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Impact of Interest and Motivation on Academic Achievement of Junior Secondary School Students in Mathematics

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ABSTRACT

This research study investigated the influence of interest and motivation on mathematics achievement among junior secondary school students in Ijebu Ode, Ogun State, Nigeria. The study methodology was a descriptive survey, and the sample size of 350 junior secondary school students in Ijebu Ode from five public schools was chosen using a simple random sampling procedure. The Mathematics Achievement Test (MAT) and the Interest and Motivation towards Learning Mathematics Scale (IMLMS), with reliability coefficients of 0.77 and 0.81, respectively, were used in the study. Multiple regression analysis, Pearson Product Moment Correlation, and descriptive statistics were used to analyze the data gathered. The results showed that motivation and interest positively impact student achievement in school. They further demonstrated the independent factors' combined influence on the dependent variables. Based on the results, it is determined that junior secondary school students in Ijebu Ode, Ogun State, Nigeria, have high academic achievements in mathematics and that both motivation and interest jointly predict academic achievement. To improve students' mathematics achievement, it is advised that schools actively support these factors during the teaching and learning processes. The Ministry of Education needs to require all schools to implement student-motivating policies.

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1. INTRODUCTION

It is impossible to overstate how crucial mathematics is to students' education. Children get mathematical instruction from birth, progressing from basic counting to addition and subtraction, division, multiplication, fractions, and word problems as they age [1]. Students frequently have the misconception that mathematics is essentially procedural and rule-based, making it difficult for them to fully appreciate the breadth and complexity of the subject and the various methods that might help them become proficient [2]. According to Asanre et al. [3], mathematics is widely used in all spheres of human endeavor

and all fields of study, demonstrating its indispensable nature. Nevertheless, despite its importance, experts have seen a gradual drop in pupils' academic achievement in mathematics. They contend that putting students' academic success first is essential to providing good mathematics instruction.

Asanre et al. [2] define achievement as the ability to perform the specified task that calls for skill. Academic success is the ability or level of competency attained in school-related activities. It is frequently evaluated using grades or units derived from norms for standardized testing derived from a sizable sample of successful students. Furthermore, Asanre et al. reported that academic accomplishment is crucial in any educational environment since it shows how competent a student is in the subject matter. While it is true that academic success breeds competitiveness among students and might divert attention from a course's academic substance, academic success is a requirement for success in all other levels of education, Ogunbowale [1]. A student's academic performance dictates whether or not they will be deemed successful. Thus, academic achievement plays a crucial role in schooling. As such, it is imperative to ascertain and comprehend the aspects that determine, predict, or induce variance in academic accomplishment [4].

Additionally, the general mathematics report from the WAEC chief examiners for 2022 revealed several applicant weaknesses that could have added to their subpar performance. Poor question interpretation, incorrect application of mathematical concepts, lack of understanding of angles of elevation and depression, coordinate geometry, circle geometry, set theory, logical reasoning, and probability are some of these deficiency areas [5]. Three of the six solutions the study recommended focused on 'encouraging' candidates to perform specific steps. The word "encourage" may motivate students and stimulate their interest, propelling them to solve problems. This highlights the importance of motivation and interest in students' learning and academic success in the educational sector.

Furthermore, Sherman et al. [6] claim that a variety of environmental and personal factors, including instruction, curriculum materials, the gap between learners and the subject, and students' motivation, interest, memory recall, attention span, and grasp of mathematical language, contribute to students' below-expected achievement in mathematics. Ifamuyiwa et al. [7] also provided information on the multitude of elements that scholars have determined to be involved in students' poor academic performance. The following are some of these factors: background and entry-level; anxiety; attitude issues; lack of interest in mathematics; self-concept; study habits; motivation factors; disadvantageous exposure; problem-solving strategies; misunderstandings of mathematical terms and symbols; misreading of word problems; disregard for examination guidelines; gender issues; and inadequate preparation for mathematics exams.

Enwezor [8] defines a good school climate as one in which the institution prioritizes the following: creating a secure and supportive learning environment, enforcing rules and regulations, and establishing relationships characterized by mutual respect, trust, and caring among all members of the school community. There is a strong likelihood that the student's motivation and interest levels will be high and motivating when these requirements are satisfied. Furthermore, as Asanre [9] noted, inspiring students has long been seen as a

significant problem in secondary education since it directly relates to obtaining high academic standing.

The word "motivation" comes from the Latin word "movere," which means "to move." According to Jansen et al. [10], motivation gives people the energy they need to act. Furthermore, according to Lena et al. [11], motivation is an internal component that influences students' attitudes, actions, and learning results. Learning motivation plays a crucial role in achieving good learning outcomes. Students who are enthusiastic about studying will show that they have a high level of learning motivation. Motivation is the passion one feels for something or the drive or strong desire to engage in an activity. It might be inherited naturally or modified by anything outside of oneself. As defined by Sivrikaya [12], motivation is starting and maintaining a desired activity, setting up a scenario, or considering every element that affects a person's willingness to engage in an activity. He goes on to describe motivation as the process of producing the energy needed to do academic work. Motivation is the primary determinant of an individual's academic success or failure during learning. It establishes the student's readiness level for engagement and focuses on the learning process.

Extrinsic and intrinsic motivation are the two categories into which Legault [13] divides motivation. Engaging in innately fulfilling or joyful conduct is referred to as intrinsic motivation. It is non-instrumental in that conduct driven by intrinsic motivation is independent of any result that can be isolated from the activity. Instead, extrinsic motivation relates to conduct dependent on achieving an outcome that can be separated from the activity, whereas means and ends are synonymous. Put differently, the extrinsic incentive is, by its very nature, instrumental. Furthermore, Lena et al. [11] noted that motivation might be either intrinsic or extrinsic, and studies have demonstrated that both types of motivation significantly impact students' English test scores. They emphasize further that an extrinsically motivated person acts due to outward reinforcement. Still, an intrinsically motivated person acts due to internal reinforcement. Abah et al. [14] claim that prizes, peer recognition, and instructor praise spark extrinsic motivation. However, intrinsic motivation results from a student's inherent desire for extraordinary academic accomplishment. The authors contend that intrinsic motivation fuels students' willingness to learn and develop even without incentives or rewards from outside sources. This natural human tendency pushes individuals to seek out new activities.

Students' interest in what they are studying is essential. When people are interested, they may actively work to gain a more profound knowledge of the many intricate concepts, jargon, and methods used in a subject. This can also improve their comprehension of the different phenomena related to learning on a situational and personal level [15]. Lena et al. [16] also noted that situational and individual categories can further subdivide the term interest. Situational curiosity is temporary and often stems from something's unique, intriguing, and captivating qualities. However, personal interest refers to a comparatively strong inclination to focus on certain things, ideas, occasions, or behaviors. Furthermore, "situational interest" refers to a transient mood brought about by external factors instead of clearly defined internal demands (e.g., the vividness of a text passage). It's described as a "brief increase in an individual's focus" [1]. Lena et al. [16] posited that an interest in learning

is characterized by enjoyment, liking, and attentiveness to information acquisition. Participating in learning activities helps students acquire information. Hence, efforts should be made to help all students attain excellent marks, which may be done by piquing their interest in studying.

James [17] found a strong correlation between students' academic achievement and their interest in their studies. Furthermore, it is commonly recognized that interest correlates with learners' inclination to respond favorably to particular environmental elements and often develops in response to and stays associated with more fundamental motivations. Lena et al. [16] further said that interest is a dynamic force thought to be helpful in learning. As a result, educators ought to provide students with greater chances to develop their interests. Likes and dislikes and whether or not one is attracted strongly correlate with interests. Therefore, the primary goal of this research is to examine how interest and motivation, two independent factors, relate to and together impact academic achievement, a dependent variable, among junior secondary school students in Ijebu Ode, Ogun State, Nigeria.

1.1 Statements of The Problem

Despite several efforts of the government, teachers, and parents to improve the academic achievement of students as well as get students interested and motivated towards studying mathematics, there are still concerns that students' interest in mathematics is diminishing, leading to poor academic achievement of students. Globally, there has been an increasing concern in the education sector on ensuring that students learn optimally at school and achieve academic excellence in their academic pursuits. Many factors have been attributed to poor achievements in mathematics, such as lack of interest, motivation, learner personality, teaching methods, learning environment and location, teacher-student relationships, etc. Also, to ensure proper decolonization of our educational system, there is a need to consider the interest and motivation of learners towards their academic achievement in school subjects, specifically mathematics, to foster human learning and development in our society. Against this backdrop of students' poor academic achievement, lack of interest, and motivation in mathematics, this study examined the impact of these variables, motivation, and interest on students' academic achievement in mathematics among junior secondary school students in Ijebu Ode, Ogun State, Nigeria.

1.2 Hypotheses

The following hypotheses guided the study:

Ho1: There is no significant relationship between interest in learning and academic achievement of junior secondary school students in mathematics

Ho 2: There is no significant relationship between students' motivation toward learning and academic achievement in junior secondary school mathematics

Ho 3: What is the extent to which student motivation towards learning and interest in learning jointly predicts academic achievement in junior secondary school mathematics

2. METHOD

The survey design used in this study was descriptive. This approach was used to get direct, first-hand information from the participants. The information was then statistically

analyzed to draw pertinent conclusions. In addition, this study was done in May 2024. All public junior secondary school students in Ogun State, Nigeria's Ijebu Ode Local Government Area, comprise the study's population. A sample size of three hundred and fifty (350) respondents comprises JSS2 students from five public secondary schools in the Ijebu Ode Local Government Area who were purposefully chosen based on factors like coeducation, government approval, and interest in participating in the study. Seventy (70) respondents were selected from each school using simple random sampling. The selection process involved selecting students who would not be preoccupied with external exams and who would have already been taught some foundational mathematical topics.

2.1. Instrumentation

The data collection instrument in this study is the Interest and Motivation towards Learning Mathematics Scale (IMLMS) with Mathematics Achievement Test (MAT). IMLMS: This instrument contains 30 items to elicit information concerning the student's interest and motivation towards learning mathematics in junior secondary school. Each item in the instrument is structured on the modified four-point scale of Strongly Agree, Agree, Disagree, and Strongly Disagree, allowing respondents to indicate their level of agreement or disagreement with the items presented. Mathematics Achievement Test (MAT) is a multiple-choice test consisting of 20 questions with options A to D, with one correct answer and three distracters, designed to assess students' academic achievement in mathematics. The questions were drawn from the New General Mathematics Junior Secondary School Two (JSS2) textbook to cover the following areas in mathematics: word problems leading to mathematics equations, standard form, binary numbers, quadratic equations, mean, median, and mode, which are topics to which the student has been exposed. The instruments were validated by experts in the educational psychology and mathematics education departments who evaluated the questionnaire's validity using face and content validity. The reliability was determined using a different sample from another local government, and the reliability coefficient was 0.77 for the IMLMS using the Cronbach alpha coefficient and 0.81 for the MAT using the split half method. The researchers visited the selected schools and then met with the school authority and the mathematics teachers for permission to administer the instrument. After that, the respondents' consent was obtained, and the researchers gave the interested students copies of the instrument. Instructions on correctly filling out the questionnaire and answering the MAT were given where and when necessary. Data was analyzed based on information obtained from the completed instruments using descriptive and inferential statistics with Statistical Package for Social Science (SPSS). Descriptive statistics such as frequency distribution tables and percentages are used to analyze the demographic data. In contrast, inferential statistics of Pearson correlation analysis and Multiple Regression were used to test the variables' hypotheses and draw conclusions from this study's results.

3. RESULTS AND DISCUSSION

Percentage Distribution of the Respondents by Demographic Characteristics

Tables 1 and 2 show the percentage distribution of the respondents interviewed by socio-demographic information.

Table 1. Percentage Distribution of the Students by Sex

Sex	Frequency	Percentage
Male	164	46.9
Female	186	53.1
Total	350	100

Table 1 above shows the percentage distribution of students by sex. The table reveals that 46.9% of the respondents are male, while 53.1% The presentation's respondents were predominantly female, which shows that there were more female respondents than male counterparts.

Table 2. Percentage Distribution of the Students by Age

Age Range	Frequency	Percentage
≤12	40	11.4
13 – 15	300	85.7
16 – 18	10	2.9
Total	350	100

Table 2 above shows the percentage distribution of students by age. It reveals that 11.4% of respondents are between the ages of 12 and below, 85.7% are between 13 and 15, and 2.9% are between 16 and 18. Therefore, most respondents are between the ages of 13 and 15.

Analysis of Hypotheses

Ho1: There is no significant relationship between interest in learning and academic achievement of junior secondary school students in mathematics

Table 3. Analysis of Research Question 1
(Using Pearson Correlation Analysis)

		Interest	Academic Achievement
Interest	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	350	
Academic Achievement	Pearson Correlation	134	1
	Sig. (2-tailed)	.000	
	N	350	350

Table 3 presents the result of the Pearson correlation, showing the extent to which students' interest in learning predicts academic achievement in mathematics. The table above shows that interest positively influences students' academic achievement in

mathematics (r = .134, N=350, P < .05). This is shown by its value of .000, which is less than the significant threshold.

Ho 2: There is no significant relationship between students' motivation toward learning and academic achievement in junior secondary school mathematics

Table 4. Analysis of Research Question 2 (Using Pearson Correlation Analysis)

		Motivation	Academic Achievement
Motivation	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	350	
Academic Achievement	Pearson Correlation	.127	1
	Sig. (2-tailed)	.007	
	N	350	350

Table 4 presents the result of the Pearson correlation, showing the extent to which motivation predicts students' academic achievement in mathematics. The table above shows a positive influence of motivation on student's academic achievement in mathematics (r = .127, N=350, P < .05). This is shown by its value of .007, which is less than the significant threshold.

Ho 3: What is the extent to which student motivation towards learning and interest in learning jointly predicts academic achievement in junior secondary school mathematics

Table 5. Multiple Regression Analysis of Interest, Motivation, and Students' Academic Achievement

Model Summary				
Multiple R = 0.155				
Multiple R^2 = .024				
Multiple R^2 (Adjusted) = .018				
F= 3.722, p<0.05				
Model	***B***	**Std Error**	***T***	**Sig**
(Constant)	4.043	.157	25.797	.000
Interest	.087	.047	.120	.004
Motivation	.044	.049	.059	.006
Std Error Estimate = .862				

Table 5 shows the analysis of interest, motivation, and academic achievement. Individually, the table shows a positive influence of interest on students' academic achievement in mathematics. This is demonstrated by its value of .004, less than the significant threshold. Individually, the table shows that motivation positively influences students' academic achievement in mathematics. This is demonstrated by its value of .006, less than the significant threshold. Collectively from the table, there is a combined influence of interest and motivation on students' academic achievement in mathematics, which implies that interest and motivation are statistically significant predictors of students' academic achievement in mathematics. This is shown by the value of .000, less than the significant threshold. R-Square value of .024, thus indicating that the independent variables (interest

and motivation) account for 2.4% of the variance in the dependent variable (students' achievement in Mathematics)

3.1. Discussion of findings

The finding shows a positive influence of interest on students' academic achievement. The results of Toli & Kallery's [18] study, which indicated that interest directly affected students' academic success, support this finding. This conclusion contrasts with that of Lena et al. [16], which found that student's interest in learning had no impact on their English learning outcomes. However, that study's results may have differed from the current one because of the respondents' varying educational backgrounds and subjects. The present study's results are consistent with those of Dona et al. [15], demonstrating a substantial correlation between academic performance and the interests of grade 10 physics students. The result also revealed that motivation positively influences academic achievement among Junior secondary school students in mathematics. Gana et al. [19] also corroborate this claim; the study found that student's academic success is positively impacted by motivation. The results are consistent with earlier research by Zhang et al. [20], Ahmetovic et al. [21], and Naz et al. [22], which discovered that student motivation affected their learning performance. This is similar to research by Awoniyi [23] that used Deci and Ryan's Self Determination Theory to examine the connection between arithmetic performance and motivation in 2,575 grade 11 students from ten senior high schools in the Cape Coast Metropolis of Ghana. The claim stated by Adesua [24] that motivation has a significant impact on students' academic achievement is supported by this research. Students' motivation level significantly impacts their academic performance in senior secondary school in South West Nigeria. It also supports Asanre's [9] finding that motivating variables significantly impact senior secondary school students' academic ability in mathematics. Furthermore, the findings indicate that their motivation and level of interest significantly predict students' achievement in mathematics. This goes against the conclusions of Lena et al. [16], who demonstrated that students' learning results in English were not concurrently influenced by motivation and interest in learning.

4. CONCLUSION

The study looked at the impact of interest and motivation on the academic achievement of junior secondary school students in mathematics; three hypotheses were formulated and tested using both Pearson correlation and multiple regression analysis. The study's findings led to the conclusion that in junior secondary schools in Ijebu Ode, Ogun State, Nigeria, motivation and interest considerably impact students' academic ability in mathematics and jointly predict such accomplishment. This suggests that motivated and engaged mathematics students are more likely to actively participate, investigate mathematical topics, and better comprehend mathematical ideas and problem-solving techniques. It is advised that parents and educators look for doable strategies to help students become more motivated so they may participate in and succeed in mathematics more effectively. Additionally, teachers should provide a supportive learning atmosphere to encourage motivation and interest in mathematics, recognize students' achievements, and

give positive feedback. The findings of this study may also be used as a basis for future research, which can be carried out in various sectors and across the nation while taking into account additional variables related to the students' environmental and personal characteristics.

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