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Influence of Artificial Intelligence on Teachers' Professional Development in Public Senior Secondary Schools in Rivers State

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ABSTRACT

This study examined the influence of artificial intelligence on teachers' professional development in public senior secondary schools in Rivers State. Descriptive research design was used for the study. The researchers formulated four objectives of the study, four research questions and four hypotheses that guided the study. The population for this study consisted of all biology teachers in Etche Municipality with the population size of 73 biology teachers in all the public senior secondary schools in Etche Municipality. Stratified and simple random sampling methods were used in the study. The instrument used for data collection was self-structured questionnaire with 20 items, titled "Influence of Artificial Intelligence on Teachers' Professional Development Questionnaire (IAITPDQ". The instrument was validated using two experts in Measurement and Evaluation, Faculty of Education, Rivers State University. Cronbach Alpha method was used to achieve a reliability index of 0.85. The data gathered were analyzed using mean and standard deviation to answer the research questions while the hypotheses where tested using t-test statistical tool at 0.05 level of significance. Based on the analysis, the findings of the study revealed that over-reliance on AI tools and dependence on technology have negative influence on teachers' professional development in public senior secondary schools in Rivers State. Based on the findings of the study, it was recommended that, School management should organize workshop programme for teachers on the danger of over reliance on AI and government and school management should not totally depend on AI tools to avoid job displacement.

Keywords: *Artificial Intelligence, Professional Development, Influence, Teachers*

INTRODUCTION

Artificial intelligence presents both positive and negative influence on students. On the positive side, AI offers personalized learning experiences, 24/7 support, and automated grading, freeing up teachers for more focused interaction. However, negative influence includes potential over-reliance on technology, diminished critical thinking, privacy concerns, and the risk of academic dishonesty. (Wang, 2024). Having a balanced approach to the consideration of the implementation of artificial intelligence in learning environments will help school leaders, teachers, and parents navigate the exciting yet complex world of Artificial intelligence powered education.

Artificial intelligence can impact education negatively by reducing the level of human interaction between students and teachers, which is essential for emotional support and social development. While artificial intelligence holds immense promise for personalising learning and enhancing educational experiences, it's crucial to acknowledge its potential downsides in K-12 environments (primary school to high school) in all corners of the world. Having a balanced approach to the consideration of the implementation of AI in learning environments will help school leaders, teachers, and parents navigate the exciting yet complex world of AI-powered education.

Smith (2024) revealed the following as how Artificial Intelligence influence teachers' professional development: Job Displacement: AI automation might impact educators' roles, particularly in areas like grading and individualised learning plans. While AI can automate tasks like grading multiple-choice

quizzes, it cannot replicate the nuanced feedback a human teacher can provide on essays or projects. Over-Reliance and Decreased Critical Thinking: Excessive use of AI tools may lead to students becoming overly reliant on them, potentially hindering the development of critical thinking and problem-solving skills. Dehumanisation of Learning: Reliance on AI tutors could diminish the vital role of human teachers in fostering critical thinking, social interaction, and emotional development which are all hugely crucial aspects of education (Smith, 2024).

Lack of Human Touch/Dehumanized Learning Experience: The lack of human touch is a critical disadvantage of AI in education, leading to a dehumanized learning experience. Traditional education relies heavily on human interaction, with teachers providing not only academic instruction but also emotional support and mentorship. AI systems, while efficient, cannot replicate the empathy, understanding and personal connection that human educators offer. This absence of human elements can affect students' social and emotional development, as well as their overall engagement and motivation in the learning process (Nwoke, 2022). The human touch is an exceptionally important aspect of learning, and ensuring that students aren't relegated to cold, isolated learning environments is an important balance and consideration for educations the world over. AI is a powerful tool, overreliance on technology can have adverse effects as students may miss out on crucial aspects of holistic learning such as social interaction, creativity and emotional intelligence. Lack of Emotional Connection: It's no doubt that the human touch in teaching including empathy and understanding, is essential for fostering a supportive and encouraging learning environment. And, while AI can assist with certain aspects of learning, it does lack the ability to establish emotional connections with students.

Tech Dependence and Reduced Critical Thinking: Overdependence on AI for problem-solving can hinder students' ability to develop critical thinking skills and develop independent learning skills. An AI homework helper might churn out solutions to complex math problems in seconds. However, this deprives students of the opportunity to grapple with the problem themselves, develop logical reasoning skills, and experience the satisfaction of arriving at a solution independently (Momen, 2022).

Dependence on Technology: Another major concern is the growing dependence on technology that AI in education fosters. As educational institutions increasingly rely on AI-driven tools for teaching, assessment and administrative tasks, there is a risk of becoming overly dependent on these technologies (Chima, 2024). This dependence can lead to significant disruptions in the event of technical failures or cyber-attacks. Furthermore, it may also diminish the development of critical thinking and problem-solving skills among students, as they may become accustomed to AI systems providing answers and solutions (Bahar, 2024).

Teacher Job Displacement: the rise of AI in education brings the concern of teacher job displacement. As AI systems take on more roles traditionally filled by educators, there is a fear that teachers may become obsolete (Ivette, 2024). Automated grading, AI-driven tutoring, and administrative tasks handled by AI could reduce the need for human teachers, leading to job losses and a devaluation of the teaching profession. While AI can certainly support and enhance educational practices, it is essential to balance its implementation to ensure that teachers remain integral to the educational process, providing the human touch that technology cannot replace.

Statement of the Problem

The rapid integration of Artificial Intelligence (AI) into the education sector is reshaping teaching and learning processes globally. In Nigerian public senior secondary schools, including those in Rivers State, AI technologies such as automated lesson planning tools, digital grading systems, and intelligent tutoring platforms are being introduced to improve efficiency and student learning outcomes. While these innovations present clear benefits, they also pose significant challenges to teachers' educational development. One major concern is that over-reliance on AI tools may lead to the gradual erosion of teachers' core pedagogical skills. When lesson delivery, assessment, and even classroom management are increasingly handled by AI systems, teachers risk becoming passive implementers rather than active developers of educational content. This dependency can reduce creativity, problem-solving ability, and adaptability skills essential for professional growth.

Furthermore, many public senior secondary schools in Rivers State face infrastructural and training gaps that make AI integration problematic. Without adequate professional development in AI literacy, teachers may experience technological anxiety, feel threatened by automation, or struggle to align AI resources with local curricular needs. This could result in diminished confidence, reduced motivation for self-improvement, and a growing disconnect between technology-driven and human-centered teaching approaches.

If these issues remain unaddressed, the unintended consequences of AI adoption may include a decline in teachers' instructional autonomy, weakened capacity for innovation, and widening disparities in teaching quality. Understanding and addressing the influence of artificial intelligence on teachers' professional development in public senior secondary schools in Rivers State.

Purpose of the Study

This study examined the influence of artificial intelligence on teachers' professional development in public senior secondary schools in Rivers State. Specifically, the objectives of the study sought to:

1. Examine the extent to which over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State.
2. Determine the extent to which dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State
3. Find out the extent to which lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State
4. Examine the extent to which teacher job displacement influence their professional development in public senior secondary schools in Rivers State

Research Questions

The following research questions guided the study

1 To what extent does over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State?

2 To what extent does dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State?

3 To what extent does lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State?

4 To what extent does teacher job displacement influence their professional development in public senior secondary schools in Rivers State?

Hypotheses

The following null hypotheses formulated were tested at 0.05 level of significance

1 There is no significant difference in the mean ratings of male and female biology teachers on extent to which over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State

2 There is no significant difference in the mean ratings of male and female biology teachers on extent to which dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State

3 There is no significant difference in the mean ratings of male and female biology teachers on extent to which lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State

4 There is no significant difference in the mean ratings of male and female biology teachers on extent to which teacher job displacement influence their professional development in public senior secondary schools in Rivers State.

RESEARCH METHOD

This study made use of correlational research design. The essence of this design was to elicit information from the respondents. The population for this study consisted of all biology teachers in Etche Municipality with the population size of 73 biology teachers in all the public senior secondary schools in Etche Municipality. The researcher made use of census sampling method, where all the entire population size of 73 biology teachers was used as the sample size. The instrument used for data collection was self-structured questionnaire with 20 items, titled "Influence of Artificial Intelligence on Teachers' Professional Development Questionnaire (IAITPDQ". The instrument was rated using 4-points rating scale of Very High Extent – 4 (VHE), High Extent – 3 (HE), Low Extent -2 (LE) and Very Low Extent – 1 (VLE). The instrument was validated using two experts in Measurement and Evaluation, Faculty of Education, Rivers State University. Cronbach Alpha method was used to achieve a reliability index of 0.85. The 73 instrument was distributed directly to the respondents by the researcher and also retrieved. The data collected were analyzed using mean and standard deviation for the research questions while the null hypotheses were tested using t-test transformation at 0.05 level of significance. The decision rule for answering the research question was based on real limits. Where any mean from 2.50 and above was accepted, while the mean below 2.49 was rejected.

RESULTS AND DISCUSSION

Research Question 1: To what extent does over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State?

Table 1: Mean and standard deviation analysis on the extent over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State

S/No	Questionnaire Items	Male Teachers = 41			Female Teachers = 32		
		Mean $\bar{x}$	SD	Remarks	Mean $\bar{x}$	SD	Remarks
1.	Excessive use of AI tools may lead to teachers becoming over reliant on them	2.83	0.84	High Extent	2.91	0.85	High Extent
2.	Artificial intelligence tools may lead to potentially hindering the development of teachers' critical thinking	2.72	0.82	High Extent	2.86	0.84	High Extent
3.	Over use of artificial intelligence tools affects problem-solving skills of teacher	2.75	0.83	High Extent	2.93	0.85	High Extent
4.	Reliance on AI tutors could diminish the vital role of human teachers in fostering critical thinking	2.69	0.82	High Extent	2.95	0.86	High Extent
5.	Reliance on AI tutors could affects social interaction and emotional development which are all hugely crucial aspects of education	2.67	0.82	High Extent	2.87	0.85	High Extent
Grand Mean		**2.73**	**0.83**		**2.90**	**0.85**	

Source: Field Survey, 2025

Table 1 presents that items 1 to 5 have means of 2.83, 2.73, 2.75, 2.69, 2.67 for male teachers with standard deviations ranging from 0.84 to 0.82 and means of 2.91, 2.86, 2.93, 2.95, 2.87 for female teachers with standard deviations ranging from 0.85 to 0.85 which indicate "High Extent" on the extent

over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State. Also, the grand means for male and female teachers are 2.73 and 2.90 respectively, further confirming a "High Extent" on the extent over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State. However, it was found that over-reliance on AI tools has negative influence on teachers' professional development in public senior secondary schools in Rivers State to a High Extent.

Research Question 2: To what extent does dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State?

Table 2: Mean and standard deviation analysis on the extent dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State

S/No	Questionnaire Items	Male Teachers = 41			Female Teachers = 32		
		Mean $\bar{x}$	SD	Remarks	Mean $\bar{x}$	SD	Remarks
6.	Dependence on technology leads to the risk of becoming over dependent on these technologies	2.89	0.85	High Extent	2.95	0.86	High Extent
7	Dependence on technology leads to significant disruptions in the event of technical failures	2.86	0.83	High Extent	2.86	0.84	High Extent
8	Dependence on technology leads to cyber-attacks	2.78	0.83	High Extent	2.91	0.85	High Extent
9	Dependence on technology lead to diminish in the development of critical thinking	2.83	0.84	High Extent	2.82	0.84	High Extent
10	Dependence on technology affects problem-solving skills among teachers and students	2.86	0.84	High Extent	2.86	0.84	High Extent
Grand Mean		**2.84**	**0.84**		**2.88**	**0.85**	

Source: Field Survey, 2025

Table 2 presents that items 6 to 10 have means of 2.89, 2.86, 2.78, 2.83, 2.86 for male teachers with standard deviations ranging from 0.85 to 0.84 and means of 2.95, 2.86, 2.91, 2.82, 2.86 for female teachers with standard deviations ranging from 0.86 to 0.84 which indicate "High Extent" on the extent dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State. Also, the grand means for male and female teachers are 2.84 and 2.88 respectively, further confirming a "High Extent" on the extent dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State. So, it is found that over dependence on technology has negative influence on teachers' professional development in public senior secondary schools in Rivers State to a High Extent.

Research Question 3: To what extent does lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State?

Table 3: Mean and standard deviation analysis on the extent lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State

S/	Questionnaire Items	Male Teachers = 41	Female Teachers = 32

No		Mean $\bar{x}$	SD	Remarks	Mean $\bar{x}$	SD	Remarks
11.	Lack of human touch leads to a dehumanized learning experience	2.89	0.85	High Extent	2.95	0.86	High Extent
12.	Traditional education relies heavily on human interaction with teachers	2.86	0.83	High Extent	2.86	0.84	High Extent
13.	Traditional education provide academic instruction, emotional support and mentorship	2.78	0.83	High Extent	2.91	0.85	High Extent
14.	Absent of human elements can affect both teachers and students' social and emotional development	2.83	0.84	High Extent	2.82	0.84	High Extent
15.	Human touch leads overall engagement and motivation in the learning process	2.86	0.84	High Extent	2.86	0.84	High Extent
Grand Mean		**2.84**	**0.84**		**2.88**	**0.85**	

Source: Field Survey, 2025

Table 3 presents that items 10 to 15 have means of 2.89, 2.86, 2.78, 2.83, 2.86 for male teachers with standard deviations ranging from 0.85 to 0.84 and means of 2.95, 2.86, 2.91, 2.82, 2.86 for female teachers with standard deviations ranging from 0.86 to 0.84 which indicate "High Extent" on the extent lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State. Also, the grand means for male and female teachers are 2.84 and 2.88 respectively, further confirming a "High Extent" on the extent lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State. Thus, it is found that lack of human touch has negative influence on teachers' professional development in public senior secondary schools in Rivers State to a High Extent.

Research Question 4: To what extent does teacher job displacement influence their professional development in public senior secondary schools in Rivers State

Table 4: Mean and standard deviation analysis on the extent teacher job displacement influence their professional development in public senior secondary schools in Rivers State

S/ No	Questionnaire Items	Male Teachers = 41			Female Teachers = 31		
		Mean $\bar{x}$	SD	Remarks	Mean $\bar{x}$	SD	Remarks
16.	The rise of AI in education brings the concern of teacher job displacement	2.86	0.84	High Extent	2.91	0.85	High Extent
17.	AI systems take on more roles traditionally filled by educators	2.83	0.84	High Extent	2.95	0.86	High Extent
18.	Teachers may become obsolete in their job with the uses of artificial intelligence	2.97	0.86	High Extent	2.98	0.86	High Extent
19.	AI could reduce the need for human teachers, leading to job losses	2.94	0.86	High Extent	2.99	0.86	High Extent
20.	AI could lead to devaluation of the teaching profession	2.97	0.86	High Extent	2.98	0.86	High Extent
Grand Mean		**2.90**	**0.85**		**2.97**	**0.86**	

Source: Field Survey, 2025

The information in table 4 shows that items 16 to 20 have means of 2.86, 2.83, 2.97, 2.94, 2.97 for male teachers with standard deviations ranging from 0.84 to 0.86 and means of 2.91, 2.95, 2.98, 2.99, 2.98 for female teachers with standard deviations ranging from 0.85 to 0.86 indicating a "High Extent" on the extent teacher job displacement influence their professional development in public senior secondary schools in Rivers State. The grand means for male and female teachers are respectively, 2.90 and 2.97, which is a confirmation of "High Extent" on the extent teacher job displacement influence their professional development in public senior secondary schools in Rivers State. The above results imply that teacher job displacement has negative influence on their professional development in public senior secondary schools in Rivers State.

Test of Hypotheses

Hypothesis 1: There is no significant difference in the mean ratings of male and female biology teachers on extent to which over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State

Table 4.5: t-test Analysis of significant difference in the mean ratings of male and female biology teachers on extent to which over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State

Status	N	Mean $\overline{X}$	SD	df	z-cal	z-crit	L/sig	Decision
Male Teachers	41	2.73	0.83					
				71	1.29	1.96	0.05	Accepted
Female Teachers	32	2.90	0.85					

The analysis in Table 4.5 revealed that the t-cal of 1.29 is less than the t-crit of 1.96. Therefore, the calculated t-ratio is not statistically significant at a 0.05 level of significance since it is smaller than the given critical value of t-ratio. So, the hypothesis 1 is thus accepted and the conclusion is that there is no significant difference in the mean ratings of male and female biology teachers on extent to which over-reliance on AI tools influence teachers' professional development in public senior secondary schools in Rivers State.

Hypothesis 2: There is no significant difference in the mean ratings of male and female biology teachers on extent to which dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State.

Table 4.6: t-test Analysis of significant difference in the mean ratings of male and female biology teachers on extent to which dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State

Status	N	Mean $\overline{X}$	SD	Df	z-cal	z-crit	L/sig	Decision
Male Teachers	41	2.84	0.84					
				71	1.24	1.96	0.05	Accepted
Female Teachers	32	2.88	0.85					

The analysis on Table 4.6 indicated that the t-cal of 1.24 is less than the t-crit of 1.96. Therefore, the calculated t-ratio is not statistically significant at the 0.05 level of significance, since it is less than the given critical value of t-ratio. Therefore, the hypothesis 2 is thus accepted, and the conclusion is that

there is no significant difference in the mean ratings of male and female biology teachers on extent to which dependence on technology influence teachers' professional development in public senior secondary schools in Rivers State.

Hypothesis 3: There is no significant difference in the mean ratings of male and female biology teachers on extent to which lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State

Table 4.7: t-test Analysis of significant difference in the mean ratings of male and female biology teachers on extent to which lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State

Status	N	Mean $\bar{X}$	SD	df	z-cal	z-crit	L/sig	Decision
Male Teachers	41	2.84	0.84					
				71	1.29	1.96	0.05	Accepted
Female Teachers	32	2.88	0.85					

The analysis in Table 4.7 revealed that the t-cal of 1.29 is less than the t-crit of 1.96. Therefore, the calculated t-ratio is not statistically significant at a 0.05 level of significance since it is smaller than the given critical value of t-ratio. So, the hypothesis 3 is thus accepted and the conclusion is that there is no significant difference in the mean ratings of male and female biology teachers on extent to which lack of human touch influence teachers' professional development in public senior secondary schools in Rivers State.

Hypothesis 4: There is no significant difference in the mean ratings of male and female biology teachers on extent to which teacher job displacement influence their professional development in public senior secondary schools in Rivers State.

Table 4.8: t-test Analysis of significant difference in the mean ratings of male and female biology teachers on extent to which teacher job displacement influence their professional development in public senior secondary schools in Rivers State.

Status	N	Mean $\bar{X}$	SD	Df	z-cal	z-crit	L/sig	Decision
Male Teachers	41	2.90	0.85					
				71	1.29	1.96	0.05	Accepted
Female Teachers	32	2.97	0.86					

The analysis on Table 4.8 indicated that the t-cal of 1.29 is less than the t-crit of 1.96. Therefore, the calculated t-ratio is not statistically significant at the 0.05 level of significance, since it is less than the given critical value of t-ratio. Therefore, the hypothesis 4 is thus accepted, and the conclusion is that there is no significant difference in the mean ratings of male and female biology teachers on extent to which teacher job displacement influence their professional development in public senior secondary schools in Rivers State.

Discussion of Findings

The finding of the study in research question one revealed that over-reliance on AI tools has negative influence on teachers' professional development in public senior secondary schools in Rivers

State. This finding is in collaboration with Ghasa (2024) who admitted that excessive use of AI tools may lead to students becoming overly reliant on them, potentially hindering the development of critical thinking and problem-solving skills. In science experiments, for example, a teacher's presence is essential to ensure student safety, answer questions, and guide them towards deeper understanding through discussions.

The study in Research Questions two indicated that dependence on technology has negative influence on teachers' professional development in public senior secondary schools in Rivers State. This study is in the same view with Kelp (2023) who asserts that Another major concern is the growing dependence on technology that AI in education fosters. As educational institutions increasingly rely on AI-driven tools for teaching, assessment and administrative tasks, there is a risk of becoming overly dependent on these technologies. This dependence can lead to significant disruptions in the event of technical failures or cyber-attacks. Furthermore, it may also diminish the development of critical thinking and problem-solving skills among students, as they may become accustomed to AI systems providing answers and solutions.

The finding of the study in research question three revealed that lack of human touch has negative influence on teachers' professional development in public senior secondary schools in Rivers State. This finding is in collaboration with Kitsios (2021) who admitted that The human touch is an exceptionally important aspect of learning, and ensuring that students aren't relegated to cold, isolated learning environments is an important balance and consideration for educations the world over. AI is a powerful tool, overreliance on technology can have adverse effects as students may miss out on crucial aspects of holistic learning such as social interaction, creativity and emotional intelligence.

The study in Research Questions four indicated that teacher job displacement has negative influence their professional development in public senior secondary schools in Rivers State. This study is in the same view with Mallillin (2024) who asserts that the rise of AI in education brings the concern of teacher job displacement. As AI systems take on more roles traditionally filled by educators, there is a fear that teachers may become obsolete. Automated grading, AI-driven tutoring, and administrative tasks handled by AI could reduce the need for human teachers, leading to job losses and a devaluation of the teaching profession. While AI can certainly support and enhance educational practices, it is essential to balance its implementation to ensure that teachers remain integral to the educational process, providing the human touch that technology cannot replace.

CONCLUSION

Influence of artificial intelligence on teachers' professional development in public senior secondary schools in Rivers State cannot be over emphasized. Based on the findings of the study, the researcher concludes that over-reliance on AI tools, dependence on technology, lack of human touch and teacher job displacement have negative influence on teachers' professional development in public senior secondary schools in Rivers State. The study also deduced that the advancement of Artificial Intelligence (AI) in education seems to have sparked a global transformation in teaching methodologies and administrative processes. Artificial intelligence presents both positive and negative influence on students. On the positive side, AI offers personalized learning experiences, 24/7 support, and automated grading, freeing up teachers for more focused interaction. However, negative influence includes potential over-reliance on technology, diminished critical thinking, privacy concerns, and the risk of academic dishonesty.

RECOMMENDATIONS

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

1. Government, through the school management should organize workshop programme for teachers on the over-reliance on AI tools hence it has negative influence on teachers' professional development.
2. Government and non-governmental organization should organize seminar programmes for the teachers on the over dependence on technology because of its negative influence on teachers' professional development.

3. Government, through the school management should not depends only on artificial intelligence hence it will lead to lack of human touch.
4. Government should not only rely only artificial intelligence because it leads to teacher job displacement.

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