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## The impact of mathematics quizzes on student attendance and student mathematics performance at the secondary level: A case of Singida District

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### Abstract

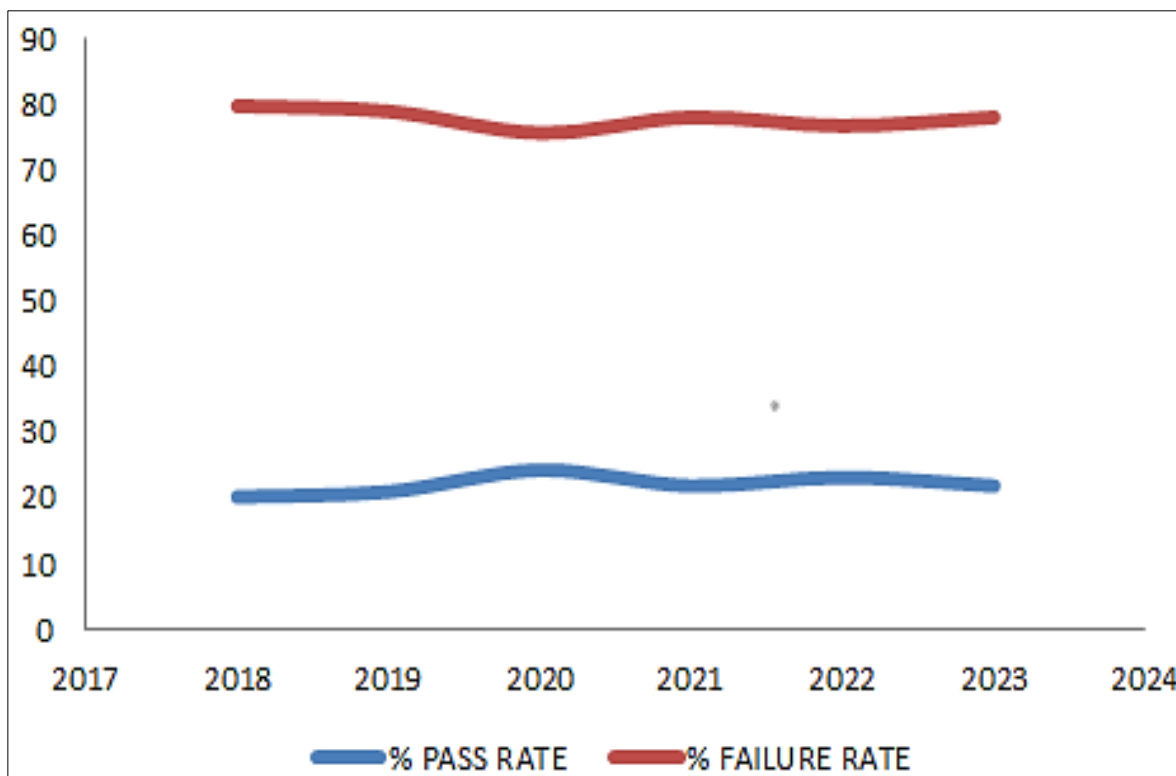
Professionals with experience in science, technology, engineering, and mathematics are in greater demand worldwide. Many secondary have changed education and encouraged training to improve students' math and science skills to achieve this requirement. Enhancing the comprehension of science and math among participants is the main objective of training and educational initiatives. While many school teachers worry about their student's attendance, not much is known about the frequency and reasons behind student absences. For this study, I examined class attendance, and I found that it declined from the start to the end of the year. The study's objective was to determine the impact of quizzes on students' attendance and math performance at the Secondary level. There is a clear pattern in the relationship between math competency and student attendance. Students need to learn efficient study strategies if they want to excel in their mathematics subjects. For 20 weeks, students were split into two treatment groups and given instructions. Group A answered quiz questions for ten minutes at a time during each session. Group B was not given access to the quiz. Participants completed quizzes and closed-ended questionnaires for twenty (20) weeks to collect data. The findings of the respondents' math quizzes were used in the study. Both descriptive and inferential statistics were used to analyze the collected data. Overall, the results showed that the mathematics quiz had a substantial (0.05-two-tailed) impact on students' academic achievement in the subject. The effects of math quizzes and math performance are very positively correlated, when all other variables stay the same. Instructors may advise students to review their lecture notes in advance and remove the need for oral evaluations of their progress in the course. They can also help students make the transition from rote memorization to in-depth knowledge through class discussion. The study found that students who routinely completed quizzes scored higher in the mathematics course and did better on the final exam. I suggest applying this teaching strategy/method to other academic courses or modules to showcase students' abilities.

**Keywords:** Regular quizzes, students' Mathematics performance, and student attendance

### Introduction

Several factors can lead to inadequate performance in secondary mathematics students. It is essential to realize that these components regularly interact and influence one another. It could be affected by a student's incapacity to completely comprehend fundamental mathematical concepts and skills, which could hinder their understanding of more difficult courses. When teachers use tactics that do not engage their students or do not consider their diverse learning styles, it can lead to poor performance. If students have a negative attitude or anxiety linked to mathematics, it may affect their performance and ability to study effectively. Procrastination and disorganization are examples of unproductive study habits that can lead to inadequate knowledge and poor performance in mathematics. Peer pressure is harmful because it causes pupils to downplay their academic achievements in mathematics subject. In the Singida district, the performance has dropped a lot even though there are enough teachers and learning resources for the relevant subject. The results of the mathematics subject for 17 schools go down from year to year as shown below.

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**Graph 1:** The Necta (CSEE) results from 2018 to 2023 statistics are presented graphically (line graph) as shown below.

**Table 1:** National form four Mathematics results for the seventeen schools from the Singida district.

Year	Pass rate	Failure rate
	Percentage	Percentage
2018	20.2	79.8
2019	21	79
2020	24.3	75.7
2021	21.9	78.1
2022	23.2	76.8
2023	21.9	78.1

**Source:** Necta (CSEE) results from 2018 to 2023 statistics.

The findings indicate that the pass rate has stayed remarkably low over time. The aforementioned pass rate yielded the following grades: D (30-40), C (41-60), B (61-80), and A (81-100). As the accompanying chart shows, the results once more demonstrate a widespread failure, with the majority of students receiving a grade F, or less than 29, or (0-29) marks [1].

According to these findings, as of late, less than 25% (1/4) of the students in the Singida region had finished their mathematics courses and were qualified to apply for advanced level. Lack of engagement is one factor contributing to this failure, as it has been demonstrated to impact students' academic achievement [1]. This study indicates once more that students' low engagement in mathematics before exams may be the cause of their subpar performance in the subject.

Using the previously mentioned case, the problem statement and question that follow can be made easier. My main research issue is, "Will regular formative assessments (quizzes) have a positive effect on student learning in a mathematics classroom and classroom attendance?"

**Related Work**

Most educators agree that it can be difficult to keep students' attention, motivation, and focus throughout a presentation. According to [3] low motivation can lead to uncomfortable

learning environments and poor learning results. This problem is usually more apparent in secondary education because classes there are usually larger and have fewer direct ties. According to [2] and [3] students who fully participate in the learning process will learn more than those who participate less. Furthermore, a plethora of evidence indicates that active learning enhances understanding and academic achievement. Studies have demonstrated that the Students Response System enhances learning results, classroom dynamics generally, and viewpoints from both students and teachers [4].

According to [5] the goal of mathematics education is to instill in students the self-assurance to take responsibility for their education and find solutions to mathematical problems on their own. Like any other required and graded topic taught in postsecondary educational institutions, mathematics has a significant impact on how people manage various areas of their personal, professional, and social lives [6]. Given the seriousness of the problem, persistently subpar performance would set off a chain reaction that would jeopardize the nation's future progress. It is improbable that the required degrees of commitment, fervor, and individual effort will be reached in the event of failure [7].

The aim of mathematics education, according to [5], is to give pupils the confidence to take charge of their education and solve mathematical problems on their own. The pupils exhibit low involvement, indifference, low motivation, and behavioral problems such as skipping class or not completing tasks. When pupils show signs of indifference and disinterest in an engaging lesson, there is a problem [8]. How a student feels about mathematics can be inferred from their ideas and views about it, including how much they enjoy it, how important they think it is, how difficult they think it is, and what they want to learn from it in the future. These viewpoints will impact their development intellectually. Their academic development will be impacted by these attitudes [9]. I want to assist my students become better learners by giving them all the tools they need to study more complex material

and present it well on final exams. Despite the relevance and real-world applications of mathematics, global performance in the discipline has continuously lagged behind average <sup>[10]</sup>.

**Methodology**

Using a quantitative methodology, this study examined the impact of math quizzes on students' attendance and mathematics performance in secondary education schools, with a particular focus on the Singida district in the Singida region. The anticipated study population consisted of 16234 students enrolled in Singida region public and private secondary schools. For this research, seventeen (17) secondary schools in the Singida district were selected at random. 2360 students were selected for the study using simple random selection

The survey included 1180 Group A students and Group B were 1180 students. Data from two distinct sources were combined to create our empirical study. The quiz results provide the first set of data, and the second set was derived from a survey that we provided to all students in all groups as displayed in the appendix below. In the Group A session, the students were given a quiz at each period marked in the twenty (20) week intervention period. A facilitator-led discussion regarding the application and importance of formative assessments as a tool for success and self-reflection opened the session <sup>[11]</sup>. Every period, students took a quick test covering the subtopics studied in that particular session. Group A received access to the quizzes, while Group B did not receive any. The students in Group A had ten minutes per session to complete the quizzes, and they were given instant feedback on their scores <sup>[12]</sup>. After completing the questions, all students in Group A could check their answers against the right answers, so they could see where they went wrong.

There were twenty (20) quizzes distributed to Group A during the course in a twenty (20) week period. Throughout the intervention phase, students were constantly informed about the merits of formative evaluations <sup>[13]</sup>.

The collected data was subjected to statistical analysis, both inferential and descriptive, using Microsoft Excel. In addition to graph comparison, to describe the math test outcomes, the terms frequency, percentage, and mean were used.

**Results and Discussion**

The study investigates the impact of mathematics quizzes on student attendance and student mathematics performance at the secondary level. Students can take these exams in different methods. These studies have examined the advantages of formative evaluations in the classroom. Formative evaluations can be assigned every session, and they can be utilized as a self-reflection tool, an extra credit, or a part of a student's final grade <sup>[14]</sup>. Also, the number of absences from each quiz in a school was recorded and compared to those from previous quizzes to check how quizzes increase student attendance <sup>[15]</sup>. The results imply that there is a positive correlation between lower absenteeism and more frequent quiz administration. The results display the percentage of applicants who took the quizzes and the mean quiz score (%) for a total of 1180 students. There were 365 (30.9%) applicants who took part in the first quiz, or Exam 1, and 373 (31.6%) candidates took part in the second quiz, or Exam 2. As the quizzes progress, the percentage of applicants increases to 100%. Therefore, This suggests that the uses of quizzes affect students' attendance <sup>[16]</sup>. The more quizzes they have, the better they perform in their final examination as shown in Figure 1 below.

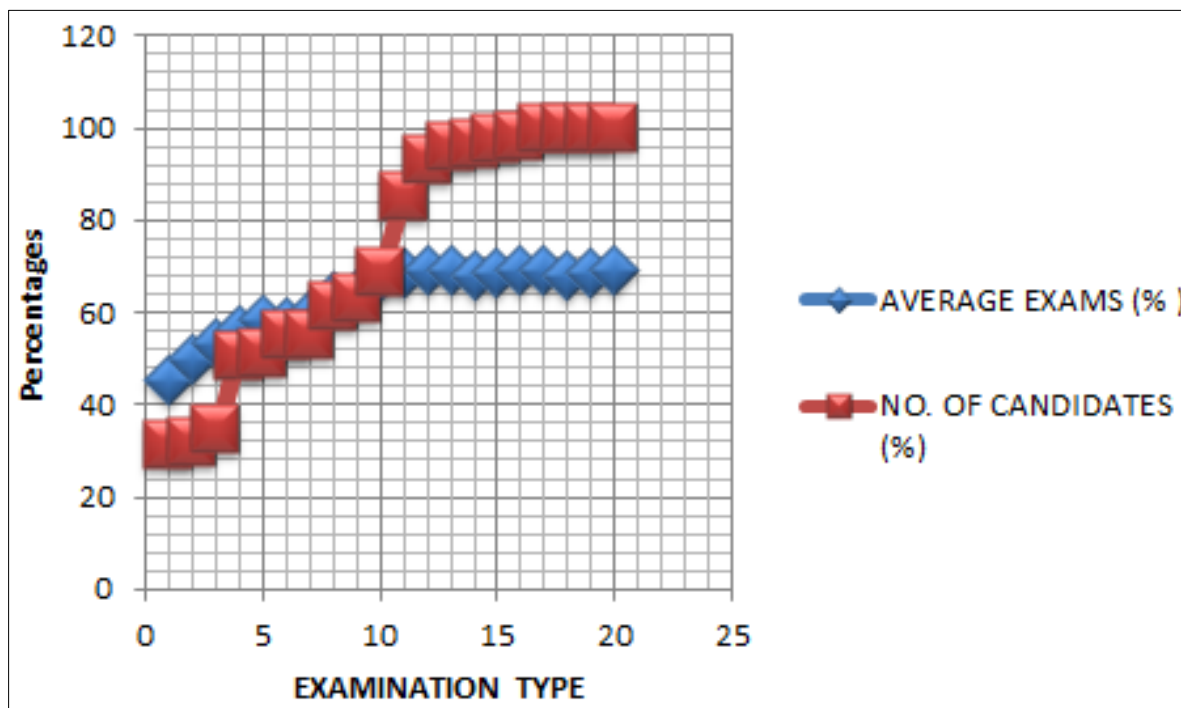


Fig 1: A line graph showing the impact of quizzes on students' attendance

Again, In Group A, the average quiz score of 1180 students for the twenty quizzes was 63.0875% and the average of final examination results was 72.25% for the same students. This implies that the use of quizzes enhances students' academic performance. By taking a comparison between the mean quiz scores and mean final examination results from Group A, and

Group B (those who were not given any quizzes), If all other factors remain constant. The result displays that, Group B's students performed poorly on their final examination because they were not given any quizzes. Teachers can assess students' progress and assist them in forming regular study habits by using formative evaluations instead of relying on

pupils to study the night before an exam. There is a higher chance of success in the classroom for students who employ this method. Additionally, there was a discernible increase in student participation during the session evaluations. Students frequently lack the motivation to engage in class activities. To attain the desired results, educators must keep an eye on how their pupils are utilizing the learning resources [17]. Researchers have confirmed that using quizzes as an assessment tool improves pupils' academic achievement. Test-

taking anxiety can be decreased long-term retention can be enhanced and deep learning can be enhanced according to several research. Quizzes can enhance student learning in addition to performance. Students' involvement and achievement have improved for teachers who choose to provide quiz points. Studies have shown that using quizzes to boost student participation in the classroom and attendance rewards is a good idea as shown in Figure 2 and Figure 3 below.

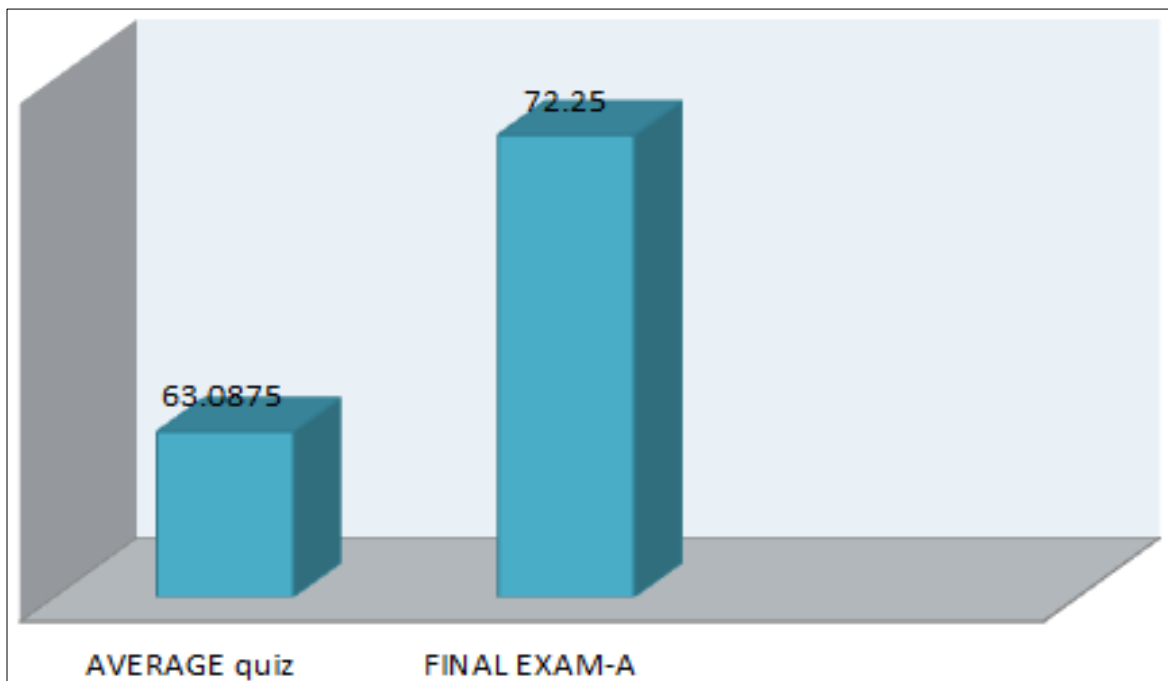


Fig 2: The bar graph displaying the effect of quizzes on final examination results

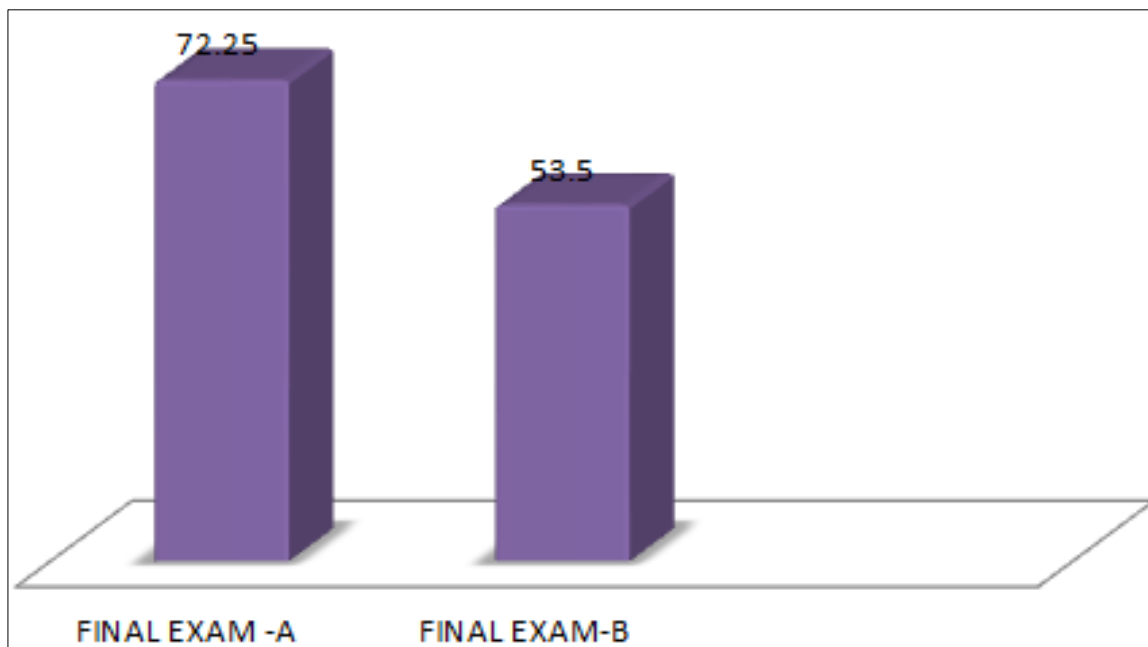


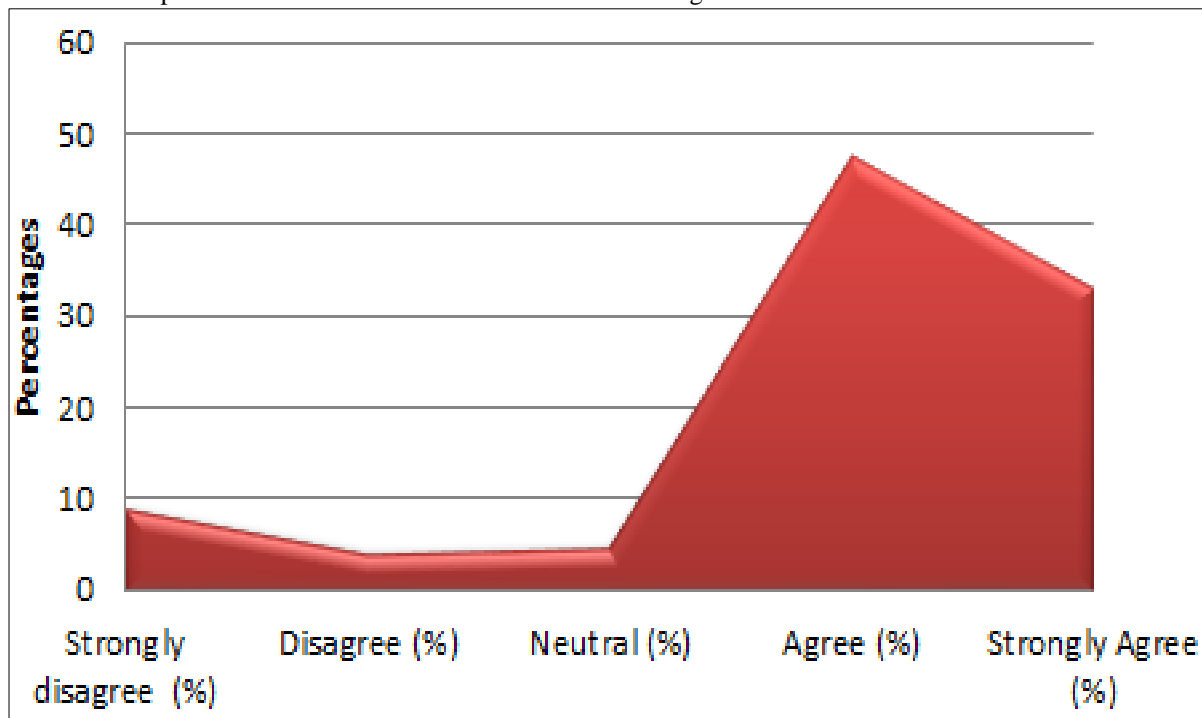
Fig 3: Bar graph displaying the comparison between Group A and Group B

**Student surveys.**

This information was gathered to assess whether or not frequent quizzes enhanced student learning and attendance. After the lesson, each student was given a survey of five questions and requested the answers to find out what they thought were the benefits of having quizzes more often. Additionally, students expressed their preference for frequent

quizzes and their belief that all courses should have uniform grading guidelines. At first, students weren't in favor of taking quizzes frequently. However, after receiving timely replies and learning that the quiz results could be helpful for their final examination. According to the results, the majority of students (47.63%) believe that using quizzes in every module

will improve students' performance in mathematics as shown in Figure 4 below.



Sources: (Field Work 2024).

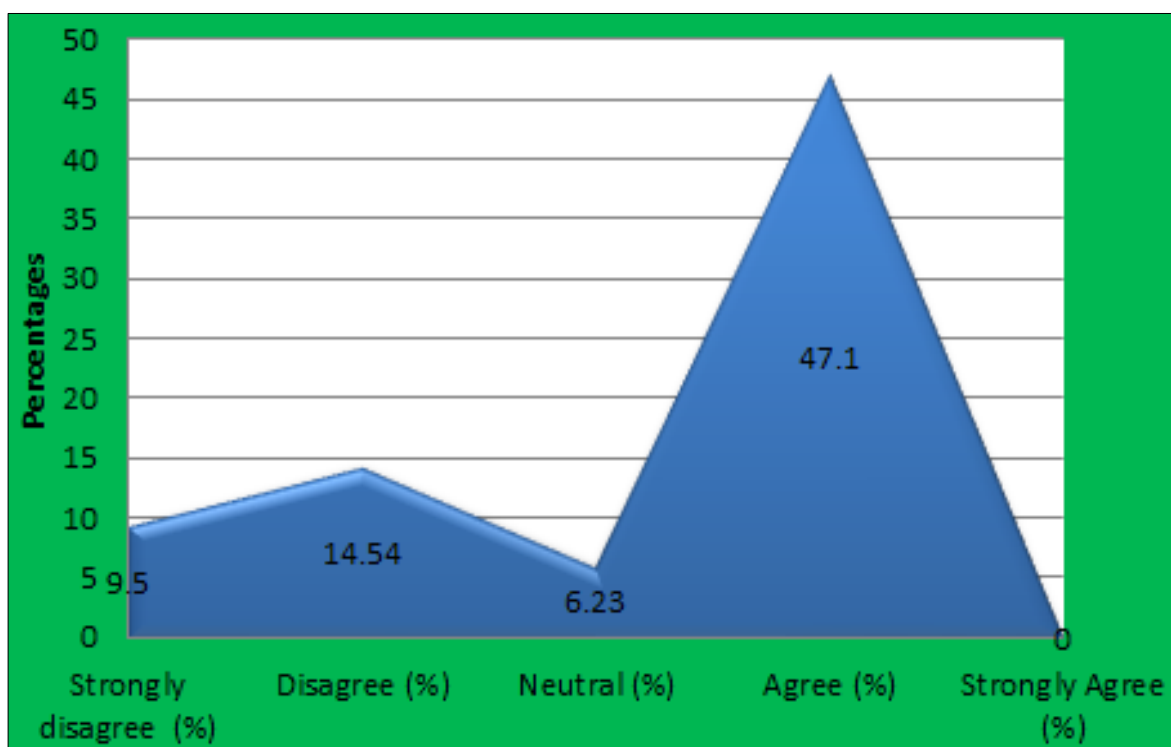
Fig 4: The area graph showing that the majority of students agree that every module uses this kind of instruction.

**The frequent nature of the quizzes didn't annoy me**

In summary, the study found that respondents were generally strongly agree. Specifically, the results show that the frequent nature of the quizzes didn't bother me. In this aspect, 10% of respondents strongly disagreed with the statement that the frequent nature of the quizzes didn't bother them. 9.23% disagreed with the statement, while 6% of respondents were neutral. On the other side, 26.17% of respondents agreed with the statement that the frequent nature of the quizzes didn't bother me while 48.6% strongly agreed with the statement as displayed in the appendix below.

**Did the quizzes increase my ability to study**

The study investigated whether respondents did the quizzes increase my ability to study. In this aspect, the survey found that 9.5% of respondents strongly disagreed, 14.54% of respondents disagreed, and 6.23% of respondents were neutral. Furthermore, 47.1% of respondents agreed with the statement that the quizzes increase my ability to study, and 22.63% of respondents strongly agreed with the above statement. The study noted that respondents generally agreed with the statement that the quizzes increase my ability to study as displayed in Figure 5 below.



Sources: (Field Work 2024).

**Fig 5:** The area graph displays that the quizzes enhanced my study skills.**The quiz motivated me to actively engage in the mathematics class**

According to the results, the majority of students strongly agreed that the quiz encouraged them to participate actively in the mathematics lesson, while very few students responded negatively to the statement. As a result, the quizzes have an impact on math performance. The study inquired whether respondents preferred that the quiz motivated them to actively engage in the mathematics class. In this aspect, the study found that 13.5% of respondents strongly disagreed, 15.54% of respondents disagreed, and 7.23% of respondents were neutral. Furthermore, 36.1% of respondents agreed with the statement that they prefer that the quiz motivated them to actively engage in the mathematics class and 27.63% of respondents strongly agreed with the above statement. The study noted that 36.1% of respondents generally agreed that the quiz motivated them to actively engage in the mathematics class.

**I managed to attend every session without absence**

This information was gathered to assess whether or not frequent quizzes increased student attendance. Here, the findings show that the majority of respondents agreed that assigning quizzes to students regularly influences attendance. The study inquired whether respondents preferred that I managed to attend every session without absence. In this aspect, the study found that 8.5% of respondents strongly disagreed, 4.64% of respondents disagreed, and 5.9% of respondents were neutral. Furthermore, 50.1% of respondents agreed with the statement that they prefer that I managed to attend every session without absence and 30.86% of respondents strongly agreed with the above statement. The study noted that 50.1% of respondents generally agree that I managed to attend every session without absence

**Conclusion**

Mathematics students' final examination scores and grades improved when they took quizzes frequently but also increased student attendance. The majority of students in the two Groups (Group A and Group B) where the approach is used say that it is helpful. In both cases, it seems to have led to more engaged learning from a larger cohort of more skilled students. I suggest applying this teaching strategy/method to other academic courses or modules to showcase students' abilities.

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**Appendices****Students Quizzes**

The average quizzes in percentage (%) in levels and final examination from Group A in percentage (%) and final examination from Group B in percentage (%).

Student's Group	Examination Type	Form One Average (%)	Form Two Average (%)	Form Three Average (%)	Form Four Average (%)	Average (%)	No. of Candidates	No. of Candid ATEs (%)
Group A (1180 Students)	Exam 1	45	47	39	51	45.5	365	30.9322
	Exam 2	49	52	42	56	49.75	373	31.61017
	Exam 3	52	56	45	59	53	405	34.32203
	Exam 4	56	59	49	61	56.25	596	50.50847
	Exam 5	59	64	44	66	58.25	603	51.10169
	Exam 6	63	67	48	54	58	650	55.08475
	Exam 7	66	63	51	58	59.5	648	54.91525
	Exam 8	62	65	56	71	63.5	721	61.10169
	Exam 9	65	69	55	68	64.25	740	62.71186
	Exam 10	68	72	59	72	67.75	810	68.64407
	Exam 11	71	74	61	68	68.5	1002	84.91525
	Exam 12	73	67	64	72	69	1100	93.22034
	Exam 13	69	72	65	70	69	1130	95.76271
	Exam 14	68	72	59	72	67.75	1140	96.61017
	Exam 15	71	74	61	68	68.5	1151	97.54237
	Exam 16	73	67	64	72	69	1160	98.30508
	Exam 17	69	72	65	70	69	1180	100
	Exam 18	68	72	59	72	67.75	1180	100
	Exam 19	71	74	61	68	68.5	1180	100
	Exam 20	73	67	64	72	69	1180	100
		Average	64.55	66.25	55.55	66	63.0875	
	Final Exam	76	71	68	74	72.25		
Group B	Final Exam	54	60	45	55	53.5		

**Student Survey**

Statements	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
A <sub>1</sub>	9.5	4.64	5.23	47.63	33
A <sub>2</sub>	10	9.23	6	26.17	48.6
A <sub>3</sub>	9.5	14.54	6.23	47.1	22.63
A <sub>4</sub>	13.5	15.54	7.23	36.1	27.63
A <sub>5</sub>	8.5	4.64	5.9	50.1	30.86

Sources: Research Work 2024

The above letter i.e. A<sub>1</sub> up A<sub>5</sub> stands for the following statements.

A<sub>1</sub> = I hope that every module uses this kind of instruction.

A<sub>2</sub> = The frequent nature of the quizzes didn't annoy me.

A<sub>3</sub> = Did the quizzes increase my ability to study?

A<sub>4</sub> = The quiz motivated me to actively engage in the mathematics class.

A<sub>5</sub> = I managed to attend every session without absence