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Influence of Students' Perception of Mathematics on Learning Behaviour in Senior Secondary Schools in Obio-Akpor Local Government Area, Rivers State

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ABSTRACT

This study employed a descriptive survey research design to examine the influence of students' perception of mathematics on their learning behavior towards the subject in public senior secondary schools in Obio-Akpor Local Government Area of Rivers State. Four research questions guided the study. The population of this study comprises of all 34 087 students offering mathematics in public senior secondary schools in the Local Government Area in the 2020/2021 academic session. The Taro Yamane formula was used to obtain the sample size of 395 students for the study. The SS2 class was purposively selected for the study. Simple random sampling technique was used to sample four public senior secondary schools out of the 23 in the area, and for the selection of the 395 students for the study. A researcher constructed instruments titled "Students' Perception of Mathematics Questionnaire" was used for data collection. The instrument was validated by experts and a reliability coefficient of 0.72 obtained to establish its reliability. The data collected were analyzed using percentage, Mean and Standard Deviation. The findings revealed that the students in have a very poor perception of mathematics and poor attitude towards mathematics learning and that students' negative perception of Mathematics grossly influenced their behavior towards mathematics learning. The study also showed amongst others, that the student self-concept has a very little influence on their learning behavior. This study therefore recommended that the government should provide a mathematics counselling unit for public secondary schools and that school management should put effort in counselling the students towards developing positive attitude and perception towards mathematics learning so as improve positive attitude towards the subject and performance.

Keywords: Influence, Perception, Mathematics, Learning behavior, Self-Concept.

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INTRODUCTION

Mathematics is said to be the Queen mother of natural science. This is believed to be so because in almost all spheres of human endeavor the application of mathematics is inevitable. In all ramifications, knowledge of mathematics is essential to the conduct of everyday living; in engineering, commerce, natural and social sciences. Even within the pre-literate society, though unwittingly the application of mathematics in games, agriculture, domestic chores and in building construction among others, could not be questioned. Douglas (1995) emphasized that the progress of any nation depends upon her scientific education capable of making the citizens efficiently functional in the natural and applied sciences.

In view of the fact that mathematics is quite crucial in our daily life, it becomes expedient therefore, that the subject becomes part of the communication skill just like the use of English language in the schools. To achieve this, the students need to have the right or positive perception of the mathematics which will in turn influence their learning behavior. Students' perception of mathematics is the result of processing of information received by the students regarding mathematics (some of which may not be true). The students while perceiving mathematics provide a picture which

expresses their own individual view of the reality (mathematics). This may actually differ from the reality. Therefore, it is appropriate to state that students tend to perceive what they expect to perceive about mathematics.

The perception of the students may influence how they react to mathematics learning. If their perception is positive, it will be evident in their behavior as they will be very eager to learn more mathematical concepts and persist in making improvement. Whereas, when students' perception is negative, their behavior towards mathematics learning would also be negative and lackadaisical. This implies that learning behavior is an outcome of perception. Perception is shaped by belief, experience and information received. Hence, Students' learning behavior or attitude towards mathematics may be influenced by their perception of mathematics. When it comes to our perceptions of mathematics, Daryl Bem's Self-Perception Theory avers that you might assume that what you see is what you get. However, in truth, research shows that the way you see the world is heavily influenced by your own past experiences, expectations, motivations, beliefs, emotions, and even your culture. The term perceptual set refers to the tendency to perceive objects or situations from a particular frame of reference, according to Hockenbury, (2016) in the book Discovering Psychology. Fekumo and Omeka, (2022) reported that students' negative or poor perception of Mathematics grossly influence their performance and learning behavior of mathematics. Similarly, Igwilo, Okwelle and Deebom (2020) found that reinforcement such as verbal praises, commendable appreciations, and teachers' word of encouragement among others reinforces their attitude towards mathematics learning.

The studies of Fekumo and Omeka, (2022) and Igwilo, Okwelle and Deebom (2020) addressed perception of students towards mathematics, but in comparison with this present study, there is variance in variables of interest. The present study is not attached to gender, family background but attached to students' self-concept, teaching method, and teacher's reinforcement of students. Also, in terms of population of interest, the present study is interested in senior secondary school students in Obio/Akpor Local Government Area of River State, Nigeria.

Existing literatures showed that students' perception towards mathematics has great impact on their mathematics learning behavior. Nevertheless, these studies do not explore into the perception of senior secondary school students in Obio-Akpor Local Government Area of River State, Nigeria. Again, they do not consider some variables which could be factors that influences the students' perception of Mathematics. Hence, this present study intends to explore this gap in the existing body of knowledge.

Purpose of the Study

The general purpose of this study is to examine the influence of students' perception of mathematics on their learning behavior. To meet the general objectives of this study, the study focused on the following specific objectives:

1. Identify how students' perception of mathematics influence their attitude towards mathematics learning in senior secondary schools in Obio-Akpor local government area of Rivers State.

2. Ascertain the influence of students' self-concept on their behaviour towards mathematics learning in senior secondary schools in Obio-Akpor local government area of Rivers State.
3. Determine the influence of students' perception of teacher's teaching method on their attitude towards mathematics learning in senior secondary schools in Obio-Akpor local government area of Rivers State.
4. Determine the influence of teacher's reinforcement on students' mathematics learning behaviour in senior secondary schools in Obio-Akpor local government area of Rivers State.

Research Questions

The study was guided by the following research questions:

1. How does students' perception of Mathematics influence their attitude towards mathematics learning in senior secondary schools in Obio-Akpor local government area of Rivers State?
2. What is the influence of students' self-concept on their behavior towards mathematics learning in senior secondary schools in Obio-Akpor local government area of Rivers State?
3. What is the influence of students' perception of teacher's teaching method on their attitude towards mathematics learning in senior secondary schools in Obio-Akpor local government area of Rivers State?
4. What is the influence of teacher's reinforcement on students' mathematics learning behaviour in senior secondary schools in Obio-Akpor local government area of Rivers State?

METHODOLOGY

The study adopted a Descriptive Survey research design. Descriptive Survey research design is a fact-finding investigative research design with adequate interpretation. The population of this study comprises of all students offering mathematics in public senior secondary schools in Obio-Akpor local government area of Rivers State, Nigeria. In all, there are 34087 registered students in the 23 public senior secondary schools as at the 2020/2021 academic session (Rivers State Senior Secondary Schools Board, 2021). The Taro Yamane formula was used to obtain the sample size of 395 students for the study. The SS2 class was purposively selected for the study. Simple random sampling technique was used to sample four public senior secondary schools out of the 23 in the area, and for the selection of the 395 students for the study. The Senior secondary school 2 (SS2) students were chosen because they have passed through the foundation class and they are now in the preparatory class, so they have had their perception of mathematics and which may have affected their interest in mathematics. Four schools were randomly elected for the study.

An instrument titled "Students' Perception of Mathematics Questionnaire" (SPOMQ) was used to collect data for this study. Items of the SPOMQ were built on a modified 4-point Likert scale of "Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2 and Strongly Disagree (SD) = 1". The content and construct of the instrument was subjected to external criticism to ensure credibility, honesty and integrity of the research and hence validated by the researcher's supervisor and two other experts in Science Education and Measurement and Evaluation, all in Rivers State University, Port Harcourt. And based on the experts' recommendations, comments and opinions,

modifications were made to the SPOMQ instrument. To ensure reliability, the SPOMQ were tested on 20 students who were not part of the research area. The responses of the 20 students used in this reliability test were subjected to reliability analysis which yielded a Cronbach's alpha coefficient of 0.72 for the entire SPOMQ, indicating a good level of consistency of the instrument. 400 copies of the SPOMQ instrument were distributed to sampled students in the 4 selected schools individually by the Researcher. Afterwards, 392 copies were retrieved while 388 of the retrieved copies were the valid responses and were used for the data analysis. Techniques used in analyzing this study and its questions are percentage, Mean and Standard Deviation. The bench mark for decision on the research questions is a mean of 2.50. A mean of 2.50 and above implies Agreement of an item while, a mean below 2.50 indicates Disagreement.

RESULTS

Research Question 1

How does students' perception of Mathematics influence their attitude towards mathematics learning in senior secondary schools in Obio/Akpor local government area of Rivers State?

Table 1

Showing the Influence of Students' Perception of Mathematics on Their Attitude Towards Mathematics Learning

S/No	Perception and Learning behavior	Mean	SD	Remark
1.	Mathematics is not really difficult to understand if you give it enough attention so I try my best to study at home.	1.98	1.73	Disagreed
2.	I don't believe that some persons are gifted in mathematics So, I try my best to do my assignment myself.	2.50	2.30	Agreed
3.	The harder you work at Math the better you become so Mathematics is on my personal study plan	2.37	2.22	Disagreed
4.	I know there are so many applications of Mathematics in my daily life so I love being present in mathematics class, I wouldn't like to miss it.	2.77	2.47	Agreed
	Grand Mean	**2.40**		

Table 1 shows the perception of students toward Mathematics in Obio/Akpor Local Government Area of River State, Nigeria. As revealed by the Grand mean of 2.40 which is lower than the benchmark of 2.50, the students in this study have negative perception which is likely to affect their learning behavior towards mathematics. However, most of the students in the study agreed that they do not believe that some persons are gifted in mathematics and so, try their best to study the subject (Mean = 2.50), and that they know that there are many applications of Mathematics in their daily life and so do not like to miss their mathematics lessons (Mean = 2.77).

Research Question 2

What is the influence of students' self-concept on their behavior towards mathematics learning in senior secondary schools in Obio/Akpor local government area of Rivers State?

Table 2

Shows the Influence of Students' Self-Concept on Their Behavior Towards Mathematics Learning

S/No	Self-Concept	Mean	SD	Remark
5.	I often feel that others are better than me and wish I was more like them, so I would prefer students who are good in mathematics to solve a math problem while I copy from them than for them to teach me the solution steps.	2.49	2.23	Disagreed
6.	I can hardly solve difficult problems no matter how hard I try so If I'm given a difficult mathematics assignment, I don't bother myself to resolve it.	2.40	2.17	Disagreed
7.	I feel I am not a bright student in Mathematics so I don't have a study plan for it.	2.54	2.31	Agreed
8.	My mistakes only show me how worthless or incapable I am so Mathematics is not on my personal study schedule.	2.25	2.01	Disagreed
	Grand Mean	**2.42**		

Table 2 shows that the students do not generally have poor concept of themselves but specifically have poor concept of mathematics (Mean=2.54).

Research Question 3

What is the influence of students' perception of teacher's teaching method on their attitude towards mathematics learning in senior secondary schools in Obio-Akpor local government area of Rivers State?

Table 3

Showing the Influence of Mathematics Teaching Method on Students' Perception of Mathematics

S/No	Teaching method	Mean	SD	Remark
9.	My Mathematics teacher explains the objective of the lesson at the start of the lesson and that makes me to look out for steps during the lesson to achieve the objectives.	2.89	2.5	Agreed
10.	My mathematics teacher gives room for me to ask question at any point in the lesson where I do not understand so I listen attentively during the lesson.	2.32	2.20	Disagreed
11.	My teacher explains the solution steps of a mathematics problem repeatedly to the class and that makes me to always not want to miss the lesson.	3.53	2.76	Agreed
12.	My mathematics teacher is too fast and always rushes the lesson so I don't even bother to attend the lesson.	2.35	2.14	Disagreed
	Grand Mean	**2.77**		

Table 3 shows that students generally perceive the teaching strategies employed by mathematics teachers helpful to their interest and engagement during mathematics classes with a grand mean of 2.77, which is greater than the criterion Mean of 2.50.

Research Question 4

What is the influence of teacher's reinforcement on students' mathematics learning behavior in senior secondary schools in Obio/Akpor local government area of Rivers State?

Table 4

Showing the Influence of Teacher's Reinforcement on Students' Mathematics Learning Behavior

S/No	Reinforcement	Mean	Std	Remark
13.	My mathematics teacher commends or appreciates me when I give an answer in the class even if it isn't the correct answer and that makes me to always want to be present and participate in the lesson.	2.52	2.22	Agreed
14.	If there is an award attached to a mathematics problem, I put more effort to get the solution.	2.98	2.63	Agreed
15.	My mathematics teacher gives me tips on how to improve in math and help me to walk toward the tips and that encourages me to study more to improve.	3.03	2.69	Agreed
16.	My mathematics teacher is kind and speaks positive of me in the class and I enjoy to attend the lesson.	2.75	2.44	Agreed
	Grand Mean	**2.82**		

Table 4 with a grand Mean of 2.82 reveal that reinforcement has a great influence on the students' learning behavior. As shown by the grand mean, the students in the study were really reinforced by the mathematics teachers and their learning behavior in the class was an active one.

DISCUSSION OF FINDINGS

Findings from this research has revealed that students in the study have a poor perception of mathematics and that the perception of the students have a significance influence on their learning behavior as shown in their low and passive involvement or participation in mathematics learning. This finding is in agreement with Fekumo & Omeka (2022) whose findings reveal that students' negative or poor perception of Mathematics grossly influence their performance and learning behavior of mathematics.

The analysis in Table 2 shows that students generally have a positive self-concept but specifically have a negative self-concept in mathematics. This finding implies that student self-concept could be categorized into two types which is general and specific self-concept. The finding of this research is in agreement with Laryea, Saani and Dewson-Brew (2014) whose findings revealed that students' self-concept influences their efforts in mathematics learning. Moreover, this very study has shown that self-concept could be categorized into general self-concept and specific self-concept. The study has also shown that although there are two key factors that influences perception and mathematics learning behavior (Bem, 1972), which are internal and external factors, the internal factors have more significant influence on the students' perception and mathematics learning behavior than the external factors.

Findings from the present study also shows that teaching method has a significant influence on the students' learning behavior of mathematics. The finding is in agreement with Munawaroh (2017) whose findings reveal that teachers' teaching method influence students learning behavior

Findings on reinforcements or teachers' reinforcement of students shows that it influences students' learning behavior of mathematics. This finding agrees with the results of Igwilo, Okwelle & Deebom (2020) whose study found that reinforcement

such as verbal praises, commendable appreciations, and teachers' word of encouragement among others reinforces their attitude towards mathematics learning.

CONCLUSION

This research was carried out to find out the influence of student perception of Mathematics on their learning behavior in public senior secondary schools in Obio-Akpor local government area of Rivers State. Based on the data collected and the results of its analysis, it is therefore concluded that student perception of Mathematics has a significant influence on their learning behavior and that their perception is a function of two factors – Internal and external factors. The external factors such as the teaching method and reinforcement have an influence on their perception as evident in their learning behavior in the classroom.

RECOMMENDATIONS

The findings of this study led to the following recommendations:

1. The government should provide a mathematics counselling unit for each public secondary school to provide the necessary counselling and guidance services for students toward developing positive attitude or perception towards mathematics learning.
2. Mathematics Educationists should be trained in the area of human relationship and social interactions so that they will learn how to deal with the students and how to reinforce them positively by commending them, giving out incentives to encourage high performance as these will keep the students motivated and willing to learn more and improve.
3. Mathematics teachers should be well-informed of the topic he or she want to teach before going for the class so that he or she can draft out modalities to simplify ambiguous solution steps as ambiguity may discourage the students at this stage.
4. The government and school management should introduce mathematics laboratory equipped with games that will encourage critical thinking so that the student can carry out real life application of mathematics and this will boost their morale in learning.

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