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Exploring Students' Motivation and Interest: A call for reform in Mathematics Education in Nigeria

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Abstract

This study explored students' active participation and performance in mathematics lessons, with a focus on the role of motivation and interest in classroom learning experiences. It was stated among others that in mathematics classrooms, motivation stimulates learners to think, concentrate, and learn effectively. It influences the rate of learning, the retention of information, and the desire to learn and increase the speed of work that a learner is putting to achieve a goal. Similarly, students' interest in mathematics help to sustain their curiosity, support their development of scientific skills, technological values and enhance overall achievement. Effective mathematics teaching therefore requires strategies that actively involve students in classroom tasks such as discussions, groupwork, and problem-solving activities. When teachers create a supportive and thrilling classroom environment, learners are more likely to take ownership of their learning, participate willingly and actively, and exhibit improved performance in assessments. The theoretical framework for this study was based on John Mills Keller's ARCS Theory of Motivation in Learning. This study highlights the need for student-centered instructional strategies that place learners at the core of classroom activities. Teachers are encouraged to adopt strategies that promote exploration and inquiry, while school management ensures provision of a conducive classroom environment for effective mathematics education. Holistically, the strategies should enhance students' motivation and interest that would enable them to perform better and achieve the objectives of mathematics education.

Keywords: Students**,** Motivation, Interest, Mathematics, Education

Introduction

Mathematics has been observed as the backbone of any nation in developmental terms. This is because the scientific progress and technological prowess of any nation is hinged on the application of mathematics. It is defined as the fundamental knowledge of number, shapes, quantity and space. According to Smith (2020), Mathematics is the science and study of quality, structure, space, and change. Mathematics is a discipline that deals with the study of numbers, quantities, and shapes (Aminu 2023). It is very important for national development and does not standalone but finds its base in industries (industrial mathematics), in physics, astronomy among others (applied mathematics), in education (Mathematics education).

Education is of great importance in the development of any nation. In the views of Omoifo (2012), Education is "The total process of human learning by which knowledge is impacted, faculties trained, and skills developed". Education is thus regarded as a critical tool for promoting and improving the capacity of the people in addressing environmental and developmental issues. As enshrined in the National Policy on Education (2013), the five main national objectives of Education in Nigeria are to build:

1. A Free and Democratic Society

2. A Just and Egalitarian Society

3. A United, Strong, and Self-Reliant Nation

4. A Great and Dynamic Economy

5. A Land Full of Bright Opportunities for All Citizens

Based on the objectives of education, it becomes essential for mathematics education to be valued and implemented. Mathematics education refers to the translation of mathematics in paper to practice. The translation goes a long way in ensuring that the objectives of mathematics education are achieved. According to Ofonime, Esuong and Enyekeme (2018), the objectives of mathematics education are to enable the learner to: a). Develop a positive attitude toward learning mathematics b). Perform mathematics operations and manipulation with confidence, speed and accuracy c). Think and reason precisely, logical and initially in any given situation d). Develop investigation skills in mathematics e). Identify, concretize, symbolize and use mathematical relationships in everyday life

f). Comprehend, analyse, synthesize, evaluate and make generalization to solve mathematical problems. g). Collect, organize, represent, analyse, interpret data and make conclusions and predictions from the results. h). Apply mathematical knowledge and skill to familiar and unfamiliar situations. i). Appreciate the role, value and use of mathematics in society to develop willingness to work collaboratively j). Acquiring knowledge and skills for further education and training). Communicate mathematics ideas.

To actualize the forestated objectives, students' motivation and interest are required in mathematics education. Sometimes the learners have the tendency, desire, zeal, and drive to attain the goal of academic success in learning and this is called motivation (Achuba,2025). Put differently, motivation is the centricity, enthusiasm, urge and ego to achieve the desirable learning outcome. By motivation, we mean the reasons, purposes, intentions, goals, feelings, intuitions, values, beliefs, and attitudes that humans use to explain why they do the things they do (Mercier & Sperber 2017). Simply put, "a person who feels no impetus or inspiration to act is thus characterized as unmotivated, whereas someone who is energized or activated toward an end is considered motivated" (Ryan & Deci 2000).

Learners' motivation arises from internal factors such as autonomy, mastery and purpose (**intrinsic**) or external factors such as compensation, punishment and reward(**extrinsic**). Irrespective of the factors that influence motivation, motivation is very important in mathematics education. However, Achuba (2025) listed the following as the importance of motivation: motivation stimulates learners to think, concentrate, and learn effectively. It influences the rate of learning, the retention of information, and the desire to learn and increase the speed of work that a learner is putting to achieve a goal. It helps the learner to concentrate on learning activities, gain satisfaction and determine reinforcing and punishing consequences. Therefore, motivation helps to ensure the learners' interest, and direct attention to what is to be learned and should be sustained throughout the entire lesson presentation. Some studies have revealed that motivation determines the students' learning (Vansteenkiste, Zhou, Lens & Soenens ,2005; Rahayu, Warsinih & Rasilah ,2024). However, Rone,Guao Jariol Jr., Acedillo, Balinton and Francisco (2023) found that students have low motivation in the classroom setting despite its importance in learning and relation to interest.

Interest is the degree of a student's willingness to learn for the attainment of the academic goals and objectives. Interest is the learner's predisposition to learn for academic success (Achuba, 2024). Interest is a powerful motivational process that energizes learning, guides academic and career

trajectories, and it is essential to academic success (Harackiewicz, Smith & Priniski ,2016). The interest of students allows them to focus attentively and deeply on the subject matter, which leads to an enhanced performance academically (Silvia, 2006; Dev, 2016, Achuba, 2024). This implies that students' interest controls their feelings and attitudes towards a particular thing or activity in learning. Students' interest supports the student's learning, development, and achievement and this is a determinant of the quality of time, effort, energy and other available resources that students can **invest** in their education. It, therefore, becomes imperative for teachers to use good innovative teaching methods, conductive learning environment and effective instructional materials that will stimulate students' interest in their attempt to make mathematics more meaningful to the learners.

Several studies have been conducted globally on mathematics education and many of the findings and suggestions were geared towards students' achievement of high interest having a balanced opportunity for students who are interested in mathematics right from the secondary school level (Ryan, Fitzmaurice & O'Donoghue ,2022; Yeh, Cheng, Chen, Liao & Chan ,*2019)*. Though other researchers have reported students' motivation and interest decline in mathematics (Potvin and Hasni ,2014; Organisation for Economic Co-operation and Development ([OECD], 2018).

Despite the reports, Pantziara and Philippou (2015) revealed that students' performance and their interest in mathematics were influenced by fear of failure, self-efficacy beliefs, and achievement goals. Studies have reported poor students' performance in Mathematics examinations (Sa'ad, Adamu and Sadiq ,2014; Kojigili, 2015; Awofala & Fatade, 2023). West African Examinations Council (WAEC) Chief Examiners Reports from 2021-2024 revealed that the percentage of candidates who obtained credit in the subject was 81.7%, in 2021, 76.36%, in 2022, 79.8% in 2023 and 72.1% in 2024. This inconsistency and sharp decline in students' performance in Mathematics raises concerns about the effectiveness of Mathematics education. However, the performance could be attributed to students' motivation and interest issues. Is it that the teachers have not been able to develop and sustain the students' motivation and interest in the classroom setting? It is on this note that the researcher was prompted to conduct this study to assess students' motivation and interest in mathematics education.

Classroom Strategies to Improve Students' Motivation and Interest in Mathematics Education.

Motivating the learner to learn is pertinent in mathematics education. According to Rahayu, Warsinih and Rasilah (2024), there are several ideas that teachers can use to motivate students in the school, and they are namely:

a) Using a variety of methods and activities to make learning mathematics fun for students. Mathematics teachers should avoid using only one teaching strategy rather they should combine discussions, group work, experiments, multimedia presentations among others. This will keep the learners engaged, meet their diverse learning needs, and makes mathematics more fun to the students.

b) Make students active participants, even in learning mathematics, which has a fixed value. Students should not be passive learners, but they should participate actively in class discussions, practical demonstrations, and problem-solving tasks. Engagement of students in activities such as projects, groupwork or role plays on mathematical concepts and processes has the propensity to increase their sense of accountability and motivation to learn.

c) Create a conducive classroom atmosphere. A positive classroom environment that is free from fear, intimidation, and undue pressure promotes learning. The teachers should be accessible, approachable, encourage questions, and make lessons interactive. A welcoming and friendly learning environment motivates students to freely engage in mathematics learning with excitement.

d) Involve yourself to help students achieve results. In mathematics lessons, teachers should be able to provide guidance to the students in attending to challenging topics and support in solving problems. This will help to boost the students' confidence in mathematics learning.

e) Enthusiastic in teaching. The attitudes of the teachers in teaching have direct proportion to students' interest in learning. A teacher who is enthusiastic, energetic, and passionate about mathematics can inspire students to develop the same excitement that makes learning more engaging to them.

f) Giving awards to motivate. Reinforcement such as praise, certificates, or verbal recognition should be employed by the teacher to motivate the students to put in more effort. Continuous positive reward sustains students' interest and encourages them to persist in their mathematics learning especially when the topics are difficult.

g) Create activities that involve all students in the class. The teacher should create activities structured to ensure the active participation of the entire students. For example, group projects, peer learning, and rotating leadership roles ensure that everyone contributes. The inclusiveness encourages collaboration among the students and keep them motivated.

h) Avoid using threats. Teachers should avoid harsh words, negative criticism, discrimination, or teaching strategies that do not support students' engagement. Destructive practice demoralizes the students and reduces their self-confidence, thereby lowering their motivation. The teacher should therefore use words of encouragement, good strategies and constructive feedback to build students' interest and commitment to mathematics learning.

Improving students' motivation and interest in mathematics requires the teachers to use diverse strategies, encourage students' participation, create a conductive atmosphere, guide learners, show enthusiasm, reward effort, design inclusive activities, and avoid negative practices. When these strategies are used holistically, mathematics becomes an exciting subject that the students will have commendable performance.

Theoretical Framework

The theoretical framework for this study is based on Theory of Motivation in learning and it was propounded by John Mills Keller (1979). The theory which is commonly referred to as ARCS Theory of Motivation comprises of four components which are Attention, Relevance, Confidence, and Satisfaction (ARCS). The four elements are vital for promoting and sustaining learners' motivation throughout the learning process. Each of the components has subcategories that specifies strategies for the enhancement of learning engagement. The components in an integrated manner provide a framework that can bridge motivational gaps from the beginning to the end of instruction, thereby improving both the teaching effectiveness and the overall learning experience in a classroom setting.

Keller highlighted that learning occurs in a sequential order, with the instructor serving as a facilitator while the learners actively engage in the process. To him, education aims not on mere transmission of knowledge but the development of the learners' critical thinking, manipulative abilities, communication, collaborative and problem-solving skills that can be transferred to diverse learning contexts. The theory emphasizes the need for practical, hands-on strategies to instruction that employ

concrete objects, laboratories, workshops, audiovisual media, and other instructional materials to enhance mastery and long-term retention of knowledge/concepts.

In accordance with Keller's theory, Mathematics and related subjects should be taught using methods and resources that can capture and sustain learners' attention, establish relevance by connecting content to their experiences, interests, or future goals, and eventually build confidence by ensuring that learning objectives are promptly achieved. Learners are more motivated when they believe in their ability to succeed and when daunting tasks can be achieved. Finally, satisfaction is achieved when learners experience a sense of accomplishment, receive reward, or find intrinsic entertainment t in the learning process. When the four elements are met, instruction becomes more meaningful and motivating.

Even though mathematics education requires the students to gain skills, the will to learn, and experience a motivating thrill and interest, a lack of motivation has long been observed as one of the most frustrating obstacles to students' education.

The researcher has observed poor secondary school students' performance in mathematics in sessional assessments, examinations conducted by external bodies such as West African Examinations Council among others. Additionally, studies have revealed poor students' performance in Mathematics (Kojigili, 2015; Awofala & Fatade, 2023). The poor performance has been a continuous trend for years and this could be attributed to students' declining interest probably because the teachers have not been able to develop and sustain the students' interest.

To the best knowledge of the researcher there are limited studies on students' motivation and interest in mathematics education in Nigeria as no prior study has used a combination of both variables (motivation and interest) in a study in mathematics education in Nigeria. Hence this study compensates for the limitations of the previous studies since it was carried out in Nigeria to assess students' motivation and interest in mathematics education to fill the gaps that have not been filled by other researchers.

Conclusion

Students' motivation and interest are vital determinants of the success of mathematics education. No instructional strategy, no matter how well it is designed, can yield optimal results without first securing learners' genuine engagement. This implies that motivation and interest must be

intentionally cultivated through active participation, contextualized learning, and supportive teaching approaches propounded by Keller's theory of Motivation in learning. Educators should understand that when students are motivated and interested, they are more likely to develop better understanding, sustain effort, and achieve higher desired learning outcomes. Therefore, the promotion of motivation and interest should not be regarded as an option in mathematics education but as a priority. This can only be attained by making motivation and interest central in teaching and learning process. With this, educators can enhance achievement and foster a lasting appreciation for mathematics in society.

Recommendations

The following recommendations were made from this study:

1. Instructional strategies: Appropriate instructional strategies that are student-centered should be employed by the teachers to enhance the students' motivation and interest level in mathematics education.

2. School management: School management should always provide a conducive learning environment for effective mathematics education.

3. Curriculum content: Accurate, timely and stimulating content that is pertinent to the students' current and future needs should be incorporated to motivate the students to learn effectively.

4. Special incentives: Special incentives should be made available for Mathematics teachers to boost their morale.

5. Teacher training: Continuous in-service training program should be organized always to enhance the teachers' knowledge and equip them with current and technological skills for effective classroom delivery.

6. Textbooks and other learning materials: Schools should be equipped with sufficient relevant and recommended mathematics textbooks and other learning materials for enhancement of students' motivation in learning.

7. School authorities: the school authorities should put structures in place that would enhance students' motivation and interest in mathematics education.

8. Government Provision of teachers: Government should ensure that schools are well staffed with specialized (qualified) teachers to enhance students' motivation and interest in Mathematics education.

9. Students' enlightenment: Students should be enlightened of the high value placed on Mathematics and Mathematics education to promote their motivation and interest in the subject.

10. Parental support: Parents/guardians should be more involved in the mathematics education of their children.

11. Instructional materials: Teachers should make effective use of appropriate instructional materials to boost the students' motivation and interest level in mathematics education.

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