

TEACHERS' PERCEPTION ON APPLICATION OF ARTIFICIAL INTELLIGENCE IN TEACHING AND LEARNING OF MATHEMATICS

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Abstract

The study investigated Teachers' Perception on Application of Artificial Intelligence (AI) in Teaching and Learning of Mathematics. The study was guided by two research questions, one null hypothesis. The study adopted a descriptive survey design. The population of this study comprised of 145 Secondary School Mathematics Teacher in Nsukka Education Zone of Enugu State. The total number of 145 Mathematics Teachers participated in the study. One instrument was used for data collection: Teachers' Perception on Application of Artificial Intelligence Questionnaire (TPAAIQ). The instrument was face validated by three experts. The Reliability of TPAAIQ was determined using Cronbach's alpha method with an index value of 0.93. The method of data collection was direct administration of instruments. Mean and standard deviation were used to answer the research questions while Analysis of Variance (ANOVA) was used to test the hypothesis at 0.05 level of significance. The findings of the study revealed that Mathematics Teachers have positive perception on the applications of Artificial Intelligence. Also, this study found that Age does not significantly influence Mathematics Teachers' Perception on the Applications of Artificial Intelligence. From the findings, it was recommended that, School administrator should ensure adequate provision of facilities and the enabling environment required for the application of AI in teaching and learning of Mathematics.

Keywords: Artificial intelligence, teachers' perception, teaching and learning, mathematics

Introduction

In recent years, due to the rapid advancement of digital technology in the teaching and learning process, there is a need to adapt to the changing demands of the 21st century where problem solving, critical thinking, logical and analytical reasoning are very essential skills in Mathematics Education. These technological advancements which may include the use of digital teaching tools and innovative technologies particularly the use of Artificial intelligence (AI) is inevitable in the teaching and learning process (Simhadri & Swamy, 2023). However, from empirical evidence, many Mathematics teachers may be unaware or may not be adequately prepared in the use of these AI technologies while some teachers may be aware of the AI technology but may have negative or positive attitudes towards the use of these innovative technologies in teaching and learning of Mathematics (Ogbu, 2025a; Eze & Onah, 2022). Some researchers also opined that the persistent use of outdated teaching methods and the limited awareness of digital teaching tools or technologies in secondary school classrooms may result to low students' learning outcomes, understanding and performance especially in the teaching and learning of Mathematics (Ogbu & Ugwu 2023, Ezeugwu & Nwankwo, 2020).

The teaching and learning of mathematics is aimed at developing students' ability to reason mathematically and empower students with mathematical literacy and competence. The main objectives and goals of introducing mathematics in the Secondary School Curriculum in Nigeria as asserted by the Nigerian Educational Research and

Development Council (NERDC, 2018), include; Cultivate the understanding and application of mathematics skills and concepts necessary to thrive in the ever changing technological world, to acquire mathematics literacy necessary to function in an information age, develop the essential element of problem solving, and connection within the study of mathematics, take advantage of the numerous career opportunities provided by mathematics, and become prepared for further studies in mathematics and other related fields.

Difficulty in problem-solving could result from students' poor mathematics knowledge: Mathematics is not just about numbers and equations, it teaches critical thinking and problem-solving skills. Poor academic achievement in mathematics can hinder students' ability to think critically and limiting their overall problem-solving skills. Also limited financial literacy could also be a contributing factor to the poor knowledge of students in mathematics. Mathematics is essential in understanding personal finance, budgeting, and managing money. Students who struggle with mathematics may lack the necessary skills to make informed financial decisions, which can impact their financial well-being later in life (Ogbu et al., 2023; Sa'ad et al., 2018). Students who struggle with mathematics may be limited in their career options, leading to lower earning potential in the future. Disengagement from school: continuous poor academic achievement in mathematics can lead to disengagement from learning in general. Students may become frustrated, lose interest in school, and develop a negative attitude towards education. Okoro et al., (2023) and Ogbu (2025c) opined that poor academic achievement in mathematics can perpetuate educational inequalities, as access to certain fields and opportunities often require a strong mathematical background. This can further contribute to social and economic disparities.

To ameliorate the issue of poor achievement in mathematics in Nsukka Education Zone, it is important to invest in improving educational amenities, such as classrooms and teaching materials. Aduloju and Adedotun (2025) added that, recruiting and training qualified mathematics teachers can help to enhance instructional quality. This is agreement with Ogbu and Anyaegbu (2021) noted that the quality of instruction is a function of teacher' qualification. An updated curriculum that emphasizes conceptual understanding and problem-solving skills, along with innovative teaching methods, can also help promote better achievement in mathematics. Efforts should be made to address socioeconomic inequalities and provide equal access to educational resources for all students. Public awareness campaigns that promote the importance and relevance of mathematics can also help change negative attitudes and perceptions towards the subject (Ogbu, 2025b; Okoro et al., 2023,). However, there is a growing demand that artificial intelligence should be deployed in teaching and learning of Mathematics as it can help to enhance student's mathematical knowledge (Ajinuhi & Honmane, 2024, Ogbu & Emeji, 2023).

Artificial intelligence is the development of computer systems that is capable of performing tasks that actually require human intelligence. These tasks may include problem-solving, speech recognition, pattern recognition, decision-making and learning. Artificial intelligence is also applied to any machine that exhibits traits associated with a human mind such as learning and problem solving. According to Offor et al., (2024), artificial intelligence is a learning machine that focuses on enabling computer systems to learn and make decisions or predictions based on data, without being explicitly programmed. Artificial intelligence allows systems to improve performance over time through experience. Ekwu et al., (2025) define artificial intelligence as the ability of computers to understand, interpret, and create human language as well as enabling tasks

like machine translation, speech recognition and sentiment analysis. Artificial intelligence is the development of systems which are capable of understanding as well as interpreting visual information from digital image or video. Artificial intelligence is a machine that can solve problems, think, make decisions and learn from experience just like human beings.

The benefits of artificial intelligence cannot be overstated; integrating Artificial intelligence into mathematics classrooms could improve students' understanding of mathematics concepts but some authors opined that the teachers must have a positive attitude towards the use of the technology so as to bring about application of AI in the mathematics classroom (Okoro et al., 2023). Artificial intelligence in this study refers to the ability of systems to possess the capacity to learn, understand, and apply knowledge across diverse domains even in mathematics similar to human intelligence. Artificial intelligence would be capable of reasoning, adapting to new situations, problem-solving, and potentially surpassing human intelligence in mathematics and other areas (Ekwu et al., 2025). Teachers must properly perceive the usage of Artificial intelligence in teaching mathematics for easy utilization in the classroom.

However, Artificial intelligence if not used appropriately may affect the students' academic achievement in mathematics. Artificial intelligence plays a vital role in teaching and learning of mathematics and teachers should have a positive attitude towards the applications of artificial intelligence in mathematics Education. Eke., (2024) addressed that one of the ways to make teachers integrate artificial intelligence efficiently in the mathematics classroom is by having positive attitudes or perception towards the use of this tool known as artificial intelligence in teaching and learning of mathematics.

Teachers' perception refers to how teachers see their own role, responsibilities, and expertise as educators. Aduloju and Adedotun (2025) were of the view that teachers' perception encompasses their understanding of pedagogical practices, subject knowledge, and their ability to effectively facilitate student learning. Teacher's perception also includes how teachers perceive their own strengths and weaknesses, their level of confidence in their teaching abilities, and their willingness to engage in continuous professional development. According to Onuh and Onoge (2025), teachers' perception is also defined as how teachers perceive their students, including their abilities, backgrounds, interests, and motivations. Teachers' perceptions of students can influence their instructional practices, as they tailor their teaching methods and strategies to meet the diverse needs of their students. It also encompasses how teachers interpret and understand their students' learning difficulties, strengths, and preferences, allowing them to adjust their instruction accordingly. It is expected however, that mathematics teachers integrate artificial intelligence in teaching and learning of Mathematics and this can only be achieved if they have the right perception of Artificial intelligence (Egara & Mosimege, 2024).

However, teachers could have positive or negative perception in the applications of artificial intelligence in teaching and learning mathematics. Considering the fact that there is poor achievement of students in mathematics in Nsukka education zone, one could say that there may be presence of teachers' low perception in the use of artificial intelligence which could result to the poor achievement in mathematics (Egara & Mosimege, 2024). Some reasons for negative or positive perception, low or high perception may be due to the reasons below. Firstly, there might be lack of understanding of the benefits and potential use of Artificial intelligence. Secondly, Teachers may be sceptical or resistant to incorporating technology into their teaching methods, viewing it as a threat to their traditional role and expertise. Thirdly, the teachers may also have concerns about their ability to adapt and effectively use these tools in the classroom, especially if they have

limited training or exposure to technology. The lack of infrastructure and Teaching resources in schools could contribute to teachers' negative perception. Okoro et al., (2023) were of the view that inadequate access to computers, internet connectivity, and necessary software may hinder the application of artificial intelligence in teaching and learning of mathematics in secondary schools. The limited availability of technical support and training to effectively integrate artificial intelligence into the curriculum can also deter teachers from embracing them.

Furthermore, the fear of the technology replacing the teacher in the classroom may hinder teachers from adopting artificial intelligent tools, as they may worry that technology will replace the need for human instruction in mathematics education (Okoro et al., 2023). Zulkarnain and Yunus (2023) reported that teachers have a very good and positive perception of the use of artificial intelligence in teaching and learning. Also, Aduloju and Adedotun (2025) reported in their study that primary school teachers were found to have a good and positive perception of the use of AI in the classroom and strongly agreed that AI can improve teacher productivity in the classroom whereas In another view, a study was carried out by Lai et al., (2020) on perceptions of Artificial intelligence and came up with the findings that various respondents saw Artificial intelligence as a falsehood to be exposed and opined that there was low and negative perception among the respondents. One of the factors that could be responsible for the application of artificial intelligence among mathematics teachers in Nsukka Education Zone may be teachers' age.

Age is simply the number of years a person has lived since birth. Ugwu et al., (2023) pointed out that age is commonly determined by counting the number of years, months, and days starting from a person's date of birth. Ugwu et al., (2023) addressed that in certain cases, especially for infants and toddlers, age may be defined in terms of months rather than years. This allows for a more precise understanding of a person's developmental progress and milestones. In some situations, such as in medical or scientific research, age may be defined in terms of the exact number of days since a person's birth. This level of granularity can be particularly relevant for studying early developmental stages or measuring specific periods of time (Ugwu et al., 2023).

In this study, age is the number of years that mathematics teachers have stayed from their birth. Age of the teachers may be one of the factors affecting the teachers' applications of artificial intelligence in teaching and learning Mathematics in Nsukka Education zone. The age of teachers may or may not significantly impact the application of artificial intelligence (AI) in teaching and learning of Mathematics in Nsukka Education Zone. Bridging the digital divide among teachers of different teacher age groups could be divided into digital native (below 35 years) and digital immigrant teachers (35 years and above) (Ugwu et al., 2023). Digital native and digital immigrants are different age groups that makes up teachers of different age range in mathematics classroom who are either below the age of 35 years or above 35 years possessing digital literacy skills and use of innovative technologies in the teaching and learning process and may be capable of affecting teachers' awareness and perception on the application of artificial intelligence in teaching and learning of mathematics (Ugwu, Ogbu & Nwankwo, et al., 2023).

The Older teachers may face challenges in adopting AI in their Mathematics teaching practices due to a lack of familiarity with technology or apprehension towards learning new tools and platforms. Eke, (2024), stated that teachers might require more training and support to develop the necessary skills and confidence in using AI in the classroom. Overcoming resistance to change and addressing any concerns about job security or displacement by technology are also important factors to consider for older

teachers. The introduction of artificial intelligence will provide old teachers with appropriate training and support, and fostering a positive attitude towards AI integration in mathematics instruction which could help ensure successful application of AI techniques in teaching and learning in Nsukka Education Zone (Okoro et al., 2023). Ayanwale et al., (2022) reported in their study that age significantly influence teachers use of Artificial intelligence in favour of teachers below 30 years. However, Khanal et al., (2020) were of the view that age does not significantly influence the use of digital technology especially the use of Artificial intelligence in teaching and learning. Since age of the teachers may have the capacity to affect the application of artificial intelligence in teaching and learning, gender may equally be a factor which affects the teachers' applications of artificial intelligence in teaching.

Considering the situation of poor achievement in Mathematics, so many efforts have been made by the government to ameliorate this issue by providing social amenities to the schools and employing qualified mathematics teachers but yet the poor academic achievement of Mathematics in secondary school persists (Jameel & Hadayat, 2020). Researchers also have tried to seek solutions to the poor academic achievement in mathematics by reviewing some variables yet the poor academic achievement continued. Several studies have been conducted by researchers on Artificial intelligence. Therefore, teachers' perception on the application of artificial intelligence in teaching and learning of mathematics and the influence of the moderator variables age, especially in Nsukka Education Zone of Enugu State is one great concern of the researcher because from the researcher's search of Empirical literature, none exists. Hence, the researcher seeks to investigate on teachers' perception on the application of artificial intelligence in teaching and learning of Mathematics in Secondary schools.

Statement of the Problem

The rapid advancement of digital technology has brought a need to adapt to the changing demands of the 21st century where problem solving, critical thinking, logical and analytical reasoning are very essential skills in Mathematics Education. These technological advancements which may include the use of digital teaching tools and innovative technologies is inevitable in the teaching and learning process. One of the digital technological teaching tools used in the teaching and learning process is artificial intelligence. Artificial intelligence (AI) is the use of computer to perform specific tasks such as problem solving and logical reasoning which may enhance teaching and learning and may provide opportunities for student engagement and teacher effectiveness. Despite all the importance attached to Artificial intelligence, from empirical evidence, some researchers pointed out some problems which could affect the application of artificial intelligence in teaching and learning process which includes; teacher negative attitudes, limited teacher training on the use of technology, inadequate professional development of the mathematics teacher and inability of the teachers to use digital tools such as AI in teaching. These educational problems still persists despite the effort made by the government, educators, teachers, stakeholders, researchers to remedy the ugly situation.

Several studies from researchers have shown that many mathematics teachers may not be adequately prepared for the use of Artificial intelligence in teaching and learning process which may improve mathematics instructions which may in turn bring about an improvement in students' achievement in mathematics. However, some researchers also pointed out that some teachers have a positive attitude towards the perception of AI in teaching and learning process. Due to the inconsistencies by the researchers and scholars, the researcher deemed it necessary to investigate if teachers in Nsukka education zone are aware and how they perceive the use of Artificial intelligence in their Mathematics

instruction considering teachers' age groups and gender as influential factors. Therefore, the purpose of this study is to investigate teachers' perception on application of artificial intelligence in teaching and learning of mathematics in secondary schools in Nsukka Education zone

Research Questions

The following research questions guided the study.

1. What is the perception of teachers on application of artificial intelligence in teaching and learning of Mathematics in secondary schools?
2. What is the influence of age on teachers' perception on application of artificial intelligence in teaching and learning of Mathematics in secondary schools?

Hypotheses

The null hypothesis guided the study and was tested at 0.05 level of significance.

H0₁: There is no significant influence of age on teachers' perception on application of artificial intelligence in teaching and learning of Mathematics in secondary schools.

Methods

The study adopted a descriptive survey research design. According to Nworgu (2015), descriptive survey research design is a purpose-based category of survey research that aims at collecting data and describing, in a sequential and systematic manner, the attributes of a specific population. This design was considered appropriate for the present study because the researcher was not interested in manipulating any variable but rather in eliciting, describing, and comparing the awareness and perception of Mathematics teachers regarding the application of artificial intelligence, as these variables naturally exist among the population, without any form of experimental manipulation. The study was carried out in all the public secondary schools in Nsukka Education Zone of Enugu State. Nsukka Education Zone was chosen because it comprises a fair mix of urban and rural public secondary schools, making it a representative setting for examining Mathematics teachers' awareness and perception of artificial intelligence application. The population of the study comprised all 145 Mathematics teachers (50 male and 95 female) in the 60 public secondary schools in Nsukka Education Zone. The mathematics teachers include those teaching at both junior and senior secondary schools. The qualification of the teachers ranged from NCE to Ph.D.

No sampling technique was employed in this study, as the entire population of 145 Mathematics teachers (50 male and 95 female) from the 60 public secondary schools in Nsukka Education Zone was used for the study. This is in line with the recommendation that for a survey-based study, the entire population should be used when the population is not too large (Nworgu, 2015). Two instruments were used for data collection in this study, both developed by the researcher based on the research questions and hypotheses that guided the study. The instruments were titled: Teachers' Awareness on Application of Artificial Intelligence Questionnaire (TAAAIQ) designed to elicit data on the extent to which Mathematics teachers are aware of the application of artificial intelligence in the teaching and learning of Mathematics. Teachers' Perception on Application of Artificial Intelligence Questionnaire (TPAAIQ) designed to elicit data on Mathematics teachers' perception of the application of artificial intelligence in the teaching and learning of Mathematics. Each instrument was structured on a four-point rating scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD), weighted 4, 3, 2, and 1 respectively, in line with common practice for this type of questionnaire in educational research.

The TAAAIQ and TPAAIQ were subjected to face validation by three (3) experts from the University of Nigeria, Nsukka. The experts scrutinized the instruments for clarity of language, appropriateness of items to the research questions and hypotheses, and adequacy of content coverage. Their observations and corrections were used to produce the final version of the instruments used for data collection. To establish the internal consistency of the instruments, a trial testing was carried out, using mathematics teachers in private schools in the study areas and the data generated were analyzed using an appropriate reliability statistic. Using Cronbach's alpha procedure, the reliability coefficient values of 0.88 and 0.93 were obtained for TAAAIQ and TPAAIQ respectively, indicating that both instruments were highly reliable and suitable for the study. The method of data collection was direct administration. The researcher, with the help of trained research assistants, personally administered the copies of the questionnaire to the mathematics teachers in their various schools and retrieved them on the spot or within an agreed short period, to ensure a high return rate and minimize the loss of instruments.

The collected data were first screened for missing values and there was no issue of missing values. The analysis was conducted using the Statistical Package for the Social Sciences (SPSS, version 27). Mean and standard deviation were used to answer all the research questions, while independent samples t-test was used to test all the null hypotheses at the 0.05 level of significance. The interpretation of the mean values for answering the research question was thus: 0.00-2.49, and 0.25-4.00 disagree and agree respectively. For the hypotheses, a null hypothesis was rejected where the calculated t-value was less than the critical/table value at the specified significance level and degrees of freedom, and retained otherwise.

Results

Table 1: Mean and Standard Deviation of Teachers' Perceptions on the Application of Artificial Intelligence in Teaching and Learning of Mathematics in Secondary Schools

S/N	Item statement	Mean	SD	Decision
1.	I am interested in using artificially intelligent systems in teaching Mathematics	3.13	0.79	Agree
2.	There are many beneficial applications of Artificial Intelligence in teaching Mathematics	3.26	0.72	Agree
3.	Artificial Intelligence is exciting when applied in teaching Mathematics.	3.14	0.94	Agree
4.	Artificial Intelligence can provide new opportunities for teaching Mathematics	3.29	0.74	Agree
5.	I prefer like to use Artificial Intelligence in teaching Mathematics	2.96	0.92	Agree
6.	I will be better than other Mathematics teachers if I apply artificial intelligence in teaching	3.08	0.94	Agree
7.	I am impressed by what Artificial Intelligence can do in teaching Mathematics	3.21	0.85	Agree
8.	Artificial Intelligence can have positive impacts on students if I teach them Mathematics using AI	3.12	0.82	Agree
9.	Artificial intelligence makes me feel happier when teaching mathematics	2.92	0.84	Agree
10.	Artificial intelligence can perform better than me if allowed to teach mathematics	2.75	1.02	Agree
11.	Much of society will benefit from a future full of Artificial Intelligence when applied in teaching mathematics	2.93	0.96	Agree
12.	For topics in mathematics I found difficult, I would rather	2.80	0.98	Agree

	interact with artificial intelligence than with a fellow teacher			
13.	I often think that Artificial Intelligence is Dangerous when applied in teaching mathematics	2.32	0.97	Disagree
14.	My school use Artificial intelligence unethically	2.06	0.87	Disagree
15.	I find that Artificial Intelligence is not favourable to me when applied in teaching mathematics	2.37	0.10	Disagree
16.	Artificial Intelligence is used to monitor the activities on my fellow teachers	2.24	0.95	Disagree
17.	I shiver with discomfort when I think about future uses of Artificial Intelligence in teaching mathematics	2.41	1.08	Disagree
18.	Artificial Intelligence might take control of teaching and learning mathematics.	2.15	0.77	Disagree
19.	Artificial intelligence makes many errors when teaching mathematics	2.37	0.92	Disagree
20.	People like me will suffer if Artificial Intelligence is used more and more in teaching mathematics	2.54	1.05	Agree
Cluster Mean		2.75	0.37	Agree

The table 1 showed the Mean and Standard deviation of teachers' perceptions on the application of artificial intelligence in teaching and learning of Mathematics in secondary schools. From the table above, the results in Items 1 to item 12 and item 20 showed high mean scores ranging from 2.75 to 3.29 with their corresponding standard deviation ranging from 0.72 to 1.05, indicating agreement on the items which implies that Mathematics teachers have a positive perception on application of AI in teaching and learning of Mathematics based on the decision rule. However, the results in Items 13 to item 19 showed low mean scores ranging from 2.06 to 2.41 with their corresponding standard deviation ranging from 0.77 to 1.08. The range of the standard deviation was (0.72 to 1.08) with an overall or cluster mean scores of 2.75 and a standard deviation of 0.37. Therefore, the results from the above table showed that mathematics teachers have a positive perception on the application of artificial intelligence in teaching and learning of Mathematics in secondary schools.

Table 2: Mean and Standard Deviation of the Influence Age on Teachers' Perception on Application of Artificial Intelligence in Teaching and Learning of Mathematics in Secondary Schools

S/N	Item statement	below 35 years (N=68)		35 years and above (N=77)		Decision
		$\bar{x}_1$	Std.D	$\bar{x}_2$	Std.D	
1.	I am interested in using artificially intelligent systems in teaching Mathematics	3.16	0.82	3.10	0.77	Agreed
2.	There are many beneficial applications of Artificial Intelligence in teaching Mathematics	3.38	0.62	3.16	0.78	Agreed
3.	Artificial Intelligence is exciting when applied in teaching Mathematics.	3.16	0.92	3.13	0.95	Agreed
4.	Artificial Intelligence can provide new opportunities for teaching Mathematics	3.44	0.63	3.16	0.80	Agreed
5.	I prefer like to use Artificial Intelligence in teaching Mathematics	3.13	0.88	2.81	0.93	Agreed

6.	I will be better than other Mathematics teachers if I apply artificial intelligence in teaching	3.25	0.89	2.92	0.97	Agreed
7.	I am impressed by what Artificial Intelligence can do in teaching Mathematics	3.25	0.76	3.17	0.92	Agreed
8.	Artificial Intelligence can have positive impacts on students if I teach them Mathematics using AI	3.15	0.76	3.10	0.88	Agreed
9.	Artificial intelligence makes me feel happier when teaching mathematics	2.96	0.85	2.90	0.84	Agreed
10	Artificial intelligence can perform better than me if allowed to teach mathematics	2.84	1.05	2.68	1.01	Agreed
11	Much of society will benefit from a future full of Artificial Intelligence when applied in teaching mathematics	2.97	0.99	2.90	0.93	Agreed
12	For topics in mathematics I found difficult, I would rather interact with artificial intelligence than with a fellow teacher	2.82	0.95	2.78	1.01	Agreed
13	I often think that Artificial Intelligence is Dangerous when applied in teaching mathematics	2.49	0.99	2.17	0.94	Disagreed
14	My school use Artificial Intelligence unethically	2.21	0.89	1.92	.839	Disagreed
15	I find that Artificial Intelligence is not favourable to me when applied in teaching mathematics	2.19	1.04	2.17	0.92	Disagreed
16	Artificial Intelligence is used to monitor the activities on my fellow teachers	2.28	0.98	2.21	0.92	Disagreed
17	I shiver with discomfort when I think about future uses of Artificial Intelligence in teaching mathematics	2.32	1.07	2.22	1.06	Disagreed
18	Artificial Intelligence might take control of teaching and learning mathematics.	2.21	0.82	2.10	0.72	Disagreed
19	Artificial intelligence makes many errors when teaching mathematics	2.37	0.93	2.36	0.92	Disagreed
20	People like me will suffer if Artificial Intelligence is used more and more in teaching mathematics	2.26	1.05	2.43	1.04	Disagreed
Cluster mean		2.85	0.32	2.67	0.38	Agreed

Table 2 showed mean and standard deviation of the influence of age (below 35 years and 35 years and above) on teachers' perception on the application of Artificial Intelligence (AI) in teaching and learning of Mathematics in secondary schools. From the above table, the results in Items 1 to item 12 had high mean scores ranging from 2.82 to 3.44 with their corresponding standard deviation ranging from 0.76 to 1.05 for Mathematics teachers (below 35 years) and high mean scores ranging from 2.68 to 3.17 with their corresponding standard deviation ranging from 0.77 to 1.01 for Mathematics teachers (35 years and above). However, the results in Items 13 to item 20 had low mean scores ranging from 2.19 to 2.49 with their corresponding standard deviation ranging from 0.82 to 1.07 for Mathematics teachers (below 35 years) and low mean scores ranging from 1.92 to 2.43 with their corresponding standard deviation ranging from 0.72 to 1.06 for

Mathematics teachers (35 years and above). Additionally, from the results, the cluster or total mean scores for Mathematics teachers (below 35 years) is 2.85 while the cluster mean score for Mathematics (35 years and above) is 2.67. Also, the standard deviation for mathematics teachers (below 35 years) is 0.32 and the standard deviation for mathematics teachers (35 years and above) is 0.38 respectively. The standard deviation for mathematics teachers (below 35 years) is slightly lower than that of the mathematics teachers (35 years and above) indicating more consistency in responses among younger mathematics teachers (below 35 years) than their older mathematics teachers (35 years and above) regarding their positive perception on the application of AI in teaching and learning of Mathematics.

Table 3: t-test of the Significant Influence of Age on Teachers' Perception on Application of Artificial Intelligence in Teaching and Learning of Mathematics in Secondary Schools

Age	N	Mean	SD	df	t-value	P-value	Decision
Below 35 years	68	73.45	6.19	143	1.91	0.06	Not Sig.
35 years and above	77	71.08	8.41				

Table 3 showed the independent t- test statistics analysis conducted to test the null hypothesis two. The result indicates that teachers below 35 years had a mean perception on application of AI in teaching and learning mathematics score ($M=73.45$, $SD=6.19$) above mathematics teachers who are 35 years and above who obtained a mean perception on application of AI in teaching and learning mathematics score ($M=71.08$, $SD=8.41$). The standard deviation values of 6.19 and 8.41 for teacher below 35 years and those who are 35 years. Further analysis revealed that that the mean perceptions on AI application for teaching and learning of mathematics by teachers below 35 years ($M=73.45$, $SD=6.19$) was not statistically significantly higher ($t = 1.91$, $df = 143$, $p = 0.06$) than those who are 35 years and above ($M=71.08$, $SD=8.41$). Hence, the null hypothesis is therefore not rejected.

Discussion

The results of this research showed that mathematics teachers have a positive perception on the application of artificial intelligence in teaching and learning of mathematics. The teachers are ready to apply AI in teaching and learning of Mathematics. The reasons for this finding could be as a result of teachers' participation of workshops on AI training programs which must have introduced them to the exploring AI to their teaching and learning of mathematics. The results from this study are in line with the findings of Zulkarnain and Yunus (2023) who found that teachers have a positive perception of the use of AI in teaching and learning. The findings of the study are also in agreement with the results of Wardat et al., (2023) that teachers have a strong and positive perception regarding the use of AI. However, the results of the study are not in agreement with the findings reported by Lai et al., (2020) that teachers had a negative perception towards AI.

Also, the results of this study showed that age does not have any significant influence on teachers' perception on application of artificial intelligence in teaching and learning of Mathematics in secondary schools. The results revealed that both age groups (below 35 years and above 35 years) of mathematics teachers have positive perception on the application of Artificial intelligence in teaching and learning of mathematics. The results of this study are in agreement with the findings of Ampong (2023) who found that age does not have any a significant influence or effect on the perceptions of AI. However, the findings of this study are not in agreement with the results of Kim and Kim, (2022)

who found that age influences teachers' perception of using AI based education tools in favour of the younger science and English teachers.

Conclusion

The findings of the study also showed that mathematics teachers have positive perception on the applications of artificial intelligence in teaching and learning of mathematics. The findings of the study also revealed that that age and gender do not have any significant influence on teachers' perception on the application of artificial intelligence in teaching and learning of mathematics in secondary schools. Also, one can also infer that if teachers have very strong and positive perception on the application of artificial intelligence in teaching and learning mathematics, teachers' teaching methods and instructional methods, integration and application of the use of AI will improve which may in turn enhance or increase students' academic achievement in mathematics.

Recommendations

From the findings of this study, it is recommended that teachers (both male and female, old and young) should be provided with opportunities by the government and educational stakeholders to further explore AI potential, ideas, insights on the application of artificial intelligence in teaching so as to increase teachers' awareness and positive perception and avoid on the application of artificial intelligence in teaching and learning of mathematics.

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