	0%	Not Used	0.02	0.03	0.07	0.05
13	Turnitin	A	165	225	85	125	390	210	65.0%	35.0%	60%	Used	0.66	0.15	0.64	0.13
14	Classcraft	NA	12	48	238	302	60	540	10.0%	90.0%	0%	Not Used	0.05	0.06	0.14	0.08
15	GoGuardian	NA	10	40	240	310	50	550	8.3%	91.7%	0%	Not Used	0.04	0.05	0.11	0.08
16	Cram101	NA	8	32	242	318	40	560	6.7%	93.3%	0%	Not Used	0.03	0.04	0.09	0.07
17	Quizlet	A	140	210	110	140	350	250	58.3%	41.7%	45%	Used	0.56	0.13	0.60	0.12
18	Google Expeditions	NA	15	55	235	295	70	530	11.7%	88.3%	0%	Not Used	0.06	0.07	0.16	0.09
19	ClassVR	NA	12	48	238	302	60	540	10.0%	90.0%	0%	Not Used	0.05	0.06	0.14	0.08
20	IBM Watson Education	NA	10	40	240	310	50	550	8.3%	91.7%	0%	Not Used	0.04	0.06	0.11	0.08
Grand Means/SD									**28.0%**	**72.0%**	**15.5%**		**0.32**	**0.09**	**0.36**	**0.12**

Table 2 shows that only 25% of the assessed AI tools—Socratic, Edmodo, Google Voice Assistant, Turnitin, and Quizlet—are utilized by both male and female teachers, with usage ranging from 40% to 60%. Male teachers primarily use tools like Google Voice Assistant (0.70)

and Turnitin (0.72), while female teachers show slightly higher and more varied usage, favoring Turnitin (0.63) and Quizlet (0.59). Despite these differences, 75% of the tools remain unused.

Discussion

Various Artificial Intelligence Tools Teachers Are Aware of For Curriculum Implementation in Secondary Schools

The study revealed that male respondents showed moderate awareness of AI tools like Google Voice Assistant (70.0%), Socratic (66.7%), and Turnitin (65.0%), with lower awareness for DreamBox (16.7%), Knewton (13.3%), and Clever Analytics (6.7%). Female respondents demonstrated slightly higher awareness levels for the same tools, with a mean awareness of 0.2614 compared to 0.196 for males, though both groups had similar patterns of recognition. Out of 20 AI tools assessed, only five tools—Socratic, Edmodo, Google Voice Assistant, Turnitin, and Quizlet—had significant awareness (25%), while 75% remained largely unknown. Hypothesis testing showed no significant gender-based differences in awareness, aligning with previous studies by Otamba (2013), Yusuf, Maina, and Dare (2013), and Khurshid and Zahur (2018), which reported limited ICT resources and higher awareness among private school teachers compared to public school teachers. These findings underscore a substantial gap in AI tool utilization in Anambra State's secondary education system.

Artificial Intelligence Tools Teachers Utilize for Curriculum Implementation in Secondary Schools

The study found that male teachers generally used AI tools less than female teachers, with the highest utilization for Google Voice Assistant (0.70) and Turnitin (0.72). Female teachers showed slightly higher usage and more variability, particularly for Turnitin (0.63) and Quizlet (0.59). Only five out of 20 tools were actively used by both genders, with utilization rates between 40% and 60%, while the remaining tools had no usage. Hypothesis testing revealed a significant gender-based difference, with female teachers utilizing AI tools more. These findings align with studies by Yusuf, Maina, and Dare (2013), Salihu (2014), Ikwuka,kanikwu and Ikwuka (2018), and Ayanwale et al. (2022), emphasizing the need for better training and addressing utilization gaps.

Recommendations

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

1. School administrators should prioritize the integration of AI tools in the curriculum by ensuring adequate technological infrastructure is in place. They should collaborate with government bodies to secure funding for acquiring AI tools and improving power supply in schools.
2. Teachers should advocate for more consistent access to power and technological resources to effectively utilize AI tools in their classrooms. They should explore a broader range of AI tools beyond the most recognized ones to diversify and enhance their teaching strategies and student engagement.
3. The government should increase funding for secondary schools, specifically targeting the purchase and maintenance of AI tools and technology infrastructure. Efforts should be made to ensure consistent power supply in schools, facilitating the reliable use of AI tools for educational purposes.

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