

TEACHERS' ATTITUDES TOWARD THE INTEGRATION OF ARTIFICIAL INTELLIGENCE-BASED TEACHING IN PUBLIC SECONDARY SCHOOLS IN DELTA STATE"

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ABSTRACT

The study explores the attitudes of teachers toward the adoption of artificial intelligence (AI)-based teaching in public secondary schools in Delta State, Nigeria. Employing a survey research design, the study targeted a sample of 500 participants, including 100 principals and 400 teachers, selected from 12 Local Government Areas. Data were collected using a structured four-point Likert scale questionnaire, the "Attitude of Teachers to Artificial Intelligence-Based Teaching Questionnaire" (ATAITQ). The findings revealed a nuanced attitude among teachers, with some recognizing the potential benefits of AI in education while others displayed concerns and resistance. Charts were used to analyze and present the data visually. The study concluded that teachers' attitudes are influenced by various factors, necessitating targeted interventions, implementing teacher training programs tailored to AI teaching; developing AI teaching methods suitable for local contexts; and promoting collaboration among educators, policymakers, and tech experts to facilitate AI integration in teaching.

Keywords: *Attitude of Teachers, Artificial Intelligence-Based Nigeria*

INTRODUCTION

The increasing demand for quality education and the need to improve students' outcomes have led to the exploration of innovative teaching methods and tools. One such innovation is Artificial Intelligence (AI)-based teaching, which has the potential to transform the education sector. Artificial Intelligence teaching involves the use of AI-powered tools and systems to support teaching and learning process. However, despite the potential benefits of Artificial Intelligence-based teaching, its adoption in educational institutions has been slow. One of the factors influencing the adoption of Artificial Intelligence-based teaching is teachers' attitudes towards it. Teachers play a critical role in the implementation of new teaching methods and tools and their attitude can either facilitate or hinder the adoption of AI-based teaching (Aljohani, 2021).

The current state of AI in education reflects a growing adoption trend as educational institutions explore various AI tools to enhance teaching and learning. Today, at a relatively early stage in the widespread use of AI in education, when no one really knows where these developments will lead, how effective AI tools are in education, or what future steps teachers should take, as there is still very little research, guidelines and policies in the subject, it is not surprising that teachers have many questions and very few answers (Fullan et al., 2023). With its ability to process large amounts of data, analyse learning patterns and make intelligent decisions, AI holds enormous potential to revolutionise teaching and learning practices, making them more personalised, engaging and efficient (Kumar et al., 2023).

As technology continues to advance, artificial intelligence is being increasingly integrated into the education sector, piquing the interest of scholars and practitioners. Over the past few decades, a myriad of technologies has been employed to enhance teaching and learning worldwide (Rajendran & Yunus, 2021). Moreover, AI applications provide an accessible means of learning, enabling individuals to study for 10-15 minutes at their convenience, which is particularly appealing to young people who frequently use smartphones or tablets (Hjiri & Dormeier, 2022).

Although the integration of artificial intelligence and education has been extensively studied and practiced in basic and higher education, its application in regular education remains relatively underdeveloped (Nazaretsky et al., 2022). Artificial intelligence has introduced innovative approaches to improving teaching and learning processes. Artificial intelligence (AI)

refers to computer programmes designed to execute intricate tasks analogous to human cognition, encompassing learning, adaptation, synthesis, self-correction, and data exploitation (Fahimirad & Kotamjani, 2018).

The thorough incorporation of artificial intelligence in education will become a powerful force in promoting educational advancement. The combination of conventional education with artificial intelligence offers boundless potential. Thus, there is a need to explore teachers' perceptions of Artificial Intelligence-based teaching, as teachers play a crucial role in facilitating pupils' learning. According to the present literature, studies regarding teachers' viewpoints on artificial intelligence are extremely scarce.

Statement to the Problem

The integration of Artificial Intelligence (AI) in education has the potential to transform the teaching-learning process. However, there is reluctance and resistance of teachers to integrate Artificial Intelligence AI-based teaching. The success of AI-based teaching depends on teachers' attitudes and willingness to adopt this innovation. This could be as a result of lack of training and support, fear of job displacement, concerns about students' dependency, and uncertainty about Artificial Intelligence effectiveness. This potential gap hinders the benefits of Artificial Intelligence-based teaching, including improved students' outcome, increased efficiency and enhance teaching practices.

Research questions

Due to the review of the extant study, the following question is asked

1. What are the factors affecting teachers' attitudes toward the integration of Artificial Intelligence-based teaching in public secondary schools in Delta State?
2. What are the challenges regarding the attitude of teachers towards AI-based teaching in Public Secondary Schools in Delta State?
3. What are the strategies to improve the attitude of teachers towards AI-based teaching in Public Secondary Schools in Delta State?

Objectives of the Study

1. To examine the factors affecting teachers' attitudes toward the integration of Artificial Intelligence-based teaching in public secondary schools in Delta State
2. To investigate the challenges regarding the attitude of teachers towards AI-based teaching in Public Secondary Schools in Delta State
3. To establish strategies to improve the attitude of teachers towards AI-based teaching in Public Secondary Schools in Delta State

Hypotheses

1. Various factors significantly influence teachers' attitudes toward the integration of Artificial Intelligence-based teaching in public secondary schools in Delta State
2. Different challenges significantly influence the attitude of teachers towards AI-based teaching in Public Secondary Schools in Delta State
3. Strategies to improve the attitude of teachers towards AI-based teaching in Public Secondary Schools in Delta State

LITERATURE REVIEW/ THEORETICAL FRAMEWORK

Attitude of teachers towards AI-based teaching

Relationship between attitudes of teachers towards AI-based teaching abound in several studies, according to Oghene (2020) Artificial Intelligence (AI) is transforming education globally. In Nigeria, AI-based teaching can enhance secondary school education. However, teacher

attitudes play a crucial role in its adoption. There are factors influencing teacher attitudes in the adoption and usage of Artificial Intelligence-based teaching such as fear of technology (technophobia) which can hinder teachers' willingness to adopt AI-based teaching, lack of training on AI-based tools and platforms. In the same vein, Okoye (2021) posit that teacher attitudes in the adoption and usage of Artificial Intelligence-based teaching could be as a result of job security concerns (fear of replacement by AI), cultural and social factors such as resistance to change, traditional teaching methods, infrastructure and resource constraints.

Studies have proved that most teachers had positive attitude (Delgado et al., 2020; Lehlou, 2021; Aljohani, 2021) towards the use of AI-based. Most of the teachers found out that AI catered the needs of their profession, improve their work efficiency and easy to use, while teachers able to employ on their own initiative (Lu, 2019). It did not increase teachers' workload because AI did not need a lot of technology (Lu, 2019). However, there were certain teachers who demonstrated dubious demeanour. Sometimes, the teachers are aggressive to students who mention getting information from AI. Also, it would make teachers to prepare adequately for their lectures as students can easily access the information from AI. Those teachers who are abreast with Artificial Intelligence are becoming lazy in preparing their lesson notes as they rely solely on AI (Oghene, 2020).

Conceptual framework

Benefits of AI-Based Teaching

1. Personalized Learning: AI adapts to individual students' needs.
2. Efficient Grading: AI automates grading, freeing teachers for more critical tasks.
3. Enhanced Engagement: Interactive AI-based content.
4. Data-Driven Insights: AI provides valuable student performance data.
5. Accessibility: AI-based teaching reaches remote or underserved areas.

Challenges regarding the attitude of teachers towards AI-based teaching

Newman (2022) noted despite the potential benefits of Artificial Intelligence (AI) in enhancing teaching and learning outcomes, many teachers show resistance to adopting AI-based teaching methods which could be as a result of limited understanding of AI and its application in education, fear of replacement by technology, fear of technology can hinder teachers' willingness to adopt AI-based teaching, lack of training on AI-based tools and platforms, job security concerns, resistance to change, traditional teaching methods.

Aljohani (2021) outline the some of the challenges regarding the attitude of teachers towards AI-based teaching such as resistance to western-style education and technology, difficulty integrating AI-based content into Nigerian curriculum, limited support for teachers to develop AI-based teaching skills, limited digital literacy among students, lack of clear policies and guidelines for AI-based teaching. Fahimirad & Kotamjani (2018) asserted that older teachers may struggle with AI-based teaching, lack of confidence in using AI-based tools, limited incentives for teachers to adopt AI-based teaching, limited education and training on AI-based teaching are some of the teacher based challenges in the adoption and usage of Artificial Intelligence-based teaching.

Strategies to improve the attitude of teachers towards AI-based teaching

Lehlou (2021) highlighted strategies to improve the attitude of teachers towards AI-based teaching as follows:

1. Awareness and Sensitization: Organize workshops, seminars, and conferences to educate teachers on AI-based teaching benefits.
2. Training and Capacity Building: Provide teachers with AI-based teaching training and certification programs.
3. Infrastructure Upgrade: Improve school infrastructure to support AI-based teaching.

4. Resource Provision: Provide teachers with AI-based teaching resources and materials.
5. Collaboration and Mentorship: Pair experienced teachers with newer teachers for guidance.
6. Curriculum Integration: Integrate AI-based content into Nigerian curriculum.
7. Policy Development: Establish national guidelines for AI-based teaching.
8. Incentives and Recognition: Offer incentives for teachers who effectively implement AI-based teaching.
9. Support Systems: Establish support systems for teachers, such as help desks and online forums.
10. Monitoring and Evaluation: Regularly assess AI-based teaching effectiveness.
11. Teacher Education Reform: Incorporate AI-based teaching into teacher education programs.
12. Institutionalization: Make AI-based teaching a core part of school culture.

Theoretical Framework

The theoretical framework of this study is geared on Technology Acceptance Model, propounded by Fred Davis (1989). Technology Acceptance Model is an information systems theory that explains how users accept and use new technology. The model suggests that users' acceptance of a technology is determined by their behavioral intentions which is influenced by their perceptions of the technology's usefulness and ease of use. Technology Acceptance Model has significantly contributed to the understanding of technology adoption and usage. The model also explains how users form attitudes and intentions to use new technologies. Also, the degree to which a user believes a technology will improve performance, increase productivity or enhance job effectiveness. Users' attitudes and intentions are influenced by their perceptions of the technology.

METHODS

The study employed a survey research design, a widely used technique in social science research, as highlighted by Sobowale (2018). This method involves preparing a set of structured questions addressing various aspects of the subject matter, which are then administered to a selected sample from the target population. The population for this study comprised all public secondary schools in Delta State. A sample of 500 respondents was selected, consisting of 100 principals and 400 teachers from 12 Local Government Areas within Delta State. Respondents were chosen using a random sampling technique to ensure representativeness.

Data were collected using a self-developed questionnaire titled 'Attitude of Teachers to Artificial Intelligence-Based Teaching Questionnaire' (ATAITQ). The instrument consisted of closed-ended questions presented in a four-point Likert scale format: Strongly Agree (SA), Agree (A), Strongly Disagree (SD), and Disagree (D). This format allowed for the collection of quantifiable data on respondents' attitudes toward AI-based teaching.

A total of 500 questionnaires were distributed and administered by the researcher to the selected respondents. The data collected were analysed using visual tools, such as pie charts and column charts, to provide clear and interpretable insights into the study variables.

Again, there is need for you to report the psychometric properties of the instruments used as evidence of their reliability, useability and appropriateness

Demographic Variables

Gender distribution

Table 4.1 Gender Distribution of Respondents

Gender	Numbers	Percentage
Male	281	56.2
Female	219	43.8

Age Distribution

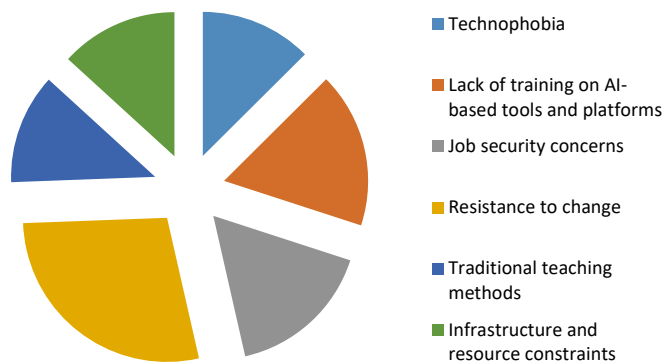
Table 4.2 Age Distribution of Respondents

Age	Numbers	Percentage
25 - 35	31	6.2
36 – 45	87	17.4
46 – 55	267	53.4
56 and above	115	23

Table 4.3 Response on Factor influencing teachers' attitude

Factor influencing teachers' attitude	Numbers	Percentage
Technophobia	74	14.8
Lack of training on AI-based tools and platforms	103	20.6
Job security concerns	97	19
Resistance to change	165	33
Traditional teaching methods	73	14.6
Infrastructure and resource constraints	78	15.6

Pie chart of factors influencing teachers' attitude



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Table 4.4 Response on Challenges

Challenges	Numbers	Percentage
Older teachers may struggle with AI-based teaching	97	19.4
Lack of confidence in using AI-based tools	113	22.6
Limited incentives for teachers to adopt AI-based teaching	74	14.8
Limited education and training on AI-based teaching	145	29
limited support for teachers to develop AI-based teaching skills	93	19

Column chart of challenges faced regarding the attitude of teachers towards AI-based Teaching

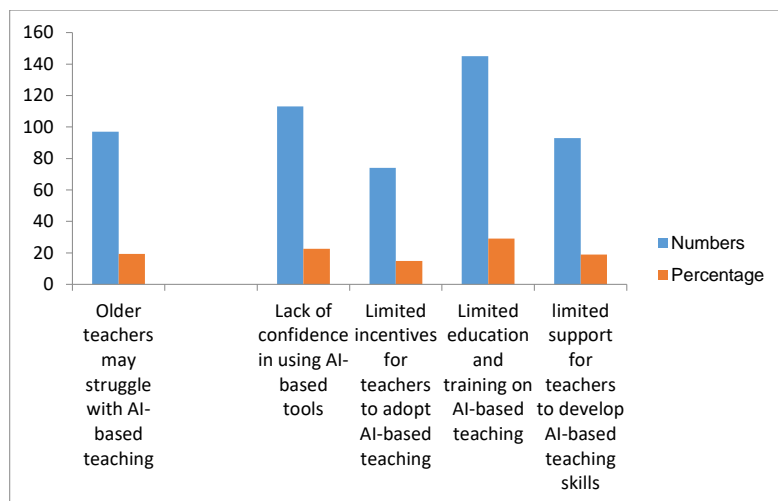
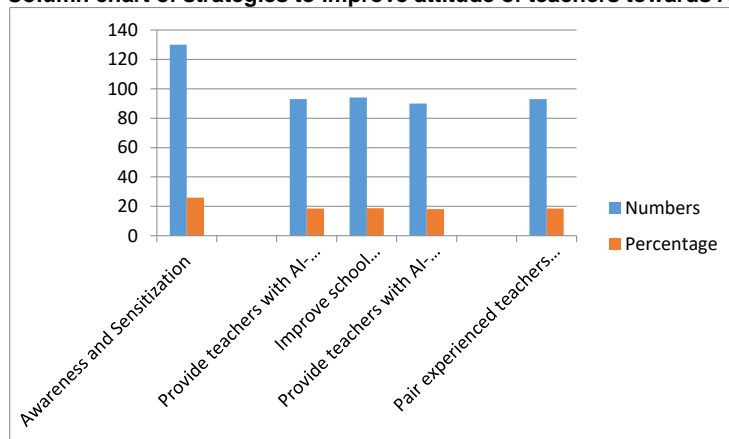


Table 4.5 Response on Strategies to Improve Attitude of Teachers Towards AI-Based Teaching

Strategies to improve attitude of teachers towards AI-based teaching	Numbers	Percentage
Awareness and Sensitization	130	26
Provide teachers with AI-based teaching training and certification programs.	93	18.6
Improve school infrastructure to support AI-based teaching	94	18.8
Provide teachers with AI-based teaching resources and materials.	90	18
Pair experienced teachers with newer teachers for guidance.	93	18.6

Column chart of strategies to improve attitude of teachers towards AI-based teaching



DISCUSSION OF FINDINGS

The findings of this study reveal a complex interplay of factors influencing teachers' attitudes toward integrating artificial intelligence (AI)-based teaching in public secondary schools in Delta State. Notably, fear of technology (technophobia) emerged as a significant factor, highlighting apprehension about AI tools potentially displacing traditional teaching roles. Additionally, the lack of adequate training on AI-based tools and platforms was identified as a key barrier, limiting teachers' ability to leverage AI effectively in their instructional practices. These findings align with Newman's (2022) assertion that insufficient understanding of AI and its applications contributes to resistance among educators.

Another salient finding was the role of job security concerns and resistance to change, which were compounded by the preference for traditional teaching methods. Such attitudes are consistent with previous studies, such as those by Okoye (2021) and Oghene (2020), which identified similar hesitations among teachers facing technological shifts in education. Furthermore, infrastructure and resource constraints were noted as persistent challenges, reflecting systemic issues within the educational framework in Delta State.

The study also explored strategies to improve teacher attitudes toward AI-based teaching. Awareness and sensitization campaigns, coupled with targeted training and capacity-building programs, were highlighted as critical interventions. These strategies are supported by Lehlou's (2021) recommendations for fostering positive attitudes through structured support systems and mentorship programs. Improving school infrastructure and providing adequate resources were also deemed essential for enabling AI integration.

Moreover, the study underscores the need for policy development and curriculum integration to institutionalize AI-based teaching practices. These findings emphasize the multifaceted approach required to address both individual and systemic barriers to AI adoption in education.

Conclusion

This study concludes that teachers' attitudes toward AI-based teaching in public secondary schools in Delta State are influenced by a combination of personal, institutional, and systemic factors. While some educators recognize the transformative potential of AI to enhance teaching and learning, others remain skeptical, driven by fears of technology, insufficient training, and traditional pedagogical preferences. The findings underscore the importance of addressing these barriers through comprehensive interventions, including capacity-building programs, resource provision, and supportive policies. By fostering an enabling environment, stakeholders can promote a more positive and inclusive approach to AI integration in education.

Recommendations

Based on the findings and conclusion, the following recommendations are proposed:

- i. The government and educational institutions should design and implement training programs focused on AI literacy and practical applications in teaching. These programs should be tailored to address the specific needs of teachers at various proficiency levels.
- ii. Adequate infrastructure, including reliable internet access and AI-compatible devices, should be provided to schools to support the effective implementation of AI-based teaching.
- iii. Policymakers should establish clear guidelines and frameworks for integrating AI into the curriculum, ensuring alignment with educational goals and local contexts.

REFERENCES

- Aljohani, R. A. (2021). Teachers and Students' Perceptions on the Impact of Artificial Intelligence on English Language Learning in Saudi Arabia. *JALLR*, 8(1), 36-47.
- Delgado, H. O. K., Fay, A. A., Sebastiany, M. J., and Silva, A. D. C. (2020). Artificial intelligence adaptive learning tools: the teaching of English in focus. *Belt*, 11(2), 1-19. doi: <http://dx.doi.org/10.15448/2178-3640.2020.2.38749>
- Elayyan, S. (2021). The future of education according to the fourth industrial revolution. *Jetol*, 4(1), 23-30. doi: <http://doi.org/10.31681/jetol.737193>
- Fahimirad, M., and Kotamjani, S. S. (2018). A Review on Application of Artificial Intelligence in Teaching and Learning in Educational Contexts. *Ijld*, 8(4), 107-118. doi: 10.5296/ijld.v8i4.14057
- Haseski, H. I. (2019). What Do Turkish Pre-Service Teachers Think About Artificial Intelligence? *International Journal of Computer Science Education in Schools*, 3(2). doi: 10.21585/ijcses.v3i2.55
- Haseski, H. I. (2019). What Do Turkish Pre-Service Teachers Think About Artificial Intelligence? *International Journal of Computer Science Education in Schools*, 3(2). doi: 10.21585/ijcses.v3i2.55
- Hjiri, M., & Dormeier, A. (2022). Towards disruptive education: The potential role of artificial intelligence in customized learning. *QScience Connect*, 2022(2). <https://doi.org/10.5339/connect.2022.spt.4>
- Lehlou, F. (2021). Artificial Intelligence in Teaching and Learning Languages. *ResearchGate*. doi: 10.13140/RG.2.2.35349.04323
- Liu, J., & Bai, H. (2020). The integration design of artificial intelligence and normal students' Education. *Journal of Physics*, 1453(1), 012090. <https://doi.org/10.1088/1742-6596/1453/1/012090>
- Lu, X. (2019). An Empirical Study on the Artificial Intelligence Writing Evaluation System in China CET. *Big Data*. 7(2), 121-129. doi: 10.1089/big.2018.0151
- Newman, S.V. (2022). Innovation in Education and Language Learning in 21st Century. *Journal of Sustainable Development Education and Research*. 2, 33-34. doi: <https://doi.org/10.17509/jsder.v2i1.12355>
- Oghene, I. (2020). Using E-Learning in English Language Teaching: A Systematic Review. *International Journal of Academic Research in Progressive Education and Development*, 10(1). <https://doi.org/10.6007/ijarped/v10-i1/8338>
- Okoye, N.S. (2021). Vision, challenges, roles and research is-sues of Artificial Intelligence in Education. *Computers and Education: Artificial Intelligence*, 1, 100001. <https://doi.org/10.1016/j.caeai.2020.100001>
- Ouyang, F., Zheng, L., & Jiao, P. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Education and Information Technologies*, 27(6), 7893–7925. <https://doi.org/10.1007/s10639-022-10925-9>
- Pokrivcakova, S. (2019). Preparing teachers for the application of AI-powered technologies foreign language education. *Sciend*, 136-153. doi: 10.2478/jolace-2019-0025
- Rajendran, T., & Yunus, M. M. (2021). Chatterpix Kids: A Potential Mobile App for Helping Primary ESL Pupils Improve Their Speaking Fluency. *International Journal of Learning, Teaching and Educational Research*, 20(4).