

Investigating the Consequences of Mathematics Quizzes on Student's Attendance and Success in Mathematics at Higher Learning Institutions. A Case of Institute of Accountancy Arusha (IAA)

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Abstract.

Professionals with knowledge of science, technology, engineering, and mathematics are in greater demand worldwide. Many Institutes and University have reorganized education and encouraged training to improve workers' and students' math and science skills in order to successfully meet this criterion. The main objective of educational and training initiatives is to enhance participants' comprehension of math and science.

Few things are known about the frequency and reasons behind students' absences from class, despite the fact that many college professors worry about student attendance. For this study, I examined class attendance, and I discovered that it declined from the start to the end of the semester.

The purpose of the study was to determine the impact of quizzes on students' attendance and math performance in higher education institutions. There is a clear pattern showing a direct correlation between math achievement and student attendance. Students who want to excel in their mathematics courses need to establish productive study habits. For a duration of 14 weeks, students were split into two treatment groups and given instructions. Treatment group A completed simple quizzes for ten minutes at each session. The Treatment group B did not have access to the quizzes.

Participants were given the quizzes for fourteen (14) weeks and questionnaires with closed-ended questions in order to collect data. The outcomes of the respondents' mathematics quizzes were used in the study. Both descriptive and inferential statistics were used to analyze the collected data. Overall, the results showed that mathematics quiz had a statistically significant (0.05-two tailed) impact on students' academic performance in the subject. The effects of math quiz and math performance are strongly positively correlated. When all other variables are held constant.

Instructors can eliminate the need for oral reviews of course progress and encourage students to review their lecture notes in advance. They can also support their efforts to help students transition from rote memorization to in depth understanding through class discussion. The study came to the conclusion that students who took quizzes frequently did better on the final examination and had higher grades in the mathematics course. I recommend that, this strategy/ method of teaching can also be applied for other modules or academic courses in order to prove students' ability.

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

Introduction

The majority of educators concur that maintaining students' interest, drive, and focus during a presentation can be challenging. According to (Liu, 2012), low motivation might result in subpar learning outcomes and a hostile learning environment. Higher education is typically where this issue is most noticeable because classrooms there are typically larger and have fewer direct connections. Students who completely participate in the learning process will learn more than those who participate less, according to (Turner, 2004) and Murray (1991).

Moreover, an abundance of data suggests that active engagement during lectures improves comprehension and scholastic performance (Barkley, Student engagement techniques: A handbook for college faculty, 2020). Studies have demonstrated that the Students Response System enhances learning results, the general dynamics of the classroom, and the viewpoints of both students and teachers (Caldwell, 2007).

The purpose of teaching mathematics, according to (Vakili, 2017), is to give students the confidence to take charge of their education and to solve mathematical problems on their own. Mathematics has a major influence on how people manage different aspects of their personal, professional, and social lives, much like any other obligatory and graded topic taught in postsecondary educational institutions (Anthony, 2009). Considering the significance of the issue, continuous underperformance would start a domino effect that would imperil the country's ability to advance in the future. It establishes the degree of engagement, enthusiasm, and individual effort all essential elements that are unlikely to be fulfilled in the absence of success (Mullis, 2001). The students display low motivation, a decline in participation, apathy, and behavioral issues including missing classes or assignments. It is obvious that something is wrong when students appear detached and uninterested throughout a teacher's engaging presentation (Langat, 2015). Students' opinions and beliefs regarding mathematics, such as how much they enjoy it, how essential they think it is, how difficult they think it is, and what they want to get out of it in the future, reveal aspects of their attitudes toward the subject. These attitudes will impact their academic progress (Schoenfeld, 1989). By providing my students all the resources they require to study more in depth content and deliver it effectively on final exams, I hope to help them become better learners. I believe that students' inability to manage the cumulative nature of these significant tests is the main cause of their struggles on summative assessments. (Black, 1998) provided the following definition of formative assessment: all those activities conducted by teachers, and/or by their students, that furnish information to be utilized as feedback for adjusting the teaching and learning activities in which they are involved. As stated by (Garrison, 2007), summative assessments are administered periodically to ascertain what students understand and what they do not understand at a specific point in time. For students to be prepared for lifelong learning, (Nicol, 2006) state that as they progress through higher education, students must be given opportunities to cultivate the ability to regulate their own learning."

Despite mathematics' importance and practical applications, global performance in the subject has always lagged behind average (Shiel, 2017). The academic system in Tanzania has continuously produced results that are of low quality following the End Semester Examination (Final examination), which is held at the conclusion of each semester. This is also a result of a large number of students missing the mathematics class.

The scenario that was previously presented can be used to simplify the problem statement and question that follow. My major research question is, "Will regular formative assessments (quizzes) have a positive effect on student learning in a mathematics classroom and classroom attendance?"

Methodology

This study examined the impact of mathematics Quizzes on student's attendance and success in mathematics at Higher Learning Institutions especially the Institute of Accountancy Arusha (IAA) which is at Arusha city using a quantitative technique (Lubawa, 2021). The intervention used in this study was to assign quizzes to mathematics classes. The study included 969 first year students from two distinct study programs at the Faculty of Informatics. We gathered the data for our empirical analysis from two distinct sources. The first set of data was derived from quiz results, and the second set was a survey that we administered to students participating in the mathematics

The intervention phase ran for a total of fourteen (14) weeks, beginning on the first session with quiz of each semester. The session began with a teacher led conversation about the use and importance of formative assessments as a tool for self reflection and success (Granberg, 2021). Students took part in a quick quiz covering the subtopics covered in that particular session during each period. Two student's groups were established. Treatment group A received access to these quizzes, whereas comparison Treatment group B was not given any. Students in Treatment group A were given 10 minutes each session to complete the quizzes, and

upon completion, they were provided with instantaneous feedback regarding their scores (Fluckiger, 2010). After completing the questions, all students got access to their responses and the correct answers, allowing them to review any errors they had made. There were fourteen (14) quizzes distributed in all during the fourteen (14) week period. Throughout the intervention period, students received continuous information about the advantages of formative evaluations. Participants in the study were given closed ended, standardized questionnaires to complete in order to gather data. To ascertain each participant's degree of skill in the subject, the results of the end of term mathematics examination were recorded on a checklist (Haydon, 2012). Descriptive and inferential statistics were run on the gathered data using Microsoft excel (Morgan, 2004). The results of the Mathematics quizzes were described in a descriptive way using the terms frequency, percentage, and mean and we use graphs comparison.

Results and Discussion.

Numerous research have examined the advantages of formative assessments in the classroom. These quizzes may be administered to students in a number of ways. Formative evaluations can be assigned on a daily or weekly basis, and they can be utilized for extra credit, as part of a student's overall grade, or just as a tool for self-reflection (Moss, 2019). Higher participation on formative quizzes was found to be associated with higher results on the final summative examination by teachers across a range of academic areas. Formative assessments, whether daily or weekly, have been widely employed by educators as a means of promoting introspection and enhancing the educational experience (Haigh, 2015).

In order to investigate how quizzes can increase student attendance, the total number of absences from each quiz in a program was tracked and compared to those from other quizzes (A. Neef, 2007). The results show that the higher quiz administration frequency is correlated with lower absence rates. The analysis is summarized in the figure below.

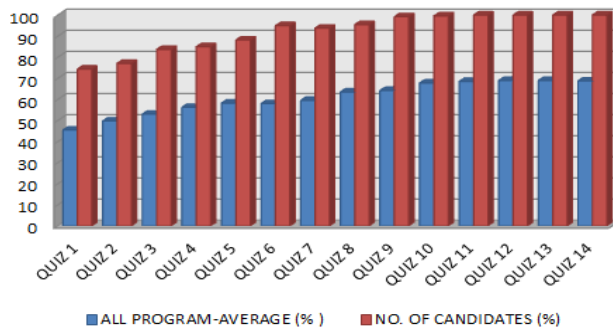


Figure 1. A bar graph representing effect of quizzes on students' attendance.

The figure 1 above show the average quizzes (%) of 484 students and percentage of candidates attended the quizzes. At the first quiz (i.e QUIZ 1), the number of candidates attended the quiz were 360 (74.4%), second quiz (i.e QUIZ 2), the number of candidates attended the quiz increases from 360 (74.4%) to 373 (77.1%). As quizzes continues the percentages of candidates also increase up to 100%. This implies that quizzes has effect on the students attendance (Zarei,2008).

Again, the result show that quizzes has effect on mathematics performance, the more quizzes they have lead to higher performance in the final examination results (Sotola, 2021), the influence of quizzes on Mathematics performance are shown in the figure below;

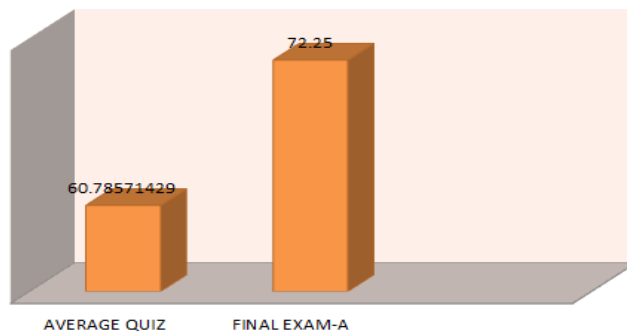


Figure 2. The bar graph showing the impact of quizzes on final examination results.

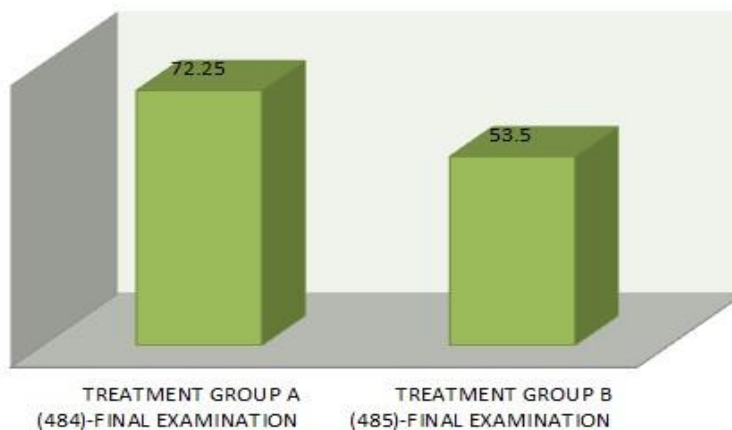


Figure 3; Bar graph that show comparison between treatment group A (with quizzes) and treatment group B (without quizzes).

The figure 2 above consist of average of quizzes of 484 students and the average of final examination results of 484 students in four programs in the faculty of informatics. Here the results show that the average of all fourteen quizzes for 484 students is 60.7871429% and the final examination results of the same students is 72.25% which implies that the application of quizzes has impact on students' achievements. Again in the figure 3, the results show the comparison between Treatment group A (average quizzes and final examination result) and Treatment group B (without quizzes). In treatment group B, the performance of the students in the final examination is low due to absence of quizzes if other factors remain constants. By using formative assessments, teachers may assess students' progress and promote regular study habits as opposed to cramming the night before a test. Students that employ this technique have a higher chance of being successful in the classroom. Furthermore, a notably elevated degree of student engagement was observed in the session evaluations. It is typical for students to lack the motivation from engaging in class activities. In order to get the desired results, teachers must supervise students' use of learning resources (Setiyani, 2020). Researcher has confirmed that using quizzes as an assessment approach can improve academic accomplishment (Ozan, 2018). According to a number of studies, quizzes can enhance deep learning (Azizan, 2018), lower test-taking anxiety (Shirvani, 2009), and boost long-term retention (Roediger III, 2011). Quizzes can enhance student learning in addition to performance (Roediger III, 2011). Research indicates that quizzes can be utilized to boost student engagement in the classroom and attendance incentive (Braun, 2012). Daily testing improved pupils' academic performance, according to research by math professor Shirvani (2009). Instructors who choose to award points for examination observed that student engagement and achievement has increased.

Student Surveys.

This information was gathered in order to assess whether or not regular quizzes enhanced student learning and students attendance. At the conclusion of the module, a survey was also given to every student to find out what they thought were the benefits of having quizzes more often. Additionally, students expressed their liking for

the regular quizzes and agreed that all courses should be evaluated using the same criteria. At first, students were against the concept of taking quizzes frequently. But after receiving timely feedback and learning that their quiz scores might help them in their final examination. The majority of the students (57%) agree that every module should use quizzes to improve mathematics performance and the majority of students agree that taking quizzes so frequently will not make them bored as displayed in the figure 1 and figure 2 below respectively.

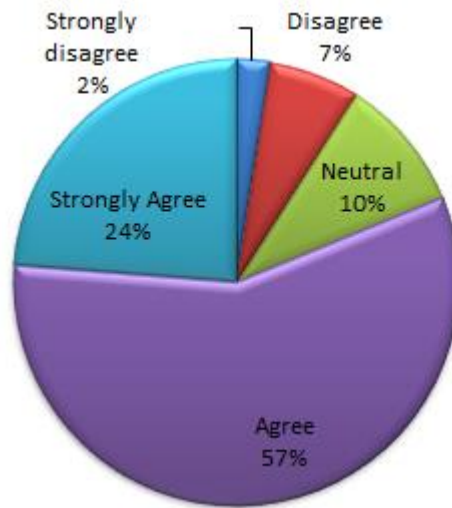


Figure 1; I hope that every module uses this kind of instruction.

SOURCES (DATA SURVEY 2023).

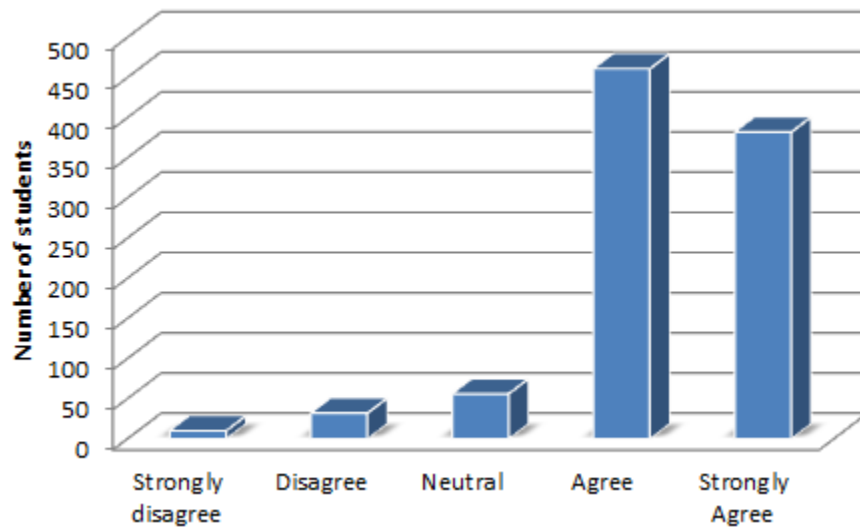


Figure 2; The fact that I took quiz so frequently didn't bother me.

SOURCES (DATA SURVEY 2023).

The figure 3 below shows that the majority of the students strongly agree quizzes improve my ability to study. After the students obtaining feedback they perceive that the application of quizzes improve the students' ability.

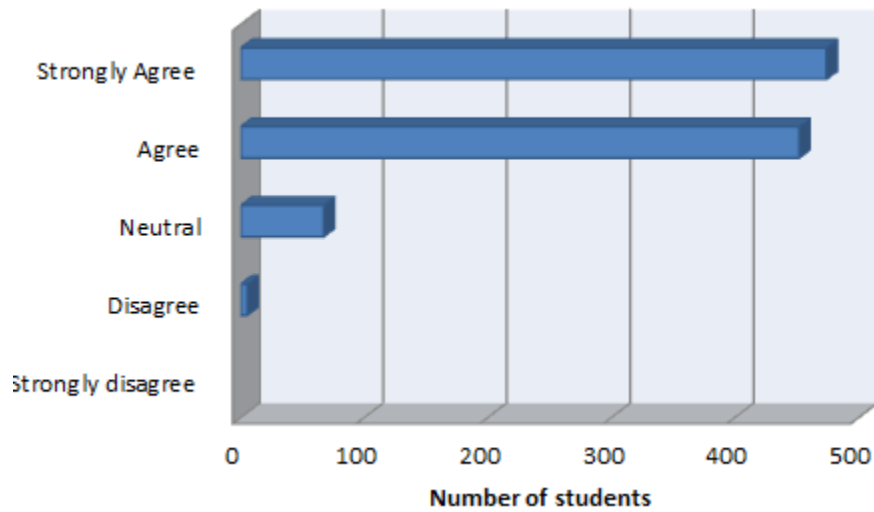


Figure 3; Did the quizzes improve my ability to study?
SOURCES (DATA SURVEY 2023).

The Quiz Encouraged Me To Participate Actively In The Mathematics Class

The results show that few students have negative responses that, the quiz encouraged me to participate actively in the mathematics class while the majority strongly agrees that the quiz encouraged me to participate actively in the mathematics class. Therefore, the quizzes have effect on the mathematics performance as displayed in figure 4.

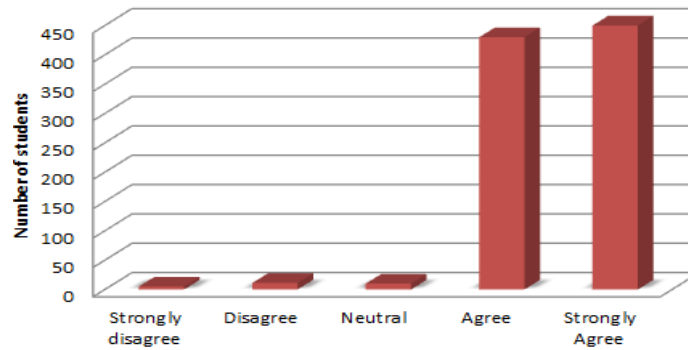


Figure 4; the quiz encouraged me to participate actively in the mathematics class.

SOURCES (DATA SURVEY 2023).

I Was Able To Attend Every Session Without Missing

This information was gathered in order to assess whether or not regular quizzes enhanced student attendance. Here the results show that the majority agree the application of regular quizzes contributed to the students attendance.

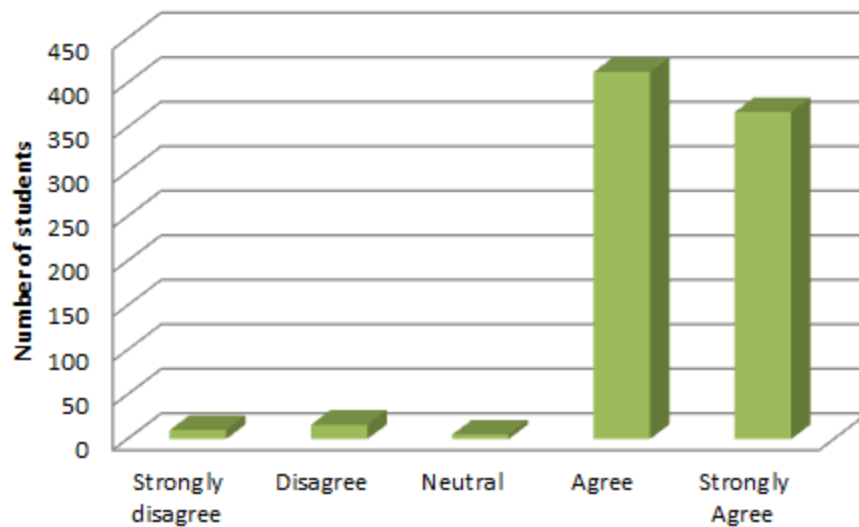


Figure 5; I was able to attend every session without missing

SOURCES (DATA SURVEY 2023).

Conclusion

The students who took quizzes frequently did better on the final examination and had higher grades in the mathematics course, and also regular quizzes contributed to the students' attendance. The approach has been popular with a majority of students on the two programs (that is Ordinary diploma and First bachelor) where it has been introduced. In both cases, it seems to have encouraged greater class participation by a larger group of better prepared students.'

I recommend that, this strategy/ method of teaching can also be applied for other modules or academic courses in order to prove students' ability.

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APPENDICES

STUDENTS QUIZZES.

The average quizzes in percentage (%) in programs and final examination from treatment group A in percentage (%) and final examination from treatment group B in percentage (%).

STUDENT'S GROUP	EXAMINATION TYPE	BCSe	BCS	ODIT	ODCS	ALL PROGRAM	NO. OF CANDIDATES	NO. OF CANDIDATES (%)
		AVERAGE (%)	AVERAGE (%)	AVERAGE (%)	AVERAGE (%)	AVERAGE (%)		
TREATMENT GROUP A (484)	QUIZ 1	45	47	39	51	45.5	360	74.4
	QUIZ 2	49	52	42	56	49.75	373	77.1
	QUIZ 3	52	56	45	59	53	405	83.7
	QUIZ 4	56	59	49	61	56.25	412	85
	QUIZ 5	59	64	44	66	58.25	427	88.2
	QUIZ 6	63	67	48	54	58	460	95
	QUIZ 7	66	63	51	58	59.5	454	93.8
	QUIZ 8	62	65	56	71	63.5	462	95.5
	QUIZ 9	65	69	55	68	64.25	480	99.2
	QUIZ 10	68	72	59	72	67.75	482	99.6
	QUIZ 11	71	74	61	68	68.5	484	100
	QUIZ 12	73	67	64	72	69	484	100
	QUIZ 13	69	72	65	70	69	484	100
	QUIZ 14	74	70	66	65	68.75	484	100
		AVERAGE	62.28571429	64.07142857	53.14285714	63.64285714	60.78571429	
	FINAL EXAM	76	71	68	74	72.25		
TREATMENT GROUP B (485)	FINAL EXAM	54	60	45	55	53.5		

STUDENT SURVEY.

Statements	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
A ₁	20	53	79	463	192
A ₂	10	32	56	461	382
A ₃		5	67	452	474
A ₄	5	11	10	430	450
A ₅	10	16	5	412	410

SOURCES; FIELD WORK 2023

The above letter i.e A₁ up A₅ stands for the following statements;

A₁= **I hope that every module uses this kind of instruction..**

A₂ = **The fact that I took tests so frequently didn't bother me.**

A₃ = **Did the tests improve my ability to study?**

A₄ = **The test encouraged me to participate actively in the mathematics class.**

A₅ = **I was able to attend every session without missing**