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Secondary School Teachers' Intentions on Integrating Artificial Intelligence in Mathematics Classrooms: A Case of Three Selected Schools in Mufulira District, Zambia

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Abstract
Artificial Intelligence (AI) is changing the traditional way of how people perform their duties in their respective fields. Nearly every profession must be interested in knowing how best they can make use of this anticipated huge turn of things. This means that education system is also rapidly changing and it is a call to educators to upskill their careers for them to remain relevant in classrooms. With the record of underperformance of secondary school learners in mathematics, as revealed by the Examination Council of Zambia (ECZ), performance reports over the years, it was necessary to investigate whether AI integration in mathematics classrooms would be a solution to underperformance in mathematics. This was in light of the evidence presented by researchers who have revealed that integrating AI in mathematics education improves learners' understanding of mathematical concepts, thus the outcomes. This study investigated secondary school mathematics teachers' intentions on integrating artificial intelligence in mathematics classrooms. Three secondary schools of Mufulira district in Zambia were purposively selected to participate in the study. The study adopted a sequential embedded design on 127 mathematics teachers of Mufulira district who responded to an online questionnaire and 10 were interviewed from the three secondary schools. The findings showed that teachers are ready to adopt the technology despite limited knowledge of proper implementation in classroom setups. Results also revealed a need to strike a balance between the use of AI tools and also the need to promote critical thinking skills in mathematics among the learners. Thus there is need for policy makers to support the teachers, through training, in implementing ethical use of AI in mathematics classrooms.
Keywords: Secondary School Teachers, Intentions, Integrate, mathematics classrooms
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INTRODUCTION

Overview

The world is witnessing the most advanced technologies in this century compared to the past. Artificial Intelligence has become the talk of the day around the world today. It is for this reason that the Independent Broadcasting Authority (IBA) of Zambia on 2nd May issued a statement informing media stations to develop clear guidelines on the responsible use of AI (Phiri, 2025). This was broadcasted on news by Zambia National Broadcasting Cooperation (ZNBC), in readiness for World Press Freedom Day which is commemorated on 3rd May and the theme for the year 2025 was "Reporting in the Brave New World: The Impact of Artificial Intelligence on Press Freedom and the Media."

It is not the Brave New World in Media industry only but also in Education. To this regard, Zambia's Education Permanent Secretary, urged universities to put in place systems that guard against AI-aided degrees (Chisalu, 2025). Besides, some researchers in other parts of the world have discovered that AI improves mathematical understanding of learners through heightened engagement (Egara & Mosimege, 2024), increased comprehension of complex concepts (Borah, 2024; Egara & Mosimege, 2024) and problem-solving abilities (Elifas & Simuja, 2024). And It is not a secret that Zambian secondary school mathematics education needs some kind of

intervention in arresting the perpetual record of secondary school learners failing mathematics. It was therefore necessary to carry out a study to determine whether AI could be one of those interventions from the teachers' perspective. Thus, this study was designed to find out secondary school mathematics teachers' intention concerning the use of AI in mathematics teaching.

Background to the study

As already indicated, the world is changing at a faster rate as frequently new technologies are coming everywhere in all spheres of life and education has not been left out (Cooper, 2025). The classroom of yesterday is different from the classroom of today. The way people are getting information today is different from the way they were getting it some years back. Technologies have made learning easy in that information on any mathematics topic can be easily be obtained. This situation has brought apprehension in some teachers who fear that they may be replaced by these technologies (Holmes et al., 2019).

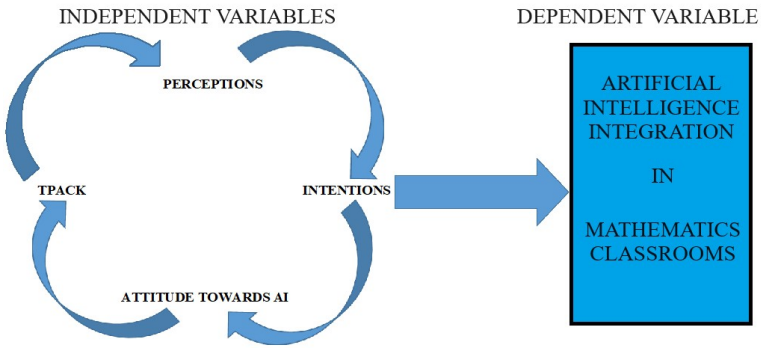
On a brighter note, Jack Ma, a Chinese businessman and philanthropist once said, "do not believe that technology is going to take away human beings' jobs. This was the case when electricity first came into existence. A number of companies worried about losing jobs but it created so many jobs. Artificial intelligence will also create more jobs (Ruijie, 2017)." On the flip side, a CNN article argued that there would be fewer and fewer jobs that a robot could not do better and a lot of people would lose their employment (Brown, 2024). No matter the case, there is every need for people to upskill their careers and learn how to incorporate these technologies in their work in order to move with the changing world.

Inasmuch as educators may be scared of being rendered irrelevant in classrooms by AI, they must also look at it in a positive perspective. As discussed earlier, studies done by Borah (2024) and others have found that AI enhances learners' mathematical problem-solving skills. As a result, by integrating it into mathematics classrooms, it may probably help in changing the global narrative that mathematics is difficult. In some way, reducing teachers' stress of helping their learners pass the subject as expected.

However, teachers' attitudes and beliefs about the adoption of AI in mathematics education dictates their actions about it (Mao Li, 2024). Moreover, the fact that the world is changing and people have to change with it cannot be over emphasized. This is because AI will take up some of the tasks humans do, so this calls for upskill and preparation amongst teachers to do tasks that do not exist at the moment (Hlongwane et al., 2024).

Therefore, these new tasks coming due to Artificial Intelligence are capable of giving rise to new opportunities in terms of skill attainment. The technology has impact nearly in all aspects of life as it brings about the development of machines that is able to stimulate the thinking processes of humans (Alsharidah & Alkramiti, 2024). As such, integrating it into education may transform traditional teaching methods and may lead to a cultural shift on how educators view, use and work with it in enhancing the teaching and learning process (Utami et al., 2024).

Conceptual Framework



The success and failure of a thing stem from how the thing is perceived. That is to say, teachers' perceptions regarding AI is a determinant key to their intentions about it (Pörn et al., 2024; Wardat et al., 2024). To put things differently, those with a negative perspective may not even think of giving it a try. However, those with a positive perspective mindset may give it a try even amidst challenges. Therefore, the nature of perceptions determines the nature of intentions. The combination of these two factors may give rise to the general attitude of teachers towards integration of Artificial Intelligence in Mathematics.

Just having an interest in the technology may be an indication of a teacher having an average and above TPACK. Saharuddin et al. (2025) points out that strong TPACK competencies amongst educators are important in the effectiveness of AI integration in classrooms. Their attitude towards this integration may be one of the ways of determining their knowledge of technology and how to apply it in teaching. This is in agreement to what Elifas and Simuja (2024) indicated in their study that, "Teachers' TPACK is the key factor in enhancing their skills and confidence in using AI tools effectively." This is to imply that the effectiveness of AI integration into mathematics classrooms may be dependent upon all these variables of perception, intention, attitude and TPACK. Chaamwe (2025) points out that the key factors which significantly impact students in university in the adoption of Generative AI are expected benefits, perceived usefulness, attitude toward Technology and behavioral intention.

Problem Statement

It is in public domain that mathematics has always been the least in pass rate among subjects offered in Zambia at secondary school level. According to the Examination Council of Zambia (ECZ) performance report (2023), candidates' performance slightly dropped from 27.1% in 2022 to 26.62% in 2023. It is clear that the pass rate in this subject has been consistently poor and below average. Therefore, this calls for an investigation to discover what really the problem is and to consider the most probable manner to solve it. Additionally, mathematics is a compulsory subject for every secondary school learner and it is one the determinant subjects for them to be enrolled in tertiary education.

Researchers in Zambia have studied a number of issues concerning the integration of ICT in schools and most importantly, they have highlighted its benefits in the education system and life at large (Chabalengula & Banda, 2023; Chewe, 2020; Phiri, 2016). Nevertheless, few if not none of the researchers in Zambia have discussed the

impact which AI could possibly bring if integrated into secondary school mathematics education. Research has shown the need to incorporate mathematics classroom environments with modern technology in increasing desire of learning (Boadu & Boateng, 2024; Bright et al., 2024). As a result, the need to do an assessment of Secondary School Teachers' Intentions on Integrating Artificial Intelligence in Mathematics Classrooms. Also, the world has gone digital and teachers need to develop digital skills for them to thrive in this era.

Justification of the study

Mathematics performance has always been a challenge and a number of learners have a negative attitude towards it which also contributes to the poor performance (Changwe & Mwanza, 2019). However, some researchers in other parts of the world have discovered that Artificial Intelligence incorporation into mathematics education enhances learners' problem solving skills. Alas, few if not none of the researchers in Zambia have researched AI integration in secondary school mathematics classrooms.

Further, the findings of this study is meant to help shape better teaching strategies and improve mathematics teaching and learning as it will inform policy makers to make informed decision. Also, the study informs the importance of TPACK theory in Artificial Intelligence integration in mathematics classrooms.

The study is important now because the world has gone digital and for people to thrive in their fields of endeavour they need digital skills. It is for this reason that the researchers developed interest to understand the change and how best to evolve with it.

Research Question

- What are the intentions of Secondary School teachers regarding adoption of AI in mathematics teaching and learning?

Objective

The specific objective of this study is to assess the intentions of Secondary School teachers regarding adoption of AI in mathematics teaching and learning.

REVIEW OF RELATED LITERATURE

The world is moving and working towards its vision of 2030 which is the achievement of Sustainable Development Goals (SDGs). Therefore, learning institutions have a task of producing graduates with quality and adequate 21st century skills. However, Africa can achieve this if only it adopts as well as embraces the integration of Artificial intelligence in its education system (Hlongwane et al., 2024). Zambia as a country is also moving towards that with its new curriculum emphasizing on competency based amongst its learners and this gave the researchers interest in finding out its intentions with AI adoption in mathematics classrooms.

In China, Li and Noori (2024) found that there is a direct link between primary school teachers' attitudes and their intention to use AI. It was noted that these attitudes are more shaped by institutional support and resource availability. In the same country, Wang et al. (2025) in their study also recorded a direct link between secondary school teachers' attitude toward Gen-AI and their usage behavior. From the two papers, it can be deduced that

both primary and secondary school teachers' attitude towards AI is the determinant factor of whether it can be adopted or not. However, more awareness, trainings and institutional support is what is mostly needed amongst the teachers for effectiveness of AI integration into mathematics classrooms. This is in line with what Rizki and Kusumah (2025) recommended regarding the need for adaptive and friendly learning support in enhancement of computational thinking skills and independent learning.

Alwakid et al. (2025) explored the Role of AI and Teacher Competencies regarding Instructional Planning and Student Performance in an Outcome-based Education System. The study revealed that AI, ChatGPT in particular, is capable of improving instructional planning and this directly improves learners' performance. This is in support of a systematic review which was done by Celik et al. (2022) in Finland on the Promises and Challenges of Artificial Intelligence for Teachers. It was noted that AI improves teachers' work regarding planning and immediate feedback. Alwakid et al. (2025) further highlighted that it is not entirely about the tools but teacher competencies also play a role in instructional planning and improvement of learner performance. This two studies suggest that AI is good but teacher competency in using these tools can never be underrated. In concurrence to this finding, Cheng (2025) emphasized that teachers must first have content knowledge for them to effectively use the technology in their teaching for the tools are prone to error. Fortunate enough, this implies that AI can never replace human teachers who have irreplaceable qualities such as critical thinking, creativity, emotions (Chan & Tsi, 2025) but must be utilized appropriately when interacting with it, especially to help in more complex topics (Yakubu et al., 2025).

Further, a study was done on teachers in Turkey which reported that they use ChatGPT and Magic School, AI tools, for effective good lesson planning (Filiz et al., 2025). Another study in the same country by Memis (2025), looked at the potential and pitfalls of AI in solving problems. According to results, AI improves learners' mathematical problem solving skills which leads to improvement in learning and performance. Nevertheless, it was discovered that it is as well makes the same common mistakes learners make in some certain mathematical concepts. This tells that educators and learners should be careful when using these tools. They have a tendency of giving shallow knowledge and compromise metacognition. Thereby promoting shallow learning (Manuel and Valderama, 2025). Using the tools with ultimate care can never be underrated for it capable of bringing lack of academic integrity, algorithm biases and misalignments between cultures and languages (Ximens, 2025).

In United States of America, Delello et al. (2025) in their study indicated that AI has potential to reduce stress through automation though causes social isolation from reduced interpersonal interactions. However, in the southern parts of the United States, the integration of AI-based systems into teaching was seen to have potential to enhance mathematics performance particularly in rural settings (Khazanchi et al., 2024). Not only in rural setting but according to a meta-analysis on 15 studies with 1073 participants from 2003 to 2019 conducted by Benavides-Varela et al. (2020) in Italy, digital-based teaching also improves mathematical performance among primary school pupils.

Based on studies done across Africa, it can be deduced that mathematics teachers welcome the idea of AI integration into teaching and what is needed is just more awareness. Nja et al. (2023) conducted a research in Nigeria on Adoption of artificial intelligence in Science teaching, from the vantage point of the African Science

teachers. Findings showed that educators approved the integration of AI in classroom and that there is a direct relationship between teachers' intention to adopt and their perceived ease of use of the tools.

Moreover, Ezenwobodo (2024), noted that mathematics instructors in Anambra state of Nigeria are of the belief that AI integration in teaching can improve how well the subject is taught. This is in agreement with another study conducted by Asanre et al. (2024) in Remo Division of Ogun state, Nigeria. The study found that incorporation of AI in mathematics education was well received by mathematics teachers. In concurrence to this fact, Wardat et al. (2023) in their recommendation to their study encouraged mathematics teachers to use latest teaching methods and strategies that rely on AI systems and applications. This was because, it was discovered that the strategies have a positive influence on student motivation and engagement. Also, this leads to reduction of dependence on textbooks as they enable learners to access educational materials at any time, place and in ways that align with their interests.

Besides, in South Africa, Opesemowo (2025) points out that the tools are believed to be good for personalized learning, adaptive assessment and real time feedback. Nevertheless, the pitfalls are that there is lack in creativity, absence of emotional intelligence and lack of data privacy. Looking at the advantages and disadvantages, it can be concluded that there is need of striking a balance between AI and human abilities (Opesemowo & Adewuyi, 2024).

Teachers in Zambia are of the view that general ICT must be integrated into mathematics education despite lack of facilities, high cost of procuring and lack of alignment into teaching (Phiri, 2016; Chama & Subaveerapandiyan, 2023). This is understandably clear that for AI to be effectively integrated, it should start with having ICT tools in institutions. Additionally, Elifas and Simuja (2024) in their study also saw the benefits AI could bring if fully integrated into teaching and learning environment though it was noticed that there were limited access to the devices amongst teachers in Namibia. Also and more importantly, there is need for device customization to accommodate diverse learning styles (Egara & Mosimege, 2024).

Modern Zambian students in colleges and universities are the ones more familiar with AI based learning tools and not that common to primary and secondary school pupils. However, Muvombo et al. (2024) conducted a case study of grade 6 and 7 across four schools in Kabwe district on Nurturing Parental Involvement in Artificial Intelligence (AI) Literacy Among Children in Multicultural Classrooms. The findings showed that learners used AI but their parents did not because of time constraints as well as not having access to technology. It was also noted that these learners negatively used AI due to lack of guidance on the proper use and it affected their academic performance negatively. The study recommended that there is need for community workshops for both parents and teachers for enhancement of AI literacy.

Kazika et al. (2025) did a concurrent mixed methods study on Mansa College of Education student teachers about Conceptual Understanding of Mathematics in Artificial Intelligence Era which was a comparative of Pre and Post-ChatGPT access. Based on the findings, it was noted that students who were there before ChatGPT era had better conceptual understanding of mathematics than the ones who had access to the tool. Although that was the case, it can be argued that artificial Intelligence tools help students in successful completion of assignments on time. This position is supported by Wang et al. (2024) who asserts that the main motivation to use AI by

students is to save time. And that they are more interested in merely getting solutions to their mathematical problems without necessary understanding how to solve the problems. According Kazika et al. (2025), it was further recommended that to avoid this challenge, educators must stop the idea of giving written assignments and pay more attention to the giving of quizzes and projects to promote deeper grasp of mathematical concepts. This is the way to go in Zambia for it to be successfully achieved its goal with regards to the shift from Outcome Based Curriculum to Competency Based. It is no longer about the known but the application. With the help of AI-Based tools, learners should interact with the technology in putting knowledge in practice.

METHODOLOGY

Overview

The essence of this section is to give a clear guide on how the research question was answered. Therefore, the study adopted a mixed method approach. This was dwelling on the concept that the world is not entirely quantitative or qualitative; it is not always a "one plus one equals to two" world, but a mixed world (Cohen et al., 2018).

Research Design

The study made use of sequential embedded research design. Embedded designs come into play if there is one main form of data which can be either quantitative or qualitative and the researcher decides to bring in a second form of data to argument or support the main form (Cohen et al, 2018; Creswell & Clark, 2018).

This study was quantitatively dominated. Therefore, qualitative data was embedded within quantitative data. This was done sequentially that is quantitative was collected first and qualitative followed thereafter.

Research Paradigm

Life is not one plus one, what worked for a person yesterday may not be what will work for another person today. This study is anchored on Pragmatist philosophical point of view which believes that knowledge is an objective reality that is only realized through individual human experiences (Dube et al., 2024). Inasmuch as this study is quantitative dominated, it was to the researchers' discretion that even qualitative part, interviews, be included in order to probe more on teachers' views regarding the integration of AI in mathematics education.

Population and Sample

Population:

The study's population was all secondary school mathematics teachers in Mufulira district.

Sample:

- **Quantitative**

There are about 200 mathematics teachers in the district and according to Cochran (1977), the sample size is determined by using the following formula:

$$n = \frac{N}{1 + N(e^2)}$$

Where: n = sample size

N = population size

Margin error (e) = 0.05

Therefore, the sample was calculated to be 134 mathematics teachers for it to be a representative of the population.

- **Qualitative**

10 mathematics teachers were conveniently picked from 3 schools to probe more on their views on AI in mathematics education.

Instrumentation

Primary data collection method was a **questionnaire** for quantitative and **semi-structured interviews** for qualitative.

Data Collection Procedures

Permission was requested to conduct the research from school authorities, including the school boards and principals.

The questionnaires were administered online by means of google forms and a link was shared through individual teachers whatsapp contacts and groups to ensure high response rates. Teachers were instructed to answer honestly, and the process was anonymous to promote candid responses. Also and more importantly, those who were interviewed were followed from their respective schools.

Data Analysis

Research Question: What are the intentions of Secondary School teachers regarding adoption of AI in mathematics education? The question was answered by performing a correlation analysis by examining relationship between perceptions and intentions. It also generated descriptive statistics. Moreover, interviews were also conducted to shade more light on potential barriers or motivations in the adoption of the technology.

Validity and Reliability

Instrument Validity: The questionnaire underwent **content validity** testing by a group of colleagues who are also mathematics educators to ensure it measured the intended constructs. The researcher gave out a draft questionnaire to 10 educators before coming up with a final one which was sent to the actual respondents.

Ethical Considerations

The study was adhered to ethical research practices, including:

- **Confidentiality**: All data was anonymized, and individual results were not shared with schools or third parties.

- **Right to Withdraw**: Participants were informed that they had the right to withdraw from the study at any time if they felt so.

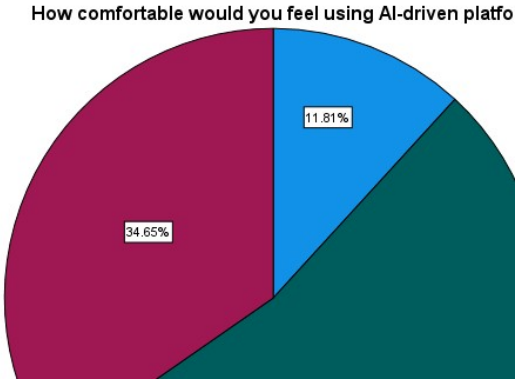
RESULTS

The study planned to have 134 and 10 respondents for both quantitative and qualitative respectively. Only 127 teachers responded to the questionnaire giving a response rate of 94.8% for quantitative analysis. For a qualitative analysis, all the planned 10 respondents responded to the interviews giving a 100% response rate.

❖ QUANTITATIVE ANALYSIS

Mathematics Teachers Intentions on Adoption of AI in mathematics education

Figure4 Teachers' comfortability regarding using of AI-driven platforms to teach mathematics



From figure 1, it can be deduced that over 80% (101 out of 127) of teachers are willing to use AI in mathematics classrooms. This comprise of 34.65% (44) who are very comfortable and 53.54% (68) of who are somewhat comfortable. Additionally, according to figure 2 it can be noted that 53.18% (68) think learners will benefit more from AI-assisted learning than from traditional teaching methods. Nevertheless, 18.25% (23) do not think so and 28.57% (36) are not sure.

Figure 5 Teachers' thought on the benefits of AI-assisted learning compared to traditional teaching methods

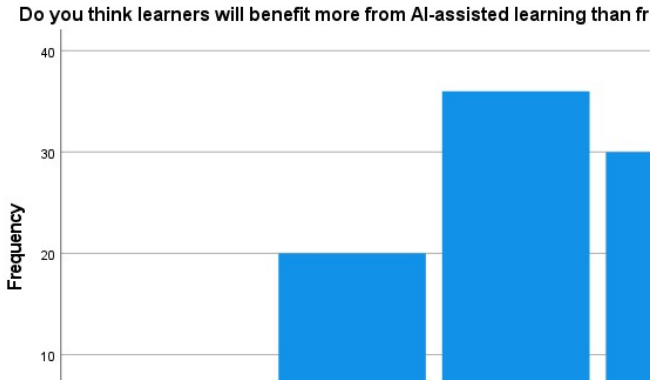
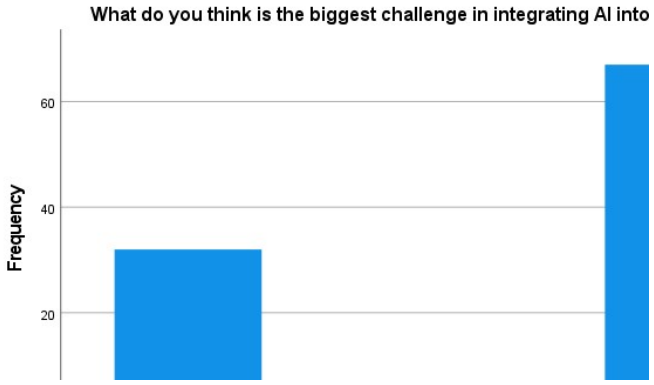


Figure 6 Biggest challenge in integrating AI in mathematics education



With regards to figure 3, 51.2% (65) teachers believe that the biggest challenge in integrating AI into mathematics is Lack of technical expertise, 23.62% (30) believe it is cost of implementation, 22.39% (28) resistance from teachers and 2.79% (4) lack of equipment and right tools.

Figure 7 Overall perception of teachers about AI role in mathematics education

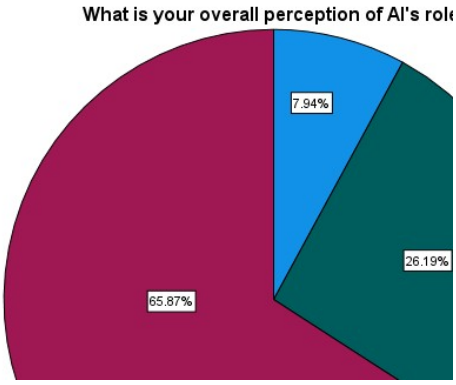
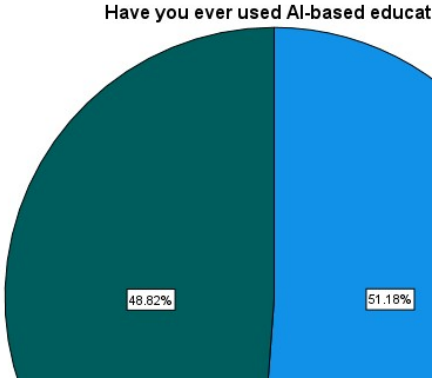


Figure 4 shows the overall perception of teachers about AI integration in mathematics education. 65.87% (83 out of 126) are positive, 26.19% (33) are neutral and 7.94% (10) are negative.

Figure 8 Teachers responses on whether they have used AI-based education tools in their teaching



Only 48.82% (61) teachers have used AI based educational tools in their teaching and 51.18% (65) have not. However, regarding figure 6, 82.54% (104) are willing to incorporate them into their teaching if they are made available. Unfortunately, 16.67% (21) are unsure and only 0.79% (1 out of 126) is not willing.

Figure 9 Teachers' willingness to incorporate AI into teaching if made available

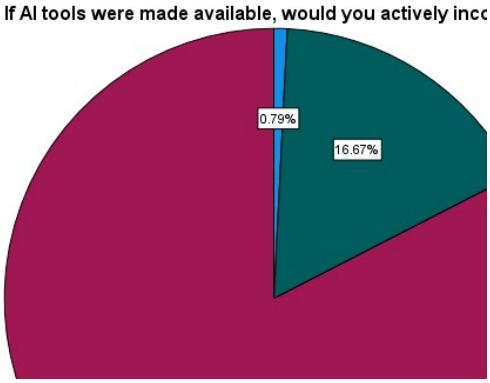
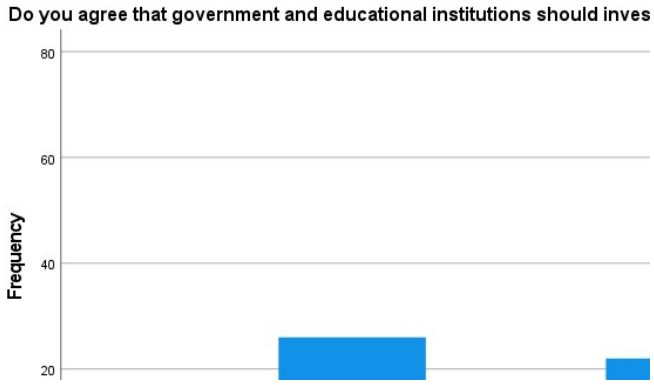


Figure 10 Teachers thought on whether government and educational institutions should invest more in AI trainings for teachers



From figure 7, 76.38% (97) teachers are of the view that government and educational institutions should invest more in AI trainings for teachers. This is also supported by what can be extracted from figure 8 which shows that 45.67% (58) teachers see AI as a long-term solution for improving mathematics education though 38.58% (48) are unsure while 14.96% (18) do not see it this way.

Figure 11 Teachers views on whether they see AI as long-term solution to improve mathematics

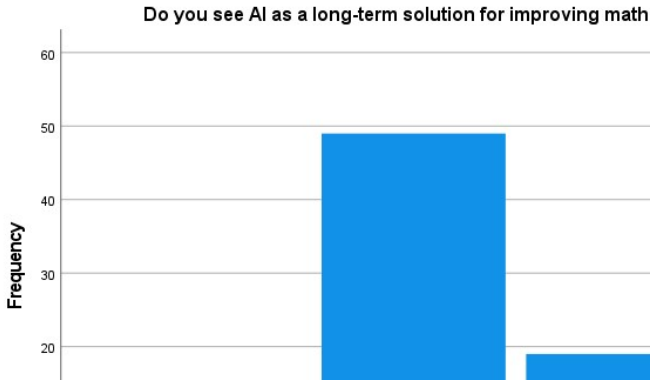


Table 1

Correlation analysis between Teachers' belief on whether AI can improve pupils' understanding of mathematics and comfortability of using AI-driven platforms to teach mathematics

		AI can improve pupils' understanding of mathematics	How comfortable would you feel using AI-driven platforms to teach mathematics?
AI can improve pupils' understanding of mathematics	Pearson Correlation	1	0.584
	Sig. (2 tailed)		0.001
	N	126	126
How comfortable would you feel using AI-driven platforms to teach mathematics?	Pearson Correlation	0.584	1
	Sig. (2 tailed)	0.001	
	N	126	127

In table 1, Pearson correlation is 0.584 which means that there is a strong positive relationship and p-value is 0.001 which is less than 0.05 meaning it is statistically significant. Therefore, there is a strong positive and statistically significant relationship between teachers' belief in AI to improve pupils understanding of mathematics and their comfortability in using AI-driven platforms to teach.

Teachers intentions of adopting AI in mathematics classroom is directly related to their perception of it regarding improvement of learners understanding of the subject.

❖ QUALITATIVE ANALYSIS

Teachers' Willingness of Using AI in Mathematics Classrooms

Theme: motivating and demotivating factors in the adoption of AI in teaching practice

Participant 1: I can be motivated to use it if it can improve the poor results.

Participant 2: Adopting AI in teaching is a NO for me since it is capable of killing critical thinking in both learners and teachers.

Participant 3: I fear AI may make learners as well teachers lazy. However, I can be motivated to adopt it if it helps in developing interest of mathematics in learners.

Participant 4: If AI can enhance problem-solving skills in the subject then I have no problem going for it and giving it my full support.

Participant 5: Would love to use it if it can make my pupils pass.

Participant 6: Motivated to adopt it if it makes our work easier

Participant 7: Will be motivated to adopt if it happens to improve learners' understanding of mathematics. And discouraged if it happens to be more complicated than our traditional way of teaching.

Participant 8: I can be very happy to adopt it if it can make learners understand mathematics better.

Participant 9: If the tools can make learners love mathematics and if it can improve their critical thinking then I will be happy to adopt it in my teaching.

Participant 10: My motivation to use AI is that it helps make our work easier and is able to stimulate interest of mathematics.

Integration of Quantitative Analysis and Qualitative Analysis

- **Willingness of Mathematics teachers to adopt AI in Education**

Quantitative Finding

Table 2
Summary of mathematics teachers' willingness to adopt AI in classrooms

Variable	Number of teachers	Percentage
Comfortable to use	101 out of 127	80%
Beneficial to learners	68 out of 127	53.18%
Positive perception	83 out of 126	65.87%
Willing to use	104 out of 126	82.54%
Average percentage		70.4%

With regards to table 3, it can be deduced that teachers are willing to use AI in mathematics classrooms and are of the belief that learners will benefit more from it than from traditional teaching methods. Moreover, the biggest challenge in the adoption is lack of technical expertise. This is according to figure 3 on page 13 of this paper.

Qualitative Finding

The biggest motivation for teachers in the adoption of AI is the improvement of results.

Integrated Finding

Teachers are ready to adopt AI in classrooms if they happen to receive adequate trainings on its professional technical uses and how best it can help in the improvement of results.

DISCUSSION OF RESULTS

Complexity of AI Tools for Classroom Use

Results showed that slightly over half of the sample of the population of this study, believe AI to be complex for classroom use. Manuel and Valderama (2025) in their study advised that teachers of mathematics must be engaged in CPDs for them to be equipped with the necessary skills aligned with the use of AI. This is because technical issues, curriculum misalignment, ethical concerns and cultural barriers like difficulties in adapting AI-generated content to local contexts are one of the notably challenges which may be there in the integration of Artificial Intelligence in mathematics education (Filiz et al., 2025).

Findings from the interviews interestingly showed that a good number of teachers claim to be confident in using technology but they do not use it that often in classrooms. The reason to this may be what Chama and Subaveerapandiyan (2023) points out that most teachers have access to digital devices and possess moderate to high levels of digital skills but they only lack alignment into education. Egara and Mosimege (2024) also points out that there is need of customizing of these tools to accommodate diverse learning styles. Therefore, mathematics educators must learn how to give correct prompts to the tools in order for them to get intended feedback they are looking for. Besides, they should also be equipped with content knowledge so that they can also evaluate the solutions given by AI since it is prone to error (Cheng, 2025).

The Role of AI in Workload of Mathematics Teachers

Interestingly, the findings of this study indicates that AI can reduce workload of mathematics teachers and there is a balanced view on whether it can affect teacher-pupil interaction negatively. This is in concurrence with the findings of Celik et al. (2022) who noted that AI helps teachers in planning, implementation and assessment work by identifying students' needs to come up with the most suitable learning contents and activities for them. On the contrary, Wardat et al. (2024) discovered that there is need to exert more effort in AI-based teaching than in traditional method especially when using different AI systems and applications. This pressure placed on them may be the reason for resistance in adoption. On the other hand, studies such as Wang et al. (2024) and Delello et al. (2025) believe that AI saves time as well as reduces stress through automation. Nevertheless, Wang et al. (2024) emphasized on the potential threat on process, using AI may lead to bypassing problem solving skills of both teachers and learners. While, Delello et al. (2025) believe it may lead to social isolation due to reduced interpersonal interactions.

However, AI is capable of significantly enhances instructional planning which in the long run can directly improves students' performance (Alwakid et al., 2025). Chan and Tsi (2023) highlights the need for educators to develop AI literacy as well as to have an understanding of how to work with it in order to deal with practical issues to do with data protection, ethics and privacy.

The Study's Limitations

The study only focused on getting teachers' perceptions and did not consider the views of the learners. The main benefit the study was conducted is to find ways of improving mathematics education and this improvement must be generally on the learners. Another limitation is that most teachers were not using AI tools in mathematics classroom setup. As a result, most of the views are not based on hands-on experience but simply hearsay. The contributing factor to this is lack of enough digital tools and internet connectivity in schools.

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

Secondary School teachers of Mufulira district of Zambia believe that Artificial Intelligence, AI, can help them in the reduction of workload but however, more information is still needed on best use in order to strike a balance so that it does not eventually affect teacher-pupil interaction negatively. Educators must be well aware of their limits of interaction with the tools. This implies that, they are ready to adopt them into classroom environments only if they happen to receive adequate trainings on professional and technical uses as well as how this AI can help in the improvement of the poor performance which has always being recorded.

The objective of this study was to assess the intentions of secondary school teachers regarding adoption of AI in mathematics education. It was observed from the findings that way over half of the teachers were not using AI in their mathematics teaching although they are aware of some AI-based tools. However, they intend to adopt the technology in their classrooms if they receive total support from policy makers with regards to trainings since a number of these teachers do not know the proper way of using it in a classroom setup.

Conclusion

One of the reasons pupils fail mathematics is lack of interest in the subject which later translates into lack of practice. It is commonly quoted and believed that practice makes a seemingly imperfect activity to be perfect. This simply implies that the more a learner practice mathematics, the more the chances are that they may be better at it. To this regard, findings revealed that AI-based mathematical tools may help learners to develop interest in mathematics. The world has gone digital today and people are more drawn to technological tools than the physical world. As such, learners are likely to pay more attention to an AI-based tutor than to a human tutor. Additionally, findings of this study as well as studies from other researchers found that these tools enhance problem-solving skills.

Nonetheless, using AI for academic purposes including mathematics education is like eating from the tree of knowledge of Good and Evil. It is not necessarily bad and neither it is good. It is a double edged sword. A lot of educators and their learners may benefit from it and a lot of them may as well be destroyed by it intellectually. Consequently, policy makers and educators must learn the best practices and limits of use for them to strike a balance to the betterment of learners. This is because, some studies have indicated that dependency on AI may affect critical thinking negatively on the users.

Even if one gives a good thing to a mad man, it will soon turn out to be bad. Nightingale (n.d.) wrote that, "life is dull only to dull people and it is interesting only to interesting people." AI-based technologies are here to stay and mathematics educators should be ready for them by learning how to benefit from this and work on changing the global narrative that mathematics is difficult.

To put simply, this study's contribution to knowledge is a reminder that AI integration in mathematics education is neither good nor bad but it is a call for more understanding and trainings to all stakeholders involved especially policy makers and educators. Secondary School Mathematics Teachers are willing to adopt AI in their teaching provided there is resource availability, administrative support and clear ethical guidelines in order to balance on human and technology roles.

Recommendations

Artificial Intelligence, AI, is here to stay and is getting advanced day by day. Therefore, mathematics education system may welcome it or not but some educators and a good number of learners will be using it no matter the case. For this reason, it is inevitable and important that all the stakeholders involved get the necessary education required so that the tools are not fallen in wrong hands.

Government should take keen interest in making sure that enough digital tools such as computers and tablets are procured in schools for this is necessary for effective AI integration into classrooms. This should go hand in hand with internet connectivity tools. Secondly, policymakers should be coming up with AI programs for educators such as trainings and CPD's. Moreover, curriculum developers should as well make sure that they fuse in AI-based activities in the curriculums. Teacher training institutions to also make sure that AI course is introduced among the courses student teachers do take in their respective majors.

Based on the study's findings and limitations, future researches should focus on learners' perceptions as well and this will require them to be exposed to the tools in a classroom setup. Also and more importantly, a comparative study may be needed to compare teaching methods that is between traditional and AI-based teaching in mathematics to confirm if truly AI can improve the poor mathematics performance in Zambia. Lastly, a longitudinal study is necessary to make a conclusion on the effects of exposing secondary school pupils to a specific AI tool such as ChatGPT or Gauth on their cognitive mathematical skills.

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