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# Interest as Predictor of Mathematics Achievement among Senior Secondary School Students in Bida Educational Zone, Niger State, Nigeria

**Manko Umar Ahmad[1]*, Alhassan D. Isa[1], Aliyu A. Zakariyya[2]**
[1]Department of Mathematics, Niger State College of Education, Nigeria
[2]Department of Science Education, Ibrahim Badamasi Babangida University, Nigeria
*yamanalkali@gmail.com

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**Abstract**

This study investigates whether senior secondary school students' interest could predict their academic achievement in mathematics. A correlation research design was used with two research questions and one null hypothesis to guide the study. The target population encompassed 13866 students (9464 males and 4402 females) in SSSII across 46 senior secondary schools owned by the Niger state government, distributed within Bida educational zone spanning five local government areas. Using a multistage sampling method, a sample of 462 students (30% of the population) was selected. Two research instruments, (Mathematics Interest Scales [MIS] and Mathematics Achievement Test [MAT]) were validated with reliability coefficient ($r$=0.79 and 0.92). Data analysis was carried out using frequency, percentage, and Pearson Product-Moment Correlation (PPMC). The findings revealed that a significant portion of students had a low interest in mathematics, which was found to predict approximately 44% of the variations in academic achievement scores. Moreover, the study demonstrated a substantial relationship between students' interest in mathematics and their academic performance. These findings led to recommendations. Emphasizing perseverance in mathematics learning, teachers were encouraged to adopt innovative, learner-centric teaching strategies. Additionally, ensuring teacher motivation and support was deemed essential for assisting students in their mathematics education among others.

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## INTRODUCTION

In Nigeria, mathematics holds a pivotal role as a mandatory subject in both primary and secondary education. Mathematics, as an academic discipline, delves into the realms of numbers, shapes, patterns, and their intricate relationships. It equips learners with the vital ability to communicate using symbols and logical reasoning,

fostering logical thinking, precision, and spatial awareness (Arhin & Yanney, 2020).

Mathematics is regarded as one of the core prime instruments for understanding and exploring the scientific, technological, economic, and social and information world. Science, Technology, Engineering and Mathematics (STEM). Mathematics education is considered as a precious way to make the education system keep up with the developments and to meet the expectations of 21st century skills (Ghazali & Yusuf, 2022; Kazu & Kurtoglu Yalcin, 2021). Mathematics underpins the others science disciplines and it is recognized as the foundation for all other science disciplines (Just & Siller, 2022). Mathematics, therefore, remains a fundamental subject, often necessitating a credit pass in public examinations for admission into science, engineering, and technology programs at tertiary institutions. Nevertheless, despite its paramount importance, students' performance in public examinations has been persistently subpar globally (Mazana et al., 2020). Research findings have attributed this underperformance to multifaceted factors, both related to students and teachers. Teaching of mathematics has been reported to be a strenuous task (Rodríguez-Naveiras et al., 2023), so also, for most learners, learning mathematics is difficult because of its abstractness. This abstractness led many students to lose interest, thus resulting in low achievement (Yeh et al., 2019).

Academic achievement, the yardstick for assessing students' success or failure upon program completion, is typically evaluated as either high or low, corresponding to good or poor performance. This achievement can affect the students' current and future life, as well as portraying students' inherent productivity and ability (Mappadang et al., 2022). The assessment of academic achievement hinges on examinations or continuous assessment, with numerous factors like test anxiety, learning environment, motivation, interest, and emotions influencing the outcome. Academic achievement is deemed high when it surpasses or meets the expected standard and poor when it falls below this standard (Scholastica, 2020). Despite poor results in external examinations (SSCE & NECO), attributable to diverse factors such as students' interest, personal attributes, motivation, and instructional methods, focusing on students' interests becomes a reasonable approach to understanding academic achievement in mathematics.

Interest, a concept widely recognized in both psychology and education, refers to an individual's inclination to engage with specific content, such as mathematics, over time. It encompasses attributes like curiosity, sustained concentration, pleasant feelings, and heightened motivation to learn (Owora & Chika, 2019). Interest exerts a positive influence on attention, goal setting, and learning styles, benefitting individuals of all ages within and beyond the school environment. Interest serves as a potent motivational force that ignites learning and steers academic success (Zambuk, 2021). Interest is said to be a powerful driving factor that triggers and promotes learning and is considered essential for academic success. Interest is characterized by increased effort, attention and affect, experienced in any particular time, as well as an enduring predisposition to reengage in academic task, like mathematics. The presence of interest can ensure active and meaningful engagement in academic activities, which is key to academic success and better learning outcomes (Toli & Kallery, 2021).

Emefa et al. (2020) define interest as a psychological state occurring during the interaction between a person and a specific subject or activity, including the process

of willingness, attention, concentration and positive feeling towards that particular subject or activity. In this study, interest is operationalized as the emotional engagement of students in mathematics learning, signifying their enjoyment of mathematical tasks (Wong & Wong, 2019). Being interested in mathematics entails an active involvement in all mathematical activities, and the role of the teacher in fostering this interest is undisputed. Although students bear the primary responsibility for their learning, teachers play a pivotal role in guiding them on their quest for knowledge. Through effective teacher-student interactions, interest in mathematics can be nurtured and sustained, equipping students with the essential skills to become proficient mathematics learners. Therefore, interest emerges as a predictive factor for academic achievement and holds particular relevance when crafting effective instructional strategies for mathematics.

Furthermore, societal beliefs can shape students' attitudes towards mathematics. Some students are led to believe, by parents, peers, or teachers, that mathematical ability is innate or a gift, while others are instilled with the notion that mathematical prowess can be cultivated through diligence (Scholastica, 2020). When students perceive mathematical ability as innate, they are more likely to lose interest when confronted with challenges. Conversely, those who view it as a product of hard work and collaboration tend to maintain their interest despite obstacles (Owora & Chika, 2019).

Psychologists have identified two categories of interest: individual interest and situational interest. Individual interest, akin to personal interest, reflects a relatively stable affection for specific subject areas or objects. It is instrumental in sustaining engagement and long-term learning. For instance, a student with a personal liking for mathematics would willingly solve math problems both in and outside the classroom. Situational interest, on the other hand, is a transient state aroused by specific features of a situation or task, often influenced by the teacher. While situational interest can impact extrinsic motivation, individual interest holds long-term sway over intrinsic motivation (Scholastica, 2020).

To foster effective mathematics learning and academic achievement, students need to develop and nurture individual interest, which gradually molds their long-term engagement with the subject. Situational interest, though fleeting, can enhance extrinsic motivation and create transient engagement during specific learning experiences. Thus, the interplay between individual and situational interest becomes crucial in understanding how students engage with mathematics and its impact on their academic outcomes (Owora & Chika, 2019).

The significance of interest in any task is reflected in the visible display of effort, which manifests as the repetition of activities without experiencing boredom, improved performance, and enhanced creativity in the respective area. Zambuk (2021) highlights that generating interest can be challenging if the underlying potential is absent. While interest can be easily sparked, sustaining it requires concrete factors. Both intrinsic and extrinsic motivating factors play pivotal roles in generating and maintaining interest, particularly within the purview of teachers. Research findings underscore the importance of perseverance in generating and sustaining learners' interest. Here, experienced and determined teachers have a vital role in stimulating and nurturing interest among students. Although interest towards mathematics has been considered an important factor influencing participation and success in mathematic (Oluyemo et al., 2020), studies have shown that negative

interest toward the learning of mathematics has been exhibited even by primary school pupils (Okenyi, 2023). However, learner-centred instructional strategies can improve and sustain students' interest in mathematics (Asmira et al., 2021; Fabarebo et al., 2023; Kihwele & Mkomwa, 2023; Ryan et al., 2022).

Previous studies related to this topic have consistently emphasized the significant correlation between interest and academic achievement in mathematics (Arhin & Yanney, 2020; Mappadang et al., 2022; Onah & Anamezie, 2022; Wong & Wong, 2019). Additionally, findings suggest that the degree of motivation significantly impacts academic achievement in mathematics, with achievement motivation emerging as a predictor of academic success among senior secondary students.

In contrast, Zambuk (2021) reported no significant relationship between interest and academic achievement, focusing on interest and self-efficacy as motivational variables. The study concluded that teachers' emotional support influenced students' interest in mathematics (Owora & Chika, 2019). Umar and Haruna (2021) also noted that interest might not necessarily be a predictor of mathematics performance, suggesting that personal factors (such as test anxiety and readiness) and environmental factors (such as instructional methods and materials) could come into play.

Given these mixed and inconclusive findings, there is a pressing need to investigate interest as a predictor of academic achievement in mathematics among senior secondary school students within the Bida educational zone. Such a study can shed further light on the complex interplay between interest, motivation, and academic performance in mathematics, providing valuable insights for educators and policymakers alike.

**Purpose of the Study**

The general objective of the study is to investigate whether interest is predictor of academic achievement of senior secondary school students in mathematic of Bida Education Zone, Niger State, Nigeria. Specifically, the study intended to: (1) determine the interest level of students towards learning of mathematics in senior secondary school, (2) determine the (the relationship between interest and) academic achievement in mathematics among senior secondary school students.

**Research Questions**

The following research questions were asked to guide the study: (RQ1) What is the interest level of students towards learning of mathematics in senior secondary school? and (RQ2) What is the relationship between interest and academic achievement in mathematics among senior secondary school students?

**Hypothesis**

The following null hypothesis was formulated at alpha 0.05 level of significance: ($H_0$) there is no significance relationship between interest and academic achievement among senior secondary school students.

**Significance of the Study**

This study's investigation into the role of interest as a predictor of academic achievement in mathematics among senior secondary school students in the Bida

Educational Zone holds significant promise for a wide range of education stakeholders. Students can gain insights into the importance of nurturing their interest in mathematics, potentially improving their academic performance. Teachers can use the findings to refine their teaching strategies and make mathematics more engaging for students, while school administrators can consider policy adjustments to support teachers and enhance the overall learning environment. Curriculum developers can benefit from insights into instructional materials and approaches that foster interest in mathematics, and policymakers can use the research to inform evidence-based decisions that improve mathematics education in the region, ultimately benefiting the entire education industry.

## RESEARCH METHODS

This is a correlation research design which gives the association between two variables (interest and academic achievement) that were investigated. These designs are most suitable because it allows collection of data on the study variables, and systematically describes the facts and characteristics of entire population, as well as predict the relationship between them (Scholastica, 2020).

### Population and Sample

The study's target population comprised 13,866 senior secondary school (SSS II) students, comprising 9,464 males and 4,402 females, all enrolled in public schools within the Bida Educational Zone. This educational zone encompasses five local government areas and houses a total of 46 senior secondary schools, all of which are state government owned. The selection of only government schools was based on their homogeneity. For this study, a sample size of 30% of the total target population was chosen based on central limit theorem which stressed that 30% of sample size viable for experimental research (Arhin & Yanney, 2020; Fraenkel et al., 2000). With assertion 30% of the total target population is 462 students. The sampling process employed to determine this sample size is through a multi-stage approach. In the first stage, simple random sampling was utilized to select three out of the five local government areas. In the second stage, one school was randomly chosen from each of the selected local government areas. Finally, in the third stage, students were selected from these three chosen schools using purposive sampling techniques.

### Instrument

The questionnaire title Mathematics Interest Scales (MIS) comprising 20 items was adapted from 27-items mathematics interest inventory developed by Wong and Wong (2019). The MIS is a four-point likert type ranging from 1=Not True of me (NTM), 2=Slightly True of me (STM), 3=True of me (TM) and 4=Very True of me (VTM), which was employed for all statements in the MIS. Ten (10) statements from (1 to 10) had positive cue in the instrument, while from 11 to 20 had negative cue. These negative cued items were reverse scored before the scores were calculated at the data analysis stages. Furthermore, the four-point scales was reduced to two points after data collection, these are low interest and high interest and benchmark (X)=2.5, i.e. $X > 2.5$ is high interest and $X \leq 2.5$ is low interest.

Mathematics Achievement Test (MAT) was measured on the mock examination scores of the SSSII students in the selected schools. The mock examination is standard examination organized by Niger State Ministry of Education; hence, the examination questions were valid and reliable. The examination was scored at 100% with interpretation as 70-100= A (Excellent), 60-69= B (Very good), 50-59=C (Good), 45-49=D (Pass), 44-40=E (Just pass), 39-0= F (Fail). The variable has been interpreted as ordinal scale in Table 1.

Table 1. The ordinal scale to interpret Mathematics achievement

| Score intervals | Grade | Remark |
|---|---|---|
| 0 – 44% | C | Low achievement |
| 45 – 59% | B | Average achievement |
| 60 – 100% | A | High achievement |

To ensure the instruments' reliability and validity, a rigorous process was undertaken. The instruments were subjected to both face and content validity assessments. Expert opinion was sought from professionals at Federal University of Technology, Minna, and Niger State College of Education, Minna, who reviewed and evaluated the instruments to ensure they effectively measured the intended variables. This expert feedback helped to refine and clarify any ambiguous statements and identify potential issues that could arise during the actual study, along with proposed solutions.

To establish the reliability of the instrument, a pre-test was conducted. This pre-testing phase allowed for the verification of the instruments' reliability by measuring consistency and stability. The reliability coefficient was determined to be 0.79 (and 0.92) through a test-retest approach, indicating a satisfactory level of reliability. Subsequently, the questionnaire designed to measure variables such as mathematics interest and academic achievement scores was administered to the study participants. The collected data were then subjected to a comprehensive statistical analysis to arrive at valid conclusions. The research questions were addressed using descriptive statistics, specifically means and standard deviations, which provided insights into the central tendencies and variations in the data. Furthermore, the hypothesis was analyzed using the Pearson Product-Moment Correlation Coefficient (PPMCC), which helped assess the relationship between the variables under investigation. This rigorous methodology ensures the quality and credibility of the study's findings by validating the instruments and employing appropriate statistical tools for data analysis, ultimately contributing to the robustness of the research outcomes.

## RESULTS AND DISCUSSION

Research questions are answered in each section regarding the interest level of students towards learning of mathematics and the level of academic achievement in mathematics.

### The Interest Level of Students towards Learning of Mathematics

In answering RQ1, descriptive statistics of mean and standard deviation (SD) was used and presented in Table 1.

Table1. Students' interest toward mathematics

| Statements | Mean | SD | Remark |
|---|---|---|---|
| 1. I like to answer questions in mathematics class | 2.4 | 0.8 | Low |
| 2. I like mathematics | 2.3 | 1.0 | Low |
| 3. I am interested in mathematics | 2.1 | 1.0 | Low |
| 4. Knowing a lot about mathematics is helpful | 3.1 | 0.7 | High |
| 5. I feel happy when it comes is works on mathematics | 2.3 | 0.7 | Low |
| 6. I am more excited when new mathematics topics is introduced | 2.4 | 1.1 | Low |
| 7. I went to learn more about mathematics | 2.4 | 0.9 | Low |
| 8. I spend many hours working on mathematics | 2.1 | 0.9 | Low |
| 9. I went to talk about mathematics with my friends | 2.1 | 1.2 | Low |
| 10. I choose to work on mathematics | 2.6 | 0.5 | High |
| 11. I am wasting my time on mathematics | 1.4 | 1.2 | Low |
| 12. I am bored when working on mathematics | 1.2 | 0.6 | Low |
| 13. I would rather be working on something else besides mathematics | 2.6 | 0.2 | High |
| 14. I give up easily when working on mathematics | 0.3 | 0.5 | Low |
| 15. I am always thinking of other subject when working on mathematics | 2.1 | 0.4 | Low |
| 16. When working on mathematics, I want to stop and start working on something else | 1.1 | 0.5 | Low |
| 17. I get mad easily when working on mathematics | 0.9 | 0.7 | Low |
| 18. I have difficulty paying attention when working on mathematics | 1.4 | 0.2 | Low |
| 19. I struggle with mathematics | 1.3 | 0.8 | Low |
| 20. I prefer easy mathematics over mathematics that is herd | 0.3 | 0.7 | Low |
| Cummulative Mean Interest | 1.81 | | Low |

Table 1 revealed the interest level of senior secondary school students of Bida Educational Zone in mathematics learning. The result indicates that, out of the 20-item statements, the students showed low interest on 17-items, while 3 items on high interest. The mean of means (cumulative mean) of mathematics interest scale is 1.81 which is indicating the level of interest of students in the learning of mathematics. This implies students have low interest in mathematics.

The results of the descriptive statistics in this study indicate a notable pattern of low mathematics interest and poor academic achievement among senior secondary school students in the Bida Educational Zone. The cumulative mean interest score of 1.81, classified as "low interest," strongly suggests that enhancing students' interest could potentially lead to improvements in their academic achievement in mathematics.

**The Level of Academic Achievement in Mathematics**

In answering RQ2, descriptive statistics of frequency and percentage was used and presented in Table 2.

Table 2. Level of students academic achievement in mathematics

| Mock Score Range | Achievement scale | Frequency | Percentage (%) |
|---|---|---|---|
| Less than 45% | Low achievement | 259 | 56.06 |
| Between 45- 59% | Average achievement | 112 | 24.24 |
| Between 60- 100% | High achievement | 91 | 19.70 |
| Total | | 462 | 100.00 |

Table 2 shows the rate of academic achievement in mathematics in the selected senior secondary schools in Bida Educational Zone. The results revealed that about 56% mathematics students had low achievement in their examination scores. About 24% had average achievement, while 20% had high achievement. This implied that 56% had poor achievement in mathematics.

To test the stated hypothesis, interest and academic achievement scores were subjected to Pearson Product Correlation test and the result is shown in Table 3.

Table 3. PPMCC analysis of relationship

| Variables | N | Mean | SD | *df* | *r* | Remark |
|---|---|---|---|---|---|---|
| Interest | 462 | 3.4 | 0.5 | 460 | 0.384 | Significant |
| Achievement | 462 | 3.6 | 0.5 | | | |

The results in Table 3 shows that the correlation is 0.384 which is very high compared to 0.05 level of significance. Hence, the null hypothesis is then rejected. This shows that there is significant relationship between interest and academic achievement. It means that students' interest in mathematics has positive relation with academic achievement. In addition, interest is a predictor of the academic achievement in mathematics.

The study identified a significant relationship between students' interest and their academic performance in mathematics. This suggests that as students' interest in mathematics increases, so does their academic achievement in the subject. Conversely, a decrease in students' interest is associated with lower academic achievement. These findings align with previous research conducted by Wong and Wong (2019), Scholastica (2020), and Zambuk (2021), which all support the notion that highly interested students tend to perform better academically. Being interested in mathematics, as defined in this study, involves displaying a genuine concern for and curiosity about the subject by actively engaging in all related activities.

It is important to note that these findings are in contrast to the results reported by Yu and Singh (2018), Owora and Chika (2019), and Umar and Haruna (2021). These studies suggest that interest alone may not directly predict mathematics achievement, as factors such as anxiety and self-efficacy in learning mathematics can potentially act as barriers to effective learning and performance in the subject. These conflicting findings highlight the complexity of the relationship between interest and academic achievement in mathematics and underscore the need for further research to delve deeper into the various contributing factors and their interplay in the learning process.

## CONCLUSION

The findings from this study support a significant and meaningful correlation between students' interest and their academic achievement in mathematics among senior secondary school students. The results strongly indicate that when students' interest in mathematics increases, there is a corresponding improvement in their academic achievement in the subject. Conversely, a decline in students' interest is associated with lower academic achievement. These findings underscore the critical role of interest in shaping students' performance in mathematics. In practical terms, this suggests that efforts to enhance students' interest in mathematics could lead to improved academic outcomes in the subject. This study contributes valuable insights into the relationship between interest and academic achievement, which has implications for educators, policymakers, and other stakeholders in the field of education. Further research and initiatives aimed at promoting and sustaining students' interest in mathematics are warranted based on these conclusive findings.

Based on the findings of the study, several recommendations can be made to improve students' interest in and academic achievement in mathematics. Firstly, counseling for mathematics. Students should receive counseling sessions focused on mathematics to increase their interest and motivation in learning the subject. These sessions can help students understand the relevance and real-world applications of mathematics, making it more engaging and relatable. Secondly, encouraging perseverance, teachers should actively encourage students to develop perseverance when learning mathematics. This can be achieved through positive reinforcement, constructive feedback, and creating a supportive classroom environment where students feel comfortable making mistakes and learning from them. Thirdly, Mathematics teachers should work to create a stimulating and engaging learning environment that captures students' interest and curiosity. Incorporating real-life examples, interactive activities, and practical applications of mathematics can make the subject more appealing. Fourthly, teachers should adopt innovative teaching strategies that promote critical thinking and problem-solving skills. Interactive and hands-on learning experiences can help students recognize the importance of mathematics in their academic and everyday lives. Fifthly, motivated and well-prepared teachers are more likely to create a positive learning atmosphere that encourages student interest and achievement in mathematics.

By implementing these recommendations, educational institutions and policymakers can work toward improving students' attitudes toward mathematics and ultimately enhancing their academic performance in the subject.

## REFERENCES

Arhin, D., & Yanney, E. G. (2020). Relationship between Students' Interest and Academic Performance in Mathematics: A Study of Agogo State College. *International Journal of Advance Research, 8*(6), 389–396.

Asmira, A., Rusli, R., & Sabri, S. (2021). Improving Students' Interest and Achievement in Mathematics Learning Through Problem-Based Learning Model. In M. Y. Basri, A. Rezky, & A. Arfah (Eds.), *Proceedings of the International Conference on Educational Studies in Mathematics (ICoESM 2021)* (pp. 303–307). Atlantis Press SARL. https://doi.org/10.2991/assehr.k.211211.050

Emefa, A. J., Miima, F. A., & Bwire, A. M. (2020). Education impact of motivation on junior high school students' interest in reading comprehension in Hohoe Municipality: A literature based review. *African Journal of Emerging Issues*, *2*(8), 1–16.

Fabarebo, F. A., Maska, B. S., & Honmane, O. (2023). Effects of Geometry Interactive Software on Secondary School Students' Achievement in Geometry in Wukari Local Government Area, Taraba State, Nigeria. *American Journal of Engineering, Mechanics and Architecture*, *1*(9), 1–9.

Fraenkel, J., Wallen, N., & Hyun, H. (2000). *How to Design and Evaluate Research in Education* (10th ed.). McGraw-Hill Education.

Ghazali, M. N. A. Bin, & Yusuf, M. (2022). Achieving Quality Learning Through STEM Education Towards Kindergarten Teachers' Perceptions. *Jurnal Pendidikan Awal Kanak-Kanak Kebangsaan*, *11*(1), 108–119. https://doi.org/10.37134/jpak.vol11.1.10.2022

Just, J., & Siller, H.-S. (2022). The Role of Mathematics in STEM Secondary Classrooms: A Systematic Literature Review. *Education Sciences*, *12*(9), 629. https://doi.org/10.3390/educsci12090629

Kazu, I. Y., & Kurtoglu Yalcin, C. (2021). The effect of stem education on academic performance: A meta-analysis study. *Turkish Online Journal of Educational Technology-TOJET*, *20*(4), 101–116.

Kihwele, J. E., & Mkomwa, J. (2023). Promoting students' interest and achievement in mathematics through "King and Queen of Mathematics" initiative. *Journal of Research in Innovative Teaching & Learning*, *16*(1), 115–133. https://doi.org/10.1108/JRIT-12-2021-0083

Mappadang, A., Khusaini, K., Sinaga, M., & Elizabeth, E. (2022). Academic interest determines the academic performance of undergraduate accounting students: Multinomial logit evidence. *Cogent Business & Management*, *9*(1), 2101326. https://doi.org/10.1080/23311975.2022.2101326

Mazana, M. Y., Montero, C. S., & Casmir, R. O. (2020). Assessing Students' Performance in Mathematics in Tanzania: The Teacher's Perspective. *International Electronic Journal of Mathematics Education*, *15*(3), em0589. https://doi.org/10.29333/iejme/7994

Okenyi, E. C. (2023). Improving Interest and Achievement in Mathematics: A Quasi-Experimental Study of Peer Tutoring among Primary School Pupils in Nigeria. *Sapientia Foundation Journal of Education, Sciences and Gender Studies*, *5*(1), 79–87.

Oluyemo, A. A., Kukwil, I. J., & Anikweze, C. M. (2020). Gender differences in Mathematics interest and achievement in Junior secondary school students, Niger State, Nigeria. *International Journal of Research and Innovation in Social Science*, *4*(10), 359–366.

Onah, K. T., & Anamezie, R. C. (2022). Academic interest as predictor of academic achievement of secondary School Physics Students. *African Journal of Science Technology and Mathematics Education*, *8*(4), 320–326.

Owora, N. O., & Chika, C. U. (2019). Strategies for arousing students' interest in Mathematics. *Abacus (Mathematics Education Series)*, *44*(1), 201–210.

Rodríguez-Naveiras, E., Chinea, S., Aguirre, T., Manduca, N., González Pérez, T., & Borges, Á. (2023). The Effects of Attitudes towards Mathematics and STEM Education on High-Ability Students and a Community Sample. *Education*

*Sciences*, *14*(1), 41. https://doi.org/10.3390/educsci14010041

Ryan, V., Fitzmaurice, O., & O'Donoghue, J. (2022). Student Interest and Engagement in Mathematics After the First Year of Secondary Education. *European Journal of Science and Mathematics Education*, *10*(4), 436–454. https://doi.org/10.30935/scimath/12180

Scholastica, O. O. (2020). Interest as Predictor of Academic Achievement of Secondary School Students in Physics. *British Journal of Education, Learning and Development Psychology*, *3*(3), 1–9.

Toli, G., & Kallery, M. (2021). Enhancing Student Interest to Promote Learning in Science: The Case of the Concept of Energy. *Education Sciences*, *11*(5), 220. https://doi.org/10.3390/educsci11050220

Umar, A. M., & Haruna, A. (2021). Relationship between Test-Anxiety and Achievement in Mathematics among Senior Secondary School Students in Bida LGA, Niger State. *Kano Journal of Educational Psychology*, *3*(1), 82–87.

Wong, S. L., & Wong, S. L. (2019). Relationship between interest and mathematics performance in a technology-enhanced learning context in Malaysia. *Research and Practice in Technology Enhanced Learning*, *14*(1), 21. https://doi.org/10.1186/s41039-019-0114-3

Yeh, C. Y. C., Cheng, H. N. H., Chen, Z.-H., Liao, C. C. Y., & Chan, T.-W. (2019). Enhancing achievement and interest in mathematics learning through Math-Island. *Research and Practice in Technology Enhanced Learning*, *14*(1), 1–19. https://doi.org/10.1186/s41039-019-0100-9

Yu, R., & Singh, K. (2018). Teacher support, instructional practices, student motivation, and mathematics achievement in high school. *The Journal of Educational Research*, *111*(1), 81–94. https://doi.org/10.1080/00220671.2016.1204260

Zambuk, U. B. (2021). Achievement motivation as a predictor of academic achievement of senior secondary school students in mathematics. *International Journal of Advances in Engineering and Management (IJAEM)*, *3*(10), 45–51.