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PERCEIVED FACTORS AFFECTING STUDENTS' LEARNING ACHIEVEMENT IN MATHEMATICS AT THE SENIOR SECONDARY SCHOOL LEVEL IN DELTA STATE

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Abstract
The study aimed to investigate the perceived factors affecting students' learning achievement in mathematics at the senior secondary school level in Delta State. A descriptive survey research design was adopted for the study. The target population of the study was all the senior secondary school students in Delta State with a sample size of 160 students which is made up of twenty students randomly selected from each of the eight schools randomly selected. Five research questions were formulated to guide the study. A questionnaire was used and data collected was analyzed using mean and standard deviation. The finding of the study revealed that motivation affects student learning achievement in mathematics; lack of communication skills and teaching methods on the part of mathematics teachers among others were identified as contributory factors hindering students learning achievement in mathematics. It was recommended among others that teachers should use different methods of teaching to secure the attention of students in mathematics classes and use learner learner-centred approach.

Keywords: Students Learning Achievement, Factors, Mathematics Laboratory, Learning Materials

Introduction

Mathematics is an important subject and a tool for understanding science and technology. So it is a force to reckon with in the development of any nation and has generally been accepted as the foundation of science and technology (Okeke, 2019). Also, Ashcraft and Kirk (2001) indicated that mathematics is the language of science and the foundation for national development and productivity. Cassidy (2004) has indicated that perception is the process by which one becomes aware of changes through the senses, sight, hearing etc. Perception of mathematics by students may be referred to the analyzing, synthesizing and integrating of sensory information about mathematics concepts. For effective teaching/learning, teachers require information as to the causes of poor academic achievement in each subject and mathematics. This information would assist in an approach to improve the understanding of students in mathematics (Yalanda, 2014). Mathematics has always been perceived as the most difficult subject in the school curriculum. Students continue to record high rates of failure in mathematics as reported (Ajani & Popoola, 2013)

Several schools outlined some factors they considered to be responsible for this trend on both internal and external examinations (Okigbo & Osuafor, 2008; Ajani & Popoola, 2013; Adedayo, 2021; Obioma 2011). These factors include:

- Dissatisfaction with the syllabus
- Experience and disposition on the part of students
- Lack of appropriate mathematics textbooks
- Lack of mathematical laboratory and its facilities
- Mathematics teachers' attitude to work
- Teacher-student relationship
- Mathematics anxiety on teaching and learning mathematics
- Students previous experiences/knowledge of instruction
- Poor background in mathematics
- Non-participation in mathematics classes
- Inadequate monitoring of students
- Poor teaching methodology

Of all the student problems that have attracted researchers in this area of educational achievement, motivation, student attitude and active class participation are seen to be gaining more popularity. Also, teachers' method of teaching, mathematics laboratory facilities and teachers' teaching and communication skills in mathematics play a lot of impact in mathematics.

Motivation is the state or condition of being induced to do something. It is the drive, desire or force that moves an individual towards the achievement of goals. Motivation causes students to generate interest in mathematics and it also sustains the interest generated. Wentzel (1998) stated that interest in activities tends to increase the likelihood that individuals formulate goals relating to the activity and invest time and effort to achieve them. Odumosu (2021) learners should be actively involved in class activities to enable teachers to note changes in the learners' behaviour. Students participate actively in a lesson where they are physically, mentally, socially and maturely ready. Learning is best done through active participation. While students are involved in the learning process, even if they forget what the teacher said, they will remember what he/she did. Active participation in classroom activities reinforces memory, enhances memory and leads to good academic achievement. The benefit of having a positive attitude towards mathematics cannot be over-emphasized because an individual attitude does not how circumstances and the actions of others are interpreted by individuals (Garba, 2014). Teachers' attitudes are very important to act in the teaching process because their attitudes can influence teaching strategies, which in turn have a critical effect on the formation of student's attitudes towards learning. Mathematics anxiety is formed in both teachers and students which results in a negative attitude towards mathematics and this seems to have passed from one generation to the next today (Ajani & Popoola, 2003). In the area of teaching and communication skills of mathematics, Kajiru and Popoola (2010) observed that effective communication skills involve the ability to deliver or teach mathematics with simple language easy to easy-to-understand presentation, and appropriate and effective teaching aids. The provision of effective communication improves the academic performance of students, thereby motivating them to the same high marks (Garba, 2013).

Mathematics laboratory helps to build a positive attitude towards mathematics and encourages group work. This brings joy to the students, gives evidence of progress to the students and ensures a greater transfer of learning through classroom procedure. The provision of equipped laboratory and learning materials enables students to frequently carry out laboratory exercises and enhance their understanding of mathematics concepts (Kajiru & Popoola, 2010). The relevance of mathematics needs to embrace appropriate teaching strategies to the teaching of mathematics in secondary schools is very significant. Kanjuru and Popoola (2010) stated that effective teaching methods and the use of teaching aids allow students to enjoy services of ownership and direct involvement in judging the quality of students' performance in mathematics. Olayede et al. (2012) also reported that the teaching method of mathematics teachers is based on the student's achievement in the subject. Other strategies that encourage students' participation, reduce the abstractness of mathematics and promote good performance, include cooperative learning, problem-solving, scaffolding and discovery approach (Kajuru & Popoola, 2010).

Statement of Problem

Student express difficulties in understanding mathematics concepts taught to them by their teachers and perform poorly in internal and external examinations. Secondary mathematics education in Nigeria needs improvement to meet the aspirations of Nigeria as a nation. It was observed that poor performance in mathematics in external examinations still exists (Akinsola, 2013; Ajani & Popoola, 2013). The factors affecting students' learning achievement vary from one school to another, from one set of students to the next and from one cultural setting to another, since not all factors are relevant to a particular context. On this note, the researchers sought to investigate the perceived factors affecting students learning achievement in mathematics at the senior secondary school educational level in Delta State.

Aim and Objectives of the Study

The main purpose of this study is to investigate the perceived factors affecting students' learning achievement in mathematics at the senior secondary school level in Delta State. Specifically, the study seeks to;

1. investigate whether motivation influences effective learning of mathematics
2. ascertain if students' attitudes influence effective learning of mathematics
3. determine whether the active involvement of students in mathematics classes influence s their learning outcomes.
4. identify whether the teaching and communication skills of mathematics teachers have any effects on students learning achievement in mathematics.

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5. examine whether teachers' teaching methods have any effect on students' learning achievement in mathematics.
6. ascertain if students' perception of mathematics anxiety has any effect on students' learning achievement in mathematics.

Research Questions:

The following research questions were formulated to guide the study.
1. Does motivation influence effective learning of mathematics?
2. Will students' attitudes influence effective learning of mathematics?
3. Does the active involvement of students in mathematics classes influence their learning outcomes?
4. Does the teaching and communication skills of mathematics teachers have any effect on students ' academic performance in mathematics?
5. Does students' perception of the teaching method have any effect on students' learning achievement in mathematics?
6. Does students' perception of mathematics anxiety have any effect on students' learning achievement?

Methodology

The study adopted a descriptive survey design. The population of the study comprises all the senior secondary school two (SSS2) students in Oshimili South Local Government of Delta State. Multi-stage sampling technique was used in the selection of schools in the education zone. There was a total of 80 senior secondary schools in Oshimili south local government area owned by the state government in the education zone. The first stage involved using a simple random sampling technique to select one school from each local government with ten years of SSCE centre. This was followed by using a simple random sampling technique to select from each school twenty (20) SSII students. This gave a total of one hundred and sixty (160) students. The study adopted a student perception questionnaire (SPQ) using a four-point scale developed and validated. The reported measure of internal consistency of the instrument was 0.83 using the method of test-retest. The instrument was administered to the study sample of one hundred and sixty (160) students from eight senior secondary schools and retrieved back after one week. The data obtained were analyzed using mean and standard deviation. The benchmark for decision is a mean of 2.5, that is a mean score = 2.5 or above implies acceptance while a mean score below 2.5 indicates rejection.

Results

Research Question 1: Does motivation influence effective learning of Mathematics?

Table 1: Influence of motivation of students on learning of Mathematics.

S/N	Items	$\bar{X}$	SD	Remark
1.	I have an urge to work harder on Mathematics when I succeed.	3.84	0.76	Accepted
2.	I am afraid of failing Mathematics that is why I work hard	4.15	1.99	Accepted
3.	I hate failure which is why I do not relax in my efforts to solve Mathematics problem	3.32	1.15	Accepted
4.	I worked hard to pass Mathematics because my parents gave me a present for passing Mathematics.	3.70	0.56	Accepted
5.	A good pass in Mathematics means I can pass my other science subjects, so I spend more time-solving Mathematics problems.	3.05	1.11	Accepted
	Grand Mean	**3.61**	**1.11**	**Accepted**

The results displayed in Table 1, indicate that all items were agreed on with a grand mean and standard deviation scores of 3.61 and 1.11 respectively. This implies that there is an influence of motivation of students to learn Mathematics towards mathematics lessons.

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Research Question 2: Will students' attitudes influence effective learning of mathematics?

Table 2: Influence of attitude on students' in learning of mathematics

S/N	Items	*X*	SD	Remark
1.	Very few people can learn Mathematics	1.76	2.44	Rejected
2.	Any person of average intelligence can understand a good deal of Mathematics	2.75	1.40	Accepted
3.	I like studying Mathematics	3.24	1.46	Accepted
4.	I solve Mathematics problems on my own and ask for help from my teacher when I face difficulties	4.25	0.66	Accepted
5.	I have a positive attitude to mathematics	3.20	1.03	Accepted
	Grand Mean	**3.04**	**1.40**	**Accepted**

The results displayed in Table 2 indicate that students' attitudes influence the learning of Mathematics with the grand mean and standard deviation scores of 3.04 and 1.40 respectively. The mean scores of all respondents agreed that students' attitudes influence effective learning of Mathematics except item 1, which has a mean value below benchmark 2.5 with the opinion that very few people can learn mathematics.

Research Question 3: Does the active involvement of students in mathematics lessons influence their learning outcomes?

Table 3: Influence of students' active involvement in classes and learning of mathematics.

S/N	Items	X	SD	Remark
1.	I listen attentively in Mathematics classes	3.56	0.49	Accepted
2.	I ask questions in Mathematics classes	3.23	1.26	Accepted
3.	I willingly answer questions in Mathematics classes	3.79	1.46	Accepted
4.	I have a special exercise book for home practice of Mathematics so that I can understand what is taught in class	3.54	0.76	Accepted
5.	I usually participate actively in Mathematics classes	4.02	1.19	Accepted
	Grand Mean	**3.63**	**1.03**	**Accepted**

The results displayed in Table 3, indicate that all items were agreed on with a grand mean and standard deviation scores of 3.63 and 1.03 respectively. This implies that the active involvement of students in mathematics lessons influences their learning outcomes.

Research Question 4: Does the teaching and communication skills of mathematics teachers have any effect on students' academic performance in mathematics?

Table 4: Students' perceived responses on teaching and communication skills of the mathematics teachers.

S/N	Items	X	SD	Remark
1.	The mathematics teacher guides a class discussion for teaching mathematics	3.56	0.97	Accepted
2.	The mathematics teacher interprets mathematical ideas for mastery of the subject	3.98	1.14	Accepted
3.	The mathematics teacher uses symbols to present mathematical ideas to the students	4.05	0.78	Accepted
4.	The teaching methods employed are suitable for teaching mathematics notations	3.91	1.47	Accepted
5.	The teachers use instructional materials to describe mathematics concepts to students	3.55	2.25	Accepted
	Grand Mean	**3'81**	**1.32**	**Accepted**

The results displayed in Table 4, indicate that all items were agreed on with a grand mean and standard deviation scores of 3.81 and 1.32 respectively. This implies that the teaching and communication skills of mathematics teachers affect students' academic performance in mathematics.

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Research question 5: Does students' perception of the teaching method have any effect on students' learning achievement in Mathematics?

Table 5: Students perceived responses on teaching method.

S/N	Items	X	SD	Remark
1.	Teaching methods are not based on induction and deduction by the Mathematics teachers.	3.15	1.56	Accepted
2.	Lack of analytic and synthetic methods by the Mathematics teachers.	3.42	0.67	Accepted
3.	Mathematics teachers do not use the discovery method to teach students	3.73	1.14	Accepted
4.	The teaching method used by mathematics teachers does not drive home the objectives of the lesson	3.19	0.46	Accepted
5.	Poor use of teaching methods results in low learning achievement in mathematics	2.90	1.23	Accepted
	Lack of mastery in mathematics methodology affects students' performance in mathematics	4.02	1.19	
	Grand Mean	**3.40**	**1.04**	**Accepted**

Results presented in Table 5 revealed that all the mean scores were above the benchmark with grand mean and standard deviation scores of 3.40 and 1.04 respectively. This shows that students' perception of the teaching method affects students' learning achievement in Mathematics.

Research question 6: Does students' perception of mathematics anxiety have any effect on students' learning achievement?

Table 6: students' perceived responses to mathematics anxiety.

S/N	Items	X	SD	Remark
1.	I enjoyed studying Mathematics	3.84	0.76	Accepted
2.	Mathematics as a subject has an important role in my future career	4.15	2.00	Accepted
3.	Mathematics prepares me for life in a scientific-technological society	3.32	1.15	Accepted
4.	My Mathematics teacher praises and encourages me in the process of studying Mathematics	3.70	0.56	Accepted
5.	Students' participation is encouraged in Mathematics class	4.25	0.66	Accepted
6.	Their interaction in Mathematics class	2.75	1.40	
	Grand Mean	**3.67**	**1.09**	**Accepted**

The results displayed in Table 6, indicate students' perception responses on mathematics anxiety towards mathematics lessons with grand mean and standard deviation scores of 3.67 and 1.09 respectively. This implies that students' perception of mathematics anxiety affects students' learning achievement.

Discussion

The findings of the study as presented in Table 1 indicate that there is an influence of motivation of students on learning Mathematics towards mathematics lessons. Motivation is the stage or condition of being induced to do something. It is the drive, desire or force that moves an individual towards the achievement of goals. Motivation causes students to generate interest in mathematics and it also sustains the interest generated. This indicates that mathematics teacher has a key role in motivating students to learn mathematics as supported by Wentzel (1998) who stated that interest in activities tends to increase the likelihood that individuals formulate goals relating to the activity and invest time and effort to achieve them.

The results displayed in Table 2 indicate the influence of attitude on students in the learning of Mathematics with the grand mean and standard deviation scores of 3.04 and 1.04 respectively. The mean scores of all respondents agreed

that students' attitudes influence effective learning of Mathematics except item 1, which has a mean value below benchmark 2.5 with the opinion that very few people can learn mathematics. This agrees with the finding that the benefit of having a positive attitude towards mathematics cannot be over-emphasized because an individual attitude does not how circumstances and the actions of others are interpreted by an individual (Garba, 2014). Teachers' attitudes are very important acts in the teaching process because their attitudes can influence teaching strategies, which in turn have a critical effect on the formation of student's attitudes towards learning.

The results displayed in Table 3, indicate that all items were agreed on with a grand mean and standard deviation scores of 3.63 and 1.03 respectively. This implies that the active involvement of students in mathematics lessons influences their learning outcomes. This agrees with the finding of Odumosu (2021) that learners should be actively involved in class activities to enable teachers to note changes in the learner's behaviour. Students participate actively in a lesson where they are physically, mentally, socially and maturely ready. Learning is best done through active participation. The findings on teaching and communication skills of mathematics teachers recorded that mean scores are above the benchmark (mean of 2.5). This indicated that mathematics teacher has a key role in teaching mathematics as supported by the findings of Oloyede et.al. (2012). The teaching methods that learners centre provides instructiveness, friendliness and teamwork which in turn bring about better performance in mathematics. The findings revealed that all items which are stated on students' perception of teaching method were all rated agreed which implies no preparation of lesson and learning objectives are not achieved because of no meaningful feedback. All these are attributed to teaching techniques, which seem to be the teacher-centred referred to as the conventional teaching method. This method requires that the learner sit and listen to the teacher as he presents the content of the lesson. According to Kajiru and Popoola (2010), students' persistent poor performance in mathematics has been ascribed to inadequate teaching strategies adopted by the teachers. This is due to the persistent use of the conventional teaching strategy as one of the shortcomings affecting performance in mathematics. It was observed that almost the mean scores are above the benchmark indicating that the respondents agreed that mathematics anxiety affects students' learning achievement in Mathematics. This agrees with the findings of Ashcraft and Kirk (2001), and Ajani and Popoola (2013) that among the factors responsible for the deteriorating performance of students in mathematics is Mathematics anxiety. Mathematics anxiety is commonly experienced by Students when learning a new mathematical task or when performing a mathematical task and this leads to a lack of interest in mathematics. Students with mathematical anxiety possess little or no confidence in their ability to solve mathematics problems (Ashcraft & Kirk, 2001).

Conclusion

The findings of this study confirmed that motivation influences students' learning of Mathematics. Also, the study confirmed those students' attitudes influence learning of Mathematics. The study further showed active classes influence the effective learning of mathematics. Student perception of some major factors might be associated with students' poor academic achievement in mathematics.

Recommendations

1. Teachers should administer various types of rewards to mathematics students to sustain their interest in the subject.
2. Teachers should continue to give students regular homework in mathematics so that study habits can be enhanced in mathematics.
3. Teachers should continue to allow all students to participate in mathematics classes.
4. Teachers should use different methods to secure the attention of students in mathematics classes.
5. The necessary equipment and facilities required of a mathematical laboratory should be provided by the state government and individuals should complement government efforts on the direction.
6. Functional libraries with appropriate mathematics textbooks including e-libraries should be provided by the state ministry of education so that mathematics students can frequently consult such textbooks and electronic libraries.

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