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****Original Research****

THE IMPACT OF QUIZZES ON STUDENTS' CLASS ATTENDANCE AND PERFORMANCE IN MATHEMATICS WITHIN SINGIDA DISTRICT

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Abstract

This study explores the impact of mathematics quizzes on student attendance and mathematics performance at the secondary school level in Singida District, Tanzania. Regular assessments, such as quizzes, are posited to enhance learning outcomes by encouraging consistent study habits and immediate feedback. The research aims to investigate whether the implementation of frequent mathematics quizzes can positively influence student attendance and improve their performance in mathematics. The researchers utilized a quantitative methodology for gathering and analyzing data. The experimental group A participated in regular mathematics quizzes, while the control group B followed the standard curriculum without additional quizzes. The findings reveal that students who participated in regular quizzes had significantly better attendance and higher mathematics performance compared to those who did not. Additionally, students reported that quizzes helped them stay engaged with the material and identify areas needing improvement. The study concludes that integrating regular quizzes into the mathematics curriculum can be an effective strategy to boost student attendance and enhance mathematics performance. Recommendations include encouraging schools to adopt regular quiz schedules, providing training for teachers on effective quiz design, and ensuring that quizzes are used as a formative assessment tool to support student learning.

Keywords: *Regular quizzes, students' Mathematics performance and Students Attendance*.

1.0 INTRODUCTION

In secondary education, mathematics stands as a foundational subject essential for cognitive development and future academic pursuits. Within the educational landscape of Singida District, Tanzania, the effectiveness of instructional practices directly influences student outcomes in mathematics. Formative assessment, particularly through the use of quizzes, plays a crucial role in monitoring student progress, providing feedback, and enhancing learning engagement. However,

the absence or infrequent use of mathematics quizzes may inadvertently impact student attendance and contribute to underperformance.

This study aims to explore the implications of the absence of mathematics quizzes on student attendance and mathematics underperformance at the secondary level within Singida District. By examining theoretical frameworks from educational psychology and pedagogy, such as formative assessment theory, self-regulated learning, motivation theories, and cognitive load theory, this research seeks to elucidate the multifaceted impacts of quiz absence on student learning outcomes (Shulman, 1986). The rationale for this study is grounded in the recognition that formative assessments, including quizzes, serve not only as tools for gauging student understanding but also as catalysts for motivation, self-directed learning, and cognitive engagement in mathematics (Hubbard et al., 2017). The theoretical underpinnings suggest that without regular opportunities for assessment and feedback, students may experience challenges in monitoring their own progress, identifying areas of improvement, and maintaining consistent attendance (Portes, 1998).

Moreover, contextual factors specific to Singida District, such as socioeconomic conditions, educational infrastructure, and pedagogical practices, may influence the effectiveness of formative assessment strategies and exacerbate the consequences of quiz absence on student outcomes. Understanding these dynamics is essential for informing targeted interventions and educational policies aimed at enhancing mathematics education quality and equity in Singida District. Through a case study approach, this research will investigate the interplay between the absence of mathematics quizzes, student attendance patterns, and mathematics underperformance. By integrating theoretical insights with empirical data from Singida District, this study seeks to contribute to the broader discourse on effective educational practices and strategies to support student achievement in mathematics at the secondary level.

Several factors can contribute to insufficient performance among secondary school mathematics students. It's crucial to recognize that these elements often interact and influence each other. Poor performance may stem from students' incomplete grasp of fundamental mathematical concepts and skills, impeding their comprehension of more advanced coursework. Ineffective teaching strategies that fail to engage students or accommodate their diverse learning styles can also result in subpar performance. Negative attitudes or anxiety related to mathematics can hinder students' ability to study effectively. Additionally, procrastination and lack of organization are unproductive study habits that can lead to inadequate understanding and performance in mathematics. Peer pressure is

detrimental as it may cause students to devalue their academic achievements in mathematics (Gaona et al 2018).

In 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 seventeen schools go down from year to year as shown below.

Table 1: National form four Mathematics results for the seventeen schools from 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 (Ndalichako, 2015).

According to these findings, as of late, less than 25% 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. 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?

2.0 OBJECTIVE OF THE STUDY

The overall objective of this study was to investigate the impact of regular mathematics quizzes on student attendance and mathematics performance at the secondary school level in Singida District, Tanzania. Specifically, the study sought to:

i. To assess the effect of regular mathematics quizzes on student attendance in secondary schools in Singida District.
ii. To evaluate the impact of regular mathematics quizzes on students' performance in mathematics in secondary schools in Singida District.
iii. To compare the mathematics performance of students who participate in regular quizzes with those who follow the standard curriculum without additional quizzes

3.0 LITERATURE REVIEW

This section presents the review of literature related to the subject under study, presented by authors, scholars and other researchers. The section is organized into two main areas, namely theoretical and empirical literature reviews.

3.1 Theoretical Literature Review

Most educators agree that it can be difficult to keep students' attention, motivation, and focus throughout a presentation. According to Liu (2012) 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 Turner (2004) and Liu, 2012) 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 (Haigh, 2002).

According to Dann (2014) seminal work on formative assessment, regular assessment practices, such as quizzes, play a pivotal role in monitoring student progress and adjusting instructional strategies. The absence of these formative assessments may diminish opportunities for timely feedback and corrective actions, thereby impacting learning trajectories and academic outcomes.

Zimmerman (2002) theory of self-regulated learning posits that students who engage in active monitoring and regulation of their learning processes tend to achieve better academic outcomes. Formative assessments like quizzes provide students with opportunities to self-assess and regulate their understanding of mathematical concepts, enhancing learning efficacy.

Ryan (2000) Self-Determination Theory emphasizes the importance of intrinsic motivation in fostering sustained engagement and academic achievement. Quizzes, when integrated effectively into instructional practices, can serve as catalysts for intrinsic motivation by providing clear goals and feedback that support students' autonomy, competence, and relatedness needs.

Sweller (1994) Cognitive Load Theory posits that learning is optimized when instructional materials are appropriately designed to manage the cognitive load imposed on learners. Regular quizzes, designed to reinforce and consolidate mathematical concepts, help reduce cognitive overload by breaking down complex information into manageable chunks, thereby enhancing learning retention and application.

Bandura (2001) Social Learning Theory highlights the role of observational learning and modelling in shaping behaviour and learning outcomes. In the context of mathematics education, the absence of collaborative learning opportunities facilitated by quiz-based assessments may limit students' exposure to peer interaction and shared problem-solving strategies, potentially hindering learning progression.

3.2 Empirical Literature Reviews

Studies have demonstrated that the Students Response System enhances learning results, classroom dynamics generally, and viewpoints from both students and teachers (Vakili et al., 2017). 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 life (Novytska & Levchuk, 2018). 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 (Schoenfeld, 2002).

The aim of mathematics education, according to (Vakili et al., 2017) 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 skipping class or not completing tasks. When pupils show signs of indifference and disinterest in an engaging lesson,

there is a problem (Akınoğlu & Tandoğan, 2007). 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 (Schoenfeld, 1989). There is a need to assist students so they can 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 (Ames & Archer, 1988).

Research indicates that the absence of regular assessment activities like quizzes can contribute to lower student attendance rates. Without structured assessments, students may perceive less value in attending classes regularly, resulting in increased absenteeism. According to Schildkamp (2020) the lack of formative assessment opportunities, such as quizzes, hinders students' ability to monitor their learning progress. This absence can lead to gaps in understanding and mastery of mathematical concepts.

Studies by Weil (2014) highlight that the absence of quizzes may diminish student motivation in mathematics education. Formative assessments like quizzes provide tangible feedback and reinforcement, fostering intrinsic motivation and a sense of achievement among students. Effective use of quizzes requires thoughtful design and alignment with curriculum objectives to optimize student engagement and learning outcomes.

4.0 METHODOLOGY

4.1 Area of the Study

A research site is a particular geographic area where researchers collect data for their study. The investigation was conducted in the Singida district in Singida region. The researchers choose this location because of its cost-effectiveness and convenient access for fieldwork.

4.2 Research Approach and Design

This study investigated the impact of mathematics quizzes on students' attendance and mathematics performance in secondary education schools, with a particular focus on the Singida district in Singida region using a quantitative approach. The research approach decides the methods for data

collection, analysis, and interpretation. The researchers used a quantitative approach in data collection and analysis because it produces objective data that can be represented through numerical and statistical techniques. The approach was effective in helping the researchers gather ample and meaningful data for the study. Additionally, the study used a case study research design. The design was useful to help the researchers obtain appropriate and adequate data for the study.

4.3 Target Population and Sample Size

The population is defined as a group of individuals or entities to which the findings of the sample are to be generalized (Kothari, 2004). The intended study population consisted of 16234 students enrolled to public and private secondary schools in Singida region. For this research, seventeen secondary schools in the Singida district were selected at random. 2360 students were selected for the study using simple random selection, whereby the survey included 1180 students for Group A and 1180 students for Group B. Data from two distinct sources were combined to create our empirical study

4.4 Data collection methods

The study utilized closed-ended questionnaires distributed to participants to collect data. The results of the end-of-term Mathematics examination were documented on a checklist to evaluate each participant's proficiency in the subject (Haydon, 2012). The data are collected from two categories, namely are quiz results and data obtained from surveys. The quiz results provided the first set of data, and the second set of data was derived from a survey that we provided to all students in all groups.

In the Group A session, the students were given a quiz at each period marked in the 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 (Granberg et al., 2021). 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 (Fluckiger et al., 2010). 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 quizzes distributed to Group A during the course in twenty weeks. Throughout the intervention phase, students were constantly informed about the merits of formative evaluations (Arop et al., 2020).

4.5 Data analysis

The study utilized descriptive statistical analysis on quantitative data with the assistance of Microsoft Excel. In addition to graph comparison, the math test outcomes are expressed in terms of frequency, percentage, and mean.

4.6 Ethical Considerations

Ethical considerations in research are a set of principles that guide the research designs and practices to comply with the laws of humanity (Mkumbo & Mbise, 2022). The researchers adhered to ethical issues such as voluntary participation, informed consent, anonymity, confidentiality, the potential for harm, and communication of results ((Sweller, 1994) and (Kothari, 2004)

4.7 Validity and Reliability

To ensure the validity of this study, the researchers used more than one data collection method and involved different sources of information in allowing valid data usage and good results (Semlambo et al.,2022) and (Nnko et al.,2023). Furthermore, the researchers ensured the reliability of the study by identifying the study's limitations and addressing them. Additionally, the researchers conducted a pilot study before the actual research took place.

5.0 RESULTS ND DISCUSSIONS

5.1 Students Quizzes

The study investigates the impact of mathematics quizzes on student attendance and student mathematics performance at secondary level. Students can take these exams in a different of 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. But also, the number of absences from each quiz in a school was recorded and compared to those from previous quizzes in order to check the way in which quizzes increases student attendance. 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 have an effect on students' attendance. The more quizzes they have, the better they perform in their final examination as shown in the Figure 2 below.

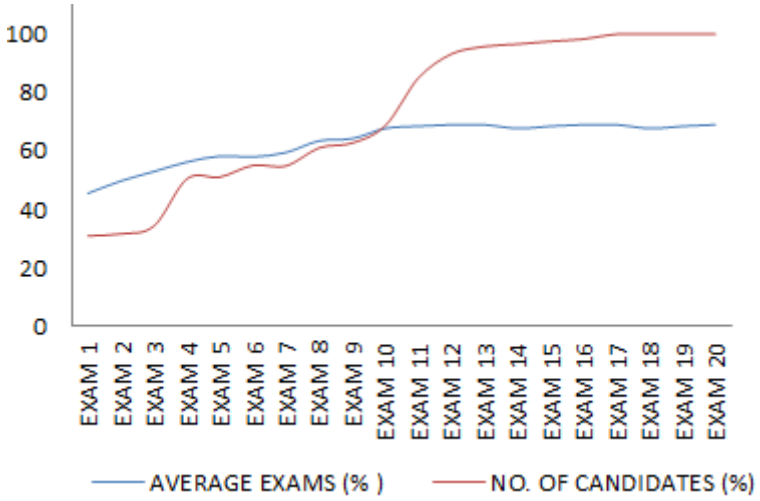
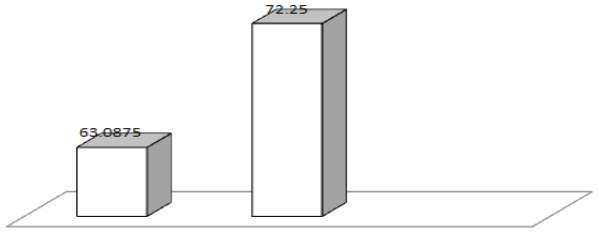


Figure 2: A line graph showing the impact of quizzes on students' attendance

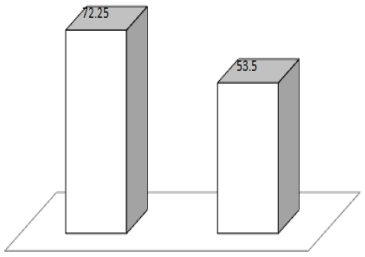
Again, in Group A, the average quizzes scores of 1180 students for the twenty quizzes is 63.0875% and the average of final examination results was 72.25% for the same students. This implies that the use of quizzes enhances students' academic performance. When you make comparison between the mean quiz scores and mean final examination results from Group A, and Group B (those who were not given any quizzes), the result display that Group B's students perform poorly on their final examination because there were not given any quizzes if all other factors remain constant. 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 that employ this method.

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 a number of 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 boost student participation in the classroom and attendance rewards is a good idea as shown in the Figure 3 and Figure 4 below.



Average quizzes (%) Average final examination (%) treatment group A

Figure 3: The bar graph displaying the effect of quizzes on final examination results



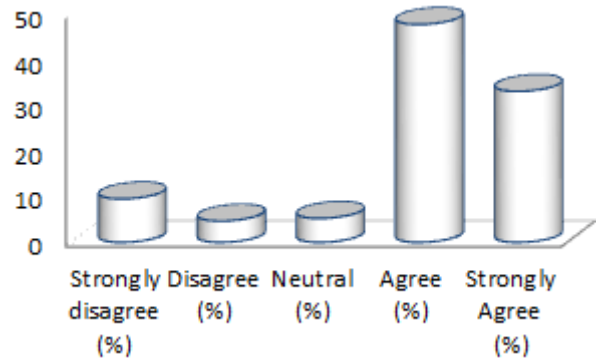
Treatment group A Treatment group B

Final exam (%) final exam (%)

Figure 4: Bar graph displaying the comparison between Group A and Group B

5.2 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 requesting 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. But 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 5 below.



SOURCES: (Field work 2024**)**

Figure 5; the area graph showing that, the majority of students agree that every module uses this kind of instruction.

5.2.1 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 me. 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.

5.2.2 DID THE QUIZZES INCREASE MY ABILITY TO STUDY

The study investigated whether respondents are 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 6 below.

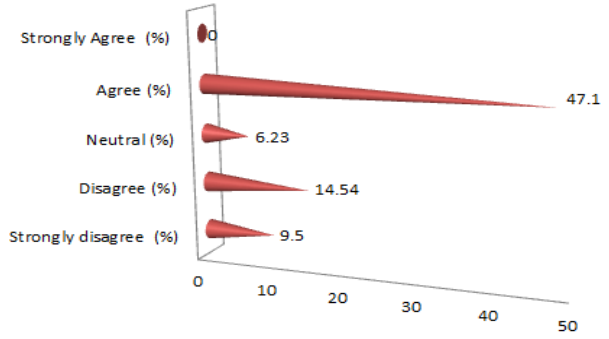


Figure 6. The area graph displaying that, did the quizzes enhance my study skills?

SOURCES (field work 2024).

5.2.3 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 me 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 me to actively engage in the mathematics class and 27.63% of respondents strongly agreed with the above statement. The study noted 36.1% of respondents generally agree that the quiz motivated me to actively engage in the mathematics class.

5.2.4 I MANAGED TO ATTEND EVERY SESSION WITHOUT ABSENCE.

This information was gathered in order 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 on a regular basis 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 50.1% of respondents generally agree that I managed to attend every session without absence.

6.0 CONCLUSION AND RECOMMENDATION

In conclusion, this study investigated the impact of mathematics quizzes on student attendance and mathematics performance at the secondary level in Singida District. Through analysis of attendance records and mathematics scores, coupled with insights from student and teacher perspectives, several key findings emerged. Firstly, mathematics quizzes were found to have a positive correlation with student attendance. Regular assessment through quizzes motivated students to attend classes consistently, contributing to improved overall attendance rates.

Secondly, regarding mathematics performance, the study revealed that students who regularly participated in quizzes demonstrated enhanced performance compared to their peers who did not

engage as actively. Quizzes served not only as a formative assessment tool but also as a means to reinforce learning and identify areas needing further attention. Furthermore, qualitative feedback from students and teachers highlighted the perceived benefits of quizzes in reinforcing mathematical concepts, promoting regular study habits, and fostering a more interactive learning environment. However, it's important to note that while quizzes showed promising impacts on attendance and performance, several factors outside the scope of this study, such as socioeconomic backgrounds and teaching methodologies, may also influence student outcomes.

In light of these findings, this study recommends the continued implementation of mathematics quizzes as part of the secondary school curriculum in Singida District. Educators are encouraged to integrate quizzes strategically to not only monitor student progress but also to enhance engagement and understanding of mathematical concepts. Future research could explore longitudinal effects of quiz implementation, investigate optimal quiz frequency and format, and assess broader implications for educational policy and practice. By refining and expanding our understanding of the role of quizzes in secondary mathematics education, we can further support student success and academic achievement in Singida District and beyond.

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