Effect of Test Timing on Students' Interest and Achievement in Senior Secondary II Mathematics in Makurdi, Benue State, Nigeria

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ABSTRACT

This study examined the influence of time of day and test duration on students' academic performance in Mathematics. The study was motivated by the persistent poor performance of students in Mathematics and the need to identify instructional and assessment factors that may enhance learning outcomes. A descriptive survey research design was adopted for the study. The population comprised secondary school students, from which a representative sample was selected using appropriate sampling techniques. Data were collected using a structured Mathematics achievement test administered at different times of the day and under varying test durations. The data collected were analyzed using appropriate statistical tools, including mean and standard deviation, as well as inferential statistics to test the formulated hypotheses at a 0.05 level of significance. The findings revealed that duration of tests significantly influence students' interest in Mathematics. Test time of the day (morning and afternoon) does not significantly influence students' achievement scores. The study concludes that while the time of day (morning or afternoon) does not significantly affect students' achievement in Mathematics, test duration has a significant influence on their interest in the subject. This suggests that students tend to perform consistently regardless of when a test is administered, but the length of the test can impact their level of engagement and motivation. Therefore, greater attention should be given to designing appropriate test durations to enhance students' interest and overall learning experience in Mathematics

Keywords: Time of Day, Test Duration, Mathematics Achievement, Students' interest.

INTRODUCTION

Mathematics is the science that deals with the logic of shape, quantity and arrangement. Mathematics is all around us, in everything we do. It is the building block for everything in our daily lives, including mobile devices, architecture (ancient and modern), art, money, engineering, and even sports (Elaine, 2021). Mathematics is one of the school subjects that every nation needs for industrial and technological advancement, useful for most vocation and higher specialized courses of learning (Yadav, 2019). According to Yadav (2019), Mathematics is the study of quantity, structures, space and change. It develops through the use of abstraction and logical reasoning from counting, calculation, measurement and the study of shapes and motion of physical objects. Mathematics is an excellent vehicle for the development and improvement of a person's intellectual competence in logical reasoning, spatial visualization, analysis and abstract thought (Curriculum Planning and Development Division, 2007). Students who study Mathematics, therefore, develop numeracy skill, reasoning, thinking skills and problem solving skills through the learning and application of Mathematics. Curriculum Planning and Development Division (2007) stipulated that the aims of Mathematics education are to enable students to:

(i) Acquire the necessary Mathematical concepts and skills for everyday life, and for continuous learning in Mathematics and related disciplines.

(ii) Develop the necessary process skills for the acquisition and application of Mathematical concepts skills.

(iii) Develop the Mathematical thinking and problem solving skills and apply these skills to formulate and solve problems.

(iv) Recognize and use connections among Mathematical ideas and develop Mathematical tools (including information and communication technology) in the learning and application of Mathematics.

(v) Produce imaginative and creative work arising from Mathematical ideas and develop positive attitudes towards Mathematics.

The above aims and objectives can be achieved through judicious use of Mathematics curriculum. Educators are often required to follow a curriculum approved by their state or supervisor. Curriculum is the subjects that make up a course of study in a school setting. Curriculum planners usually identify and organize the instructional materials that the course will follow. A curriculum designer makes decisions about what the students will be learning at all levels and how to deliver that material to the students which helps in achieving the aims and objectives of the subject matter.

The inclusion of Mathematics as a core subject in the Secondary School curriculum is due to the key roles Mathematics has to play in the achievement of the objectives of the secondary school education, such as promoting of science and technology, provision of trained manpower in the applied sciences, technology and commerce, and the acquisition of appropriate skills, abilities and competence both mental and physical, as equipment for the individual to live on and contribute to the development of his society (Federal Republic of Nigeria, 2014). It is widely believed that Mathematics is very important to the economic, scientific and political development of any nation. It is because of this common phenomenon that made most nations in the world (including Nigeria) to make Mathematics a compulsory subject in every aspect of educational system. The principles of Mathematics are generally understood at an early age. When missed, it gives birth to loss of interest which interferes with Mathematics performance.

Despite the laudable aims and great importance of Mathematics, it is the only subject that is most dreaded to learners among all subjects offered in schools (Langoban, 2020). Students therefore tend to respond to it with less self-confidence and negative feeling which results to lack of interest in the subject. This situation is worsened by the compulsory nature of the subject at primary and secondary levels, leading to student's poor performance in the subject. In the May/June 2023 WAEC released result, out of the 316,999 students who registered for examination across the country, only 38.33% of the students obtained at least a credit pass (WAEC Chief Examiner's report, 2023).

More so, the Benue State Examination Board results analysis in Mathematics at Mock Senior Secondary Certificate Examination (SSCE) level in some selected secondary schools in Makurdi Local Government Area of Benue State substantiate the above assertion. Below is the analysis for four years. From the result those with 40 and above were considered as pass and those with scores below 40 considered as fail. (Grade: E8, D7, C6 C5, C4, B3, B2, A1 = Pass and F9 = Fail).

Figure I: Mock SSCE Results

Year	Total number of Students	Number of students passed	Number of students failed	Percentage (%) passed	Percentage (%) fail
2016	409	230	179	56.23	43.77
2021	420	197	223	46.90	53.10
2022	382	143	239	37.43	62.57
2023	424	207	217	48.82	51.18
Total	1635	777	858	47.52	52.48

Source: Benue State Examination Board (BSEB)

From the result analysis in figure I, it shows that it was only in 2016 that the percentage pass was above 50%. The figure also shows an average percentage pass of 47.52 while the average percentage failed is 52.48. Therefore on average, it shown that there was poor performance.

The incessant poor achievement in Mathematics in Nigerian Primary and Secondary Schools levels may be attributed to several factors including student's lack of interest in learning Mathematics. A number of researchers have also looked into the cause of poor performance of students in Mathematics, from their reports, the causes of poor performance include; inadequate qualified teachers, lack of creative thinking, lack of proper teaching aids, poor use of instructional materials, lack of interest on the part of students (Jameel & Ali 2016).

However, Lack of interest on the part of students seems to be a major problem that is affecting the performance of students in Mathematics (Tembe, Anyah & Abakpa, 2020). According to Longman Dictionary (1995), Interest is a feeling that makes you want to pay attention to something or to find out more about it. That implies that if students have interest in Mathematics, they will pay attention to it, listen to their Mathematics teachers both in class and outside the class, find out more about Mathematics. On doing this, performance of the students will improve. Many factors have been identified in literature as reasons associated with student's lack of interest in learning Mathematics. These include Student's factor, teachers' factor, Mathematics anxiety, class size, government factor, infrastructural problem, instructional strategy, test timing, among others (Akinnoso, 2011).

However, Test timing seems to be a major factor that is contributing negatively to the performance of students in Mathematics. O'kwu and Anyagh (2010) stated that, management of time is an essential ingredient for success in mathematics tests. Cyril (2015) also viewed time as a precious and irreplaceable commodity. The author reviewed that; the use of time can determine the success or failure of a given task. Cyril therefore stressed that time management must be regarded as a crucial skill, which must be mastered for one to succeed on any assignment.

A test is a structured exercise or questions which require the respondent to display a pre-determined behavioural trait. It is an instrument used to elicit a type of behavior or competency one is interested in finding out. Test is used to detect the presence or absence of certain kind of psychological trait in an individual. Test is a systematic procedure for measuring a sample of behavior or a systematic procedure for observing a person's behavior and describing it with the aid of numerical scale (Emaikwu, 2016). Achievement Test on the other hand is a test constructed based on some course content which students or pupils have been exposed to previously, either in the classroom or otherwise (Adikwu, Aduloju & Agi, 2016). An achievement test is an instrument designed to measure the relative accomplishment in a specified area of work (Emaikwu, 2016). Achievement test are constructed to measure the effects of specific programme of instruction or training. Testing the achievement of the students is mainly directed to the "cognitive" domain of Bloom's taxonomy of educational objectives. An achievement test tries to measure the current status of individuals with respect to achieving proficiency in given area of knowledge. The purpose of the test is to determine how much of these content, students have learnt (determination of the extent of attainment). Examples are tests given to students by the subject teacher, popularly known as teacher-made-test; certificate examinations such as First School Living Certificate (FSLC), West African Examination Council (WAEC), Unified Tertiary Matriculation Examination (UTME) and Semester Examinations (SE). Achievement tests are either standardized or teacher-made. In general, testing is finding out how well something works. In terms of human beings, testing tells what level of knowledge or skill has been acquired. In as much as test gives the level of knowledge or skill acquired, if the right choice of test timing (both duration and time of the day) is not used, the result obtained may not be the true level of knowledge or skill acquired by the testee.

Timing according to Merriam – Webster (2025), is the time when something happens or is done especially when it is thought of as having a good or bad effect on the result. According to Wikipedia, Timing is the time when something happens or the spacing of events in time. Timing also means the tracking of time when an event is happening in time. Timing in Oxford dictionary is the choice, judgment, or control of when something should be done. It is a particular point or period of time when something happens. According to Cyril (2015), time is a precious and irreplaceable commodity. Thus the use of time can determine the success or failure of a

given task. Walter therefore stressed that time management must be regarded as a crucial skill, which must be mastered for one to succeed in any assignment.

Timing of Mathematics test can be divided into Test duration and Test time of the day. Test duration refers to the time frame during which students are allowed to respond to test items. Test duration can influence the interest and achievement of students in Mathematics. When students are under time pressure, they may make mistakes that have nothing to do with the extent of their learning which can make them to loss interest in the subject. As O'kwu and Anyagh (2010) recommended that, timing should be done in such a way that the allocated time would be adequate for students to respond to the required number of questions, which can make way for student's success in a Mathematics test.

On the other hand, Test time of the day is the time (Morning, Afternoon or Evening) at which students are being tested. Time – of – day when academic subjects are taught could affect students' achievement. Learning – styles research reveals that students shows interest when they are taught and assessed at their preferred time – of – day (Amanda & Gary, 2011). Millar, Styles and Wastell in Amanda and Gary, (2011) claimed morning assessments is associated with superior immediate recall when compared to assessments in afternoon or evening. However, material initially learned in afternoon is more beneficial to long – term memory recall. Dimitrova (2017) suggested that, Mathematics assessments ought to be held in the morning because students are better at concentrating before lunch time. According to the author, brains are better and fresher in the morning, so students are better at doing something repetitive like problem solving, where they require more speed, attention and focus in the morning. This study focused on this timing in which morning is inclusive.

Timing is one of the factors that can motivate the interest of students in Mathematics if properly managed. Kpolovie, Joe and Okoto in Boniface (2018) defined interest as a psychological state of having an affective reaction to and focus attention for particular content and or the relatively enduring predisposition to engage repeatedly in particular classes of objects, events or ideas. According to Adeyemi and Adeyemi in Boniface (2018) interest has to do with a learner's predisposition to react positively in certain ways towards certain aspects of the environment and is usually developed in relation to and remains allied to more basic motives. Interest is often thought of as a process that contributes to learning and achievement. That is, being interested in a topic is a mental resource that enhances learning, which then leads to better performance and achievement. More so, Kpolovie, Joe and Okoto (2014), has demonstrated in their research that, both situational and individual interest promote performance of students.

Conclusively, time is the most influential factor in this world. It is abstract. Everything in this world is commanded and decided by time. Nobody can escape the hold of time. It is on this note that the researcher is interested in Test Timing as a factor affecting students' interest. Therefore, the researcher wishes to find out the effects of test timing on students' interest and achievement in Mathematics so as to address the issue of poor performance of students in Mathematics. The researcher focused on test Time of day and Test duration.

Statement of the Problem

Time is the most influential factor in this world. It is abstract. Everything in this world is commanded and decided by time. Thus, the use of time can determine the success or failure of students in Mathematics. When time is properly managed, it serves as an essential ingredient for success in Mathematics tests. Proper management of time for the success of students in Mathematics may involve test duration and test time of the day.

When students are under time pressure, they may make mistakes that have nothing to do with the extent of their learning which can make them to loss interest in the subject. Learning takes place properly when its result is satisfying. In a situation where by students persistently meet with failure or get no satisfaction from their Mathematic test scores due to test duration, the progress on the path of interest and learning may be blocked. For instance, analysis of the Mock SSCE Mathematics results from 2016 to 2023 in selected secondary schools in Makurdi Local Government Area reveals a troubling trend; only one year (2016) recorded a pass rate above 50%. On average, the percentage pass was 47.52%, with a failure rate of 52.48%, indicating consistent underperformance. This alarming pattern suggests that students are not only struggling academically but may also be losing interest in Mathematics as a result of these repeated failures.

Several studies have identified various factors contributing to poor performance in Mathematics, including inadequate teaching materials, unqualified teachers, overcrowded classrooms, and student-related factors such as anxiety and low interest. Among these, students' lack of interest stands out as a critical issue influencing both engagement and achievement in Mathematics. Research has shown that when students are interested in a subject, they are more likely to engage, persist, and perform better. Conversely, disinterest often leads to low motivation, poor participation, and ultimately, academic failure.

A potentially overlooked yet significant factor that may influence students' interest and achievement in Mathematics is test timing, which includes both test duration (how much time is allotted for a test) and test time of the day (when during the day the test is administered). Evidence from the literature suggests that these timing variables can affect students' mental readiness, anxiety levels, attention span, and cognitive performance. For instance, assessments taken during early hours of the day are believed to yield better concentration and higher achievement in Mathematics, while insufficient test duration may induce unnecessary pressure, leading to errors and disinterest. Cognitive Load Theory (CLT), as proposed by Sweller (1988), provides a useful theoretical framework for explaining how test timing variables may influence students' learning outcomes. The theory posits that the human working memory has limited capacity, and learning is optimized when instructional and assessment conditions are structured to avoid overloading this capacity. CLT identifies three types of cognitive load: intrinsic load (associated with the complexity of the task), extraneous load (resulting from the way tasks are presented), and germane load (devoted to meaningful learning). In the context of Mathematics testing, test duration can influence extraneous cognitive load; insufficient time may impose excessive pressure, leading to anxiety, rushed responses, and reduced interest, while overly long durations may cause fatigue and reduced concentration. Similarly, test time of the day may affect learners' mental alertness and readiness, thereby influencing how cognitive resources are allocated during task performance. When testing conditions align with students' cognitive capacity, learning and performance are likely to improve. Thus, Cognitive Load Theory provides a theoretical basis for understanding how test duration and time of the day may affect students' interest and achievement in Mathematics

More so, evidence from the literature claims that, brains are better and fresher in the morning, which implies that, students are better at responding to Mathematics questions in the morning. Test time of the day has to do with students' mind set. Most students prefer morning time for Mathematics test. Therefore, if teachers are able to know their students' prefer time of the day in Mathematics and make use of it, it may be one of the ingredients to boost students' interest in Mathematics as readiness is an important condition of learning because satisfaction or frustration depends on individuals' state of readiness

In light of the persistent poor performance in Mathematics and the possible role of test timing as a contributing factor, this study investigated the effects of test timing (both duration and time of day) on students' interest and achievement in Mathematics. Additionally, it explore whether gender moderates these effects. Understanding the relationship between test timing and student outcomes may offer practical solutions for improving Mathematics interest and performance among senior secondary school students.

Mathematics is a fundamental discipline that deals with the study of quantity, structure, space, and change, and plays a crucial role in the scientific, technological, and economic development of any nation. It serves as a foundation for logical reasoning, problem-solving, and analytical thinking, which are essential skills for everyday life and advanced learning. Consequently, Mathematics has been made a core subject in the Nigerian secondary school curriculum to equip learners with the necessary competencies for national development.

Despite its importance, students' performance in Mathematics at the secondary school level has remained persistently poor. Reports from national examination bodies such as the West African Examinations Council (WAEC) indicate consistently low pass rates over the years. Similarly, analysis of Mock Senior Secondary Certificate Examination results in Benue State shows that a significant proportion of students fail to attain satisfactory performance levels. This persistent poor performance has been attributed to several factors, including ineffective teaching methods, inadequate instructional materials, and most importantly, students' lack of interest in the subject.

Interest is a key psychological factor that influences students' engagement and achievement in learning. When students develop interest in Mathematics, they tend to pay attention, participate actively, and perform better.

Conversely, lack of interest leads to poor engagement and low academic achievement. While several factors influence students' interest, one important but often overlooked factor is test timing, which includes test duration and test time of the day**.**

Test duration refers to the amount of time allocated for students to complete a test. Inadequate or excessive test duration may affect students' level of comfort, concentration, and ultimately their interest in the test. When students are subjected to insufficient time, they may experience anxiety, make avoidable errors, and lose interest. Conversely, appropriate test duration can enhance students' confidence, engagement, and overall interest in Mathematics.

Another important dimension of test timing is the time of the day at which tests are administered. Students' cognitive functioning, attention span, and level of alertness may vary depending on whether a test is taken in the morning or afternoon. Studies suggest that students tend to perform better during periods when they are mentally alert and less fatigued. Morning sessions, in particular, are often associated with better concentration and improved academic performance, especially in cognitively demanding subjects like Mathematics.

In addition to influencing interest, test duration also has implications for students' achievement in Mathematics. When the allocated time is insufficient, students may be unable to fully demonstrate their knowledge and skills, resulting in poor performance. On the other hand, adequate time enables students to organize their thoughts, attempt more questions, and achieve better results. Thus, test duration plays a critical role in shaping students' achievement outcomes.

Given the persistent poor performance in Mathematics and the need to improve both students' interest and achievement, it becomes necessary to examine how test timing variables specifically test duration and test time of the day affect students' learning outcomes. Understanding these effects will provide valuable insights into how assessment conditions can be structured to enhance students' engagement and academic performance.

Therefore, this study investigates the effects of test duration on students' interest**,** test time of the day on students' achievement**,** and test duration on students' achievement in Senior Secondary II Mathematics in Benue State, Nigeria.

Empirical evidence further supports the importance of test timing variables in influencing students' learning outcomes. O'kwu and Anyagh (2010) examined the effect of timing in Mathematics tests on students' achievement in Makurdi metropolis using a descriptive survey design. A sample of 250 Senior Secondary II students was selected, and two Mathematics Achievement Tests were administered under different timing conditions. The results, analyzed using mean, standard deviation, and t-test, revealed that students who managed their time effectively and those given additional time performed significantly better. This finding underscores the influence of test duration on students' achievement**.**

Similarly, Denis and Henry (2021) investigated the combined effects of time of the day and test duration on students' achievement in Mathematics using a 3×4 factorial design involving 488 students. The study found that both test duration and time of the day significantly influenced achievement, with students tested in the afternoon and given longer durations achieving the highest mean scores. This highlights the importance of both timing variables in shaping academic performance.

Danish, John and Latif (2022) also examined the effect of time of the day on students' learning and achievement in Mathematics. Using descriptive statistics and t-test, the study revealed that students performed significantly better when assessed during their preferred time of the day. This supports the view that time of the day influences students' achievement, particularly when comparing morning and afternoon sessions.

In a related study, Uyanah and Ojating (2021) investigated the influence of test duration on students' academic performance using a quasi-experimental design. The findings indicated that longer test durations significantly improved students' achievement, suggesting that adequate time enhances students' ability to perform effectively in Mathematics tests.

Furthermore, Sari Hidayat and Prasetyo (2025) explored the relationship between time management, students' interest, and academic achievement in Mathematics. Using correlational and regression analyses, the study found that effective time management significantly predicts both students' interest and achievement. Although the study focused on general time management, it reinforces the importance of time-related factors in influencing students' interest, which is relevant to the present study's focus on test duration and interest.

Additionally, Sidhu and Srinivasan (2020), as well as Mehta (2025), examined the influence of time of the day and circadian rhythms on students' academic performance. Their findings revealed that students' cognitive performance and achievement were higher during morning and early afternoon periods, indicating that time of the day plays a significant role in students' achievement**.**

Based on the foregoing, the following research questions were raised to guide the study:

i. What is the mean interest rating of students on test duration in Senior Secondary II Mathematics?

ii. What are the mean achievement scores of students tested at different times of the day (morning and afternoon) in Senior Secondary II Mathematics?

iii. What is the mean achievement score of students tested at different test durations in Senior Secondary II Mathematics?

The following hypotheses were formulated and tested at 0.05 level of significance:

i. There is no significant difference in the mean interest rating of students across different test durations in Senior Secondary II Mathematics.

ii. There is no significant difference in the mean achievement scores of students tested at different times of the day (morning and afternoon) in Senior Secondary II Mathematics.

iii. There is no significant difference in the mean achievement scores of students across different test durations in Senior Secondary II Mathematics.

METHODOLOGY

The study adopted a quasi-experimental one-group time-series design involving repeated measurement of students' interest and achievement under different test durations and times of testing. The design was suitable due to the impracticability of random assignment; hence, an intact class was used.

The study was conducted in Benue State, Nigeria. The population comprised 254,000 Senior Secondary II students offering Mathematics in 899 secondary schools (Benue State Ministry of Education, 2022/2023). A sample of 130 students was purposively selected from intact SS II classes in 3 secondary school in Makurdi based on the availability of qualified teachers and adequate facilities.

Data were collected using two instruments: The Mathematics Achievement Test on Measures of Central Tendency and Dispersion (MATMCD) and the Mathematics Interest Inventory (MII). The MATMCD consisted of 20 multiple-choice items and was administered under four different durations (30, 60, 90, and 120 minutes) and at different times of the day (morning and afternoon) to measure achievement. The MII, a 26-item 4-point Likert scale, was used to assess students' interest.

The instruments were validated by two experts in Measurement and Evaluation and one in Mathematics Education. Reliability coefficients for the MATMCD ranged from 0.65 to 0.74 using the split-half method, while the MII yielded a Cronbach's alpha of 0.85.

Data collection was carried out during normal school hours with the assistance of trained Mathematics teachers using standardized lesson procedures. Measures such as uniform instruction and consistent testing conditions were used to control extraneous variables.

Data were analyzed using mean and standard deviation to answer the research questions, while repeated measures ANOVA and paired sample t-test were used to test the hypotheses at the 0.05 level of significance. A criterion mean of 2.50 was used to interpret students' interest levels.

RESULT AND DISCUSSION

Research Question one: What is the mean interest rating of students on test duration in senior

Table 1: Mean and Standard Deviation of interest rating of students on test duration in senior secondary II Mathematics

Test duration	Morning $\bar{X}_1$	SD_1	Afternoon $\bar{X}2$	SD_2	Grand mean	Grand SD	Decision
30 minutes	3.24	0.82	2.60	0.86	2.92	0.84	M. Interest
60 minutes	2.94	0.84	2.71	0.76	2.82	0.80	M. Interest
90 minutes	2.93	1.14	3.11	0.84	3.02	0.99	H. Interest
120 minutes	3.21	0.89	3.20	0.79	3.20	0.84	H. Interest

The results presented in the table show that students' interest in Mathematics varied with test duration. Based on the mean interpretation criteria, students exposed to 30 minutes ($\bar{X}$ = 2.92) and 60 minutes ($\bar{X}$ = 2.82) test durations demonstrated a moderate level of interest in Mathematics. However, students' interest increased to a high level at 90 minutes ($\bar{X}$ = 3.02) and further improved at 120 minutes ($\bar{X}$ = 3.20).

This trend indicates that students tended to show greater interest in Mathematics as the test duration increased, with the highest level of interest observed at 120 minutes. The finding suggests that extended test duration may reduce time pressure and enhance students' engagement during Mathematics tests.

Research Hypothesis 1: There is no significant difference in the mean interest rating of students with different test duration in senior secondary II Mathematics.

The data for testing the hypothesis is presented in table 2.

Table 2: Repeated Measures ANOVA Showing the Effect of Test Duration on Students' Mean Interest Rating

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
factor1 testdura	**Sphericity Assumed**	**1678.758**	**3**	**559.586**	**72.555**	**.000**
	Greenhouse-Geisser	1678.758	2.625	639.545	72.555	.000
	Huynh-Feldt	1678.758	2.910	576.921	72.555	.000
	Lower-bound	1678.758	1.000	1678.758	72.555	.000
Error(factor1)	Sphericity Assumed	670.992	87	7.713		
	Greenhouse-Geisser	670.992	76.123	8.815		
	Huynh-Feldt	670.992	84.386	7.951		
	Lower-bound	670.992	29.000	23.138		

$p < .05$ (difference is significance) H_0: Rejected

Table 2 reveals that the computed F-value is F(3, 87) = 72.55 with a significant value (p) of .000. Since the obtained significant value (p = .000) is less than the chosen level of significance ($\alpha = .05$), the null hypothesis (H_0) is rejected

Research Question Two: What is the mean achievement scores of students tested at different time of the day in senior secondary II Mathematics?

To answer this question, data is presented in table 3.

Table 3: Mean and Standard Deviation of students' achievement score tested at different time of the day in senior secondary II Mathematics

Test time of the day	$\bar{X}$/SD	30 min	60 min	90 min	120 min	Grand Mean
Morning	$\bar{X}_1$	4.34	8.93	13.40	12.70	9.84
	SD_1	1.98	3.15	3.29	3.09	2.88
Afternoon	$\bar{X}_1$	4.73	9.10	14.03	13.34	10.30
	SD_2	2.59	2.41	2.95	2.88	2.71
Mean diff		0.39	0.17	0.63	0.64	0.46

The table shows the mean achievement scores of students tested at different time of the day (Morning and Afternoon) for Senior Secondary II Mathematics. The mean achievement score of 9.84 was recorded in the morning, with a standard deviation (SD) of 2.88 while in the Afternoon, the mean achievement score increases to 10.30, with a standard deviation (SD) of 2.71. The lower SD compared to the morning indicates that there is slightly less variability in the afternoon scores. The Mean Difference between the morning and afternoon scores is 0.46.

Research Hypothesis Two: There is no significant difference in the mean achievement scores of students tested at different time of the day in senior secondary II Mathematics

The data presented in table 4 is used in testing the hypothesis.

Table 4: Paired Samples t-Test Showing the Difference in Students' Mean Achievement Scores Based on Test Time of the Day (Morning and Afternoon)

Variables Compared	**Mean Difference**	**t**	**df**	**Sig. (2-tailed)**
Morning				
	-0.361	-0.806	29	.427
Afternoon				

$p > 0.05$ (difference is not significance) H_0: Not Rejected

A paired samples t-test was conducted to examine whether there was a significant difference in students' mean achievement scores between morning and afternoon test periods. The result showed no statistically significant difference between morning and afternoon achievement scores, $t(29) = -0.806$, $p > .05$. Therefore, the null hypothesis which states that there is no significant difference in the mean achievement scores of students tested at different times of the day in Senior Secondary II Mathematics was not rejected

Research Question Three: What is the mean achievement score of students tested at different test duration in senior secondary II Mathematics?

Table 5: Mean and Standard Deviation of students' achievement score tested at different test duration in senior secondary II Mathematics

Test duration	Morning $\bar{X}_1$	SD_1	Afternoon $\bar{X}_1$	SD_2	Mean diff	Grand mean	Grand SD
30 minutes	4.34	1.98	4.73	2.59	0.39	4.54	2.29
60 minutes	8.93	3.15	9.10	2.41	0.17	9.02	2.78
90 minutes	13.40	3.29	14.03	2.95	0.63	13.72	3.12
120 minutes	12.70	3.09	13.34	2.88	0.64	13.02	2.99

The table compares the mean achievement scores of Senior Secondary II Mathematics students tested at different test durations (30, 60, 90, and 120 minutes). The table shows a grand mean score of 4.54 with standard deviation of 2.29 for the 30-minutes test, 9.02 with standard deviation of 2.78 for the 60-minutes test,

13.72 with standard deviation of 3.12 for the 90-minutes test and 13.02 with standard deviation of 2.99 for the 120-minutes test. This signifies that students' achievements were better at 90-minutes and 120-minutes.

Research Hypothesis Three: There is no significant difference in the mean achievement score of students tested at different test durations in senior secondary II Mathematics.

Table 6: Repeated Measures ANOVA Showing the Effect of Test Duration on Students' Achievement Scores

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
hyp4	**Sphericity Assumed**	**1677.723**	**3**	**559.241**	**150.531**	**.000**	**.838**
	Greenhouse-Geisser	1677.723	2.531	662.942	150.531	.000	.838
	Huynh-Feldt	1677.723	2.793	600.745	150.531	.000	.838
	Lower-bound	1677.723	1.000	1677.723	150.531	.000	.838
Error(hyp4)	Sphericity Assumed	323.215	87	3.715			
	Greenhouse-Geisser	323.215	73.391	4.404			
	Huynh-Feldt	323.215	80.989	3.991			
	Lower-bound	323.215	29.000	11.145			

$p < .05$ (difference is significance) H_0: Rejected

The table showed a repeated measures ANOVA, $F(2.531, 73.391) = 150.531$, $p < .05$, indicating that the mean achievement scores of students differed significantly across the different test durations**,** and the null hypothesis is therefore rejected hence, there is a significant difference in the mean achievement score of students tested at different test durations in senior secondary II Mathematics.

Summary of major findings

The following findings emanate from the study base on the results of the analysis:

i. There is statistically significant effect of test duration on students' mean interest rating in senior secondary II Mathematics.

ii. There is no statistically significant difference between morning and afternoon achievement scores among senior secondary II students in Mathematics.

iii. There is a significant difference in the mean achievement score of students tested at different test durations in senior secondary II Mathematics.

DISCUSSION OF FINDINGS

The first finding indicates that test duration has a statistically significant effect on students' mean interest rating in Senior Secondary II Mathematics. This suggests that the amount of time allocated for testing plays an important role in shaping students' psychological engagement with Mathematics. This finding is consistent with O'kwu and Anyagh (2010), who reported that adequate test timing enhances students' performance, implying that sufficient time reduces tension and promotes better engagement with test items. Supporting this position, Uyanah and Ojating (2021) found that longer test durations significantly improved students' achievement in Mathematics, indicating that time availability enhances students' ability to process and respond to tasks effectively. Furthermore, recent evidence by Sari et al. (2025) shows that time management significantly predicts both students' interest and achievement in Mathematics, suggesting that time-related variables are critical determinants of students' academic engagement. Thus, the present finding reinforces the importance of adequate test duration in fostering students' interest.

Secondly, there is no statistically significant difference between morning and afternoon achievement scores contradicts some empirical studies. This coloborates Uyanah and Ojating (2021) who reported significant

effects of time of day on students' Mathematics achievement, with afternoon sessions yielding higher performance. Likewise, Muhammad et al. (2020) found that students in morning sessions performed better than those in later sessions. The inconsistency between these findings and the present study may be attributed to contextual differences such as variations in sample characteristics, instructional conditions, or students' adaptability to testing schedules.

The third finding showed that test duration significantly affects students' achievement in Mathematics. This finding is in agreement with several empirical studies. O'kwu and Anyagh (2010) found that students who had adequate or extended time performed significantly better than those with limited time. Similarly, Uyanah and Ojating (2021) demonstrated that students who took tests of longer duration achieved higher mean scores. In addition, the researchers' longitudinal evidence suggests that increased time on task leads to improved Mathematics achievement, particularly among lower-performing students. These converging findings underscore the importance of sufficient test duration in enhancing students' academic outcomes.

CONCLUSION AND RECOMMENDATIONS

This section presents the summary of the study, conclusion, recommendations, contributions to knowledge, limitations of the study and suggestions for further studies.

Based on the findings of this study, it concluded that, test timing, especially in terms of duration, plays a crucial role in students' interest and achievement in Mathematics. A structured approach to managing test timing can significantly enhance students' engagement and subsequent performance. Further, it underscores the potential need for reformed educational strategies that consider these timing aspects, thereby fostering a more positive attitude toward Mathematics among students.

Recommendations

Based on the findings of this study, the following recommendations are made:

i. **Appropriate Test Duration:** Teachers and examination bodies should allocate adequate time for Mathematics tests to enable students to fully demonstrate their knowledge and abilities without undue pressure.

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