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Factors Influencing the Attitude of Students Towards the Study of Mathematics among Secondary Schools in Uyo, Akwa Ibom State Nigeria

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ABSTRACT

Students' attitude towards mathematics has been a factor that is known to influence students' achievement in mathematics. This paper explored factors influencing the attitude of students towards the study of mathematics in Nigeria. This study used a descriptive survey design. A simple random sampling technique was further applied to obtain Mathematics teachers, junior and senior staff, and principals targeted in this research, equal to 273 staff. The study sampled 162 respondents. The collected data was analyzed using descriptive statistics, correlation, and regression analysis through the Statistical Package for Social Science (SPSS) version 21. The data collected were analyzed using descriptive statistics and multiple regression. The findings indicated that the teaching approach in teaching Mathematics was more correlated with students' attitudes in Uyo, Akwa Ibom State ($r = 0.738$; $p = 0.000$). Multiple linear regression analysis showed that the problem-solving method contributed to 57.2% of the variation in the performance, hence playing a vital role in students' attitudes towards Mathematics subjects in public secondary schools. It was also inferred that the teaching approach increases positive attitudes toward learning Mathematics subject. The study recommended that the maximum effort should be given to improve the students' attitude toward mathematics by organizing forums such as seminars and workshops where teachers and other education stakeholders can support, motivate, and cultivate positive attitudes among their students.

INTRODUCTION

Student feeling and perception about mathematics is a major factor that affects his or her attainment and realization of full potential. Neale (2019) defines attitudes towards mathematics as "alienated measures of like or disliking of mathematics, a tendency to engage in or avoid mathematics activities, the belief that mathematics is useful or useless". Several important components emerge from these definitions: attitude is learned, it influences one to take a slated or implied attitude or to have such an attitude as a result of prior influences that may be either positive and there is response consistency. On the same note, Aiken (2016) defines attitude as "a learned predispositions or tendency on the part of an individual to respond positively or negative to some objects, situation, concept or another person.

Teacher's attitudes towards mathematics could presuppose an inclination to pass on what they have received as a duty or as a valuable asset of knowledge that could be beneficial in their learners. On the contrary the learner's attitudes towards mathematics could be valued in relation to natural disposition environmental exposure, scales of value or personal disposition, which needs investigation to establish the missing link in the achievement of mathematics (Dennis, 2019). A positive attitude towards mathematics reflects a positive emotional disposition in relation to the subject and, in a similar way, a negative attitude towards mathematics relates to a negative emotional disposition (Amadi, 2014).

In Nigeria, despite the importance of maths and

government efforts to improve student performance in this area, results are still not satisfactory. The WAEC (West African Examination Council, 2004) management report shows that 1,090,503 candidates sat for the external examination, of which only 10.5 per cent passed. In 2005, only 15.2 per cent of the 1,464,301 candidates who sat the external examination passed in mathematics. In 2007, only 18.5 per cent of 1,484,611 candidates passed in Mathematics. The National Examinations Council, NECO (2006) reports that many of the candidates showed a lack of knowledge of the basic principles needed to solve some of the maths problems. Educational researchers have spent much time and energy trying to understand the possible reasons for students' poor attitudes and low performance in Mathematics

Research findings indicate that effective teachers facilitate learning by truly caring about their students' engagement and creating the right atmosphere that enhances student learning (Bolaji, 2010). They have high yet realistic expectations about enhancing students' capacity to think, reason, communicate, reflect upon and critique their own practice, and they provide students with opportunities to ask why the class is doing certain things and with what effect (Flanders and Altındağ, 2009). The relationships that develop in the classroom become a resource for developing students' attitudes and Mathematical competencies and identities. These resources are very essential to the learning of Mathematics.

Attitude as a concept is concerned with an individual's way of thinking, acting and behaving. It has very serious

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implications for the learner, the teacher, the immediate social group with which the individual learner relates, and the entire school system. Attitudes are formed as a result of some kind of learning experiences students go through. This is mimicry, which also has a part to play in the teaching and learning situation. In this respect, the learner draws from his teachers' disposition to form his own attitude, which may likely affect his learning outcomes (Eze, 2004). He avers that teachers with positive attitude towards Mathematics were inclined to stimulate favourable attitudes in their pupils. This immediately puts the teacher in the spotlight as one whose attitude, expressed in their behavior, has a telling effect on students. Teachers' attitude and beliefs play a very significant role in shaping classroom practices (Hanula, 2002). It is against this background that this research sought to examine factors influencing the attitude of students towards the study of mathematics in secondary schools in Nigeria.

Problem Statement

Today, the failure rate in mathematics in both internal and external examinations is very worrying. The failure rate is getting worse from year to year (WAEC, 2004). A student's attitude towards an academic subject is a very important factor in his/her learning and performance in that subject. A student's perception of himself/herself as strong or weak in a particular subject can be an important factor in his/her academic performance. Ohuche (1998) showed that there is a positive correlation between mathematics and mathematics achievement. According to Ghaith (2003), those who have a positive attitude towards mathematics perform better in this subject. However, this study focuses on the factors affecting students' attitudes towards mathematics in secondary schools in Uyo, Akwa Ibom State in Nigeria.

This study sought to achieve the following research hypothesis:

H_{01} : There is no significance between teacher approach in teaching mathematics and student attitude towards the subject in secondary schools in Uyo, Akwa Ibom State

METHODOLOGY

This study evaluated factors influencing the attitude of students towards the study of mathematics among secondary schools in Nigeria. The researcher used descriptive research survey design in building up this project work the choice of this research design was considered appropriate because of its advantages of identifying attributes of a large population from a group of individuals. The design was suitable for the study as the study sought factors influencing the attitude of students towards the study of mathematics in Nigeria

Population of a study is a group of persons or aggregate items; things the researcher is interested in getting information on the study factors influencing the attitude of students towards the study of mathematics in Nigeria. 273 staff of selected secondary schools in Uyo, Akwa Ibom State was selected randomly by the researcher as

the population of the study.

In addition, the study used the following formula proposed by using Yamane (1973) to determine the sample size because that is too large waste scarce resources and could expose more participants than necessary to any related risk. Thus, the study used Yamane formula to calculate a sample size because it is the most appropriate for this study.

Using Yamane formulae

$$n = \frac{N}{1 + (N)(e^2)}$$

Where:

n = sample size

N = the population size

e = the acceptable sampling error (5%) at 95% confidence level

Thus; $n = \frac{273}{1 + (273)(0.05)^2}$

$n = 162.2 = 162$ respondents

In this study the researcher used questionnaires, and documentary review. Closed –ended questions were used where the answers were divided into categories such discrete, distinct and relatively few in number. It is easier for respondents to answer because they had only to choose categories. In that way a chance for irrelevant answers is limited to the minimum, because appropriate answer categories were provided. The main respondents were being teachers that was given the questionnaire as they were enough time to respond to the questions based on specific objectives. Questionnaires were given to Mathematics teachers, senior staff, junior staff and principals.

The questionnaire used as the research instrument was subjected to face its validation. This research instrument (questionnaire) adopted was adequately checked and validated by the supervisor his contributions and corrections were included into the final draft of the research instrument used.

RESULTS AND DISCUSSION

Findings

In this study the research sampled 162 staff of selected secondary schools in Uyo, Akwa Ibom State. The data collected from the respondents were analyzed in tabular form with simple percentage for easy understanding. A total of 162 questionnaires were distributed and 162 questionnaires were returned.

Descriptive Statistics

Effect of Teacher Approach in Teaching Mathematics and Student Attitude Towards the Subject

In this research the study attempted to determine the factors influencing the attitude of students towards the study of mathematics in Nigeria. The respondents were asked to rate the statements by indicating the extent to which they apply to their organization in 5-point Likert scale as shown on: 5. Strongly Agree (SA), 4. Agree (A), 3. Neutral (N), 2. Disagree (D) and 1. Strongly Disagree (SD). Besides, the mean and deviation were used for

interpretation of the findings where mean (M) is the average of group of scores and it is sensitive to extreme score when the population samples are small. Moreover, the standard deviation (SD) was also used to measure the variability in those statistics as it shows how much variation is there from the average (mean).

Table 1: Level of agreement on teacher approach in teaching Mathematics

Statements	Mean	Std Dev
The methods and activities used by the teacher reflect attention to learners' experience	4.5	0.71
Teacher attitude towards Mathematics is significantly related to high achievement in students	4.2	0.68
Teachers' instructional methods and activities reflect attention to issues of access, equity and diversity for learners	4.2	0.75
The learner draws from the teacher's disposition to form his own attitude which may affect her learning outcomes	3.9	0.96
Attitudes and practices of teaching Mathematics are complexly affected by beliefs, emotions	4.1	1.05
Teachers' exhibition of self-confidence when teaching Mathematics motivates student achievement in Mathematics	3.5	1.22
Teachers' beliefs about Mathematics affect their attitude towards the subject and impact on students' performance	4.1	0.86

Source: Field research, 2023

As shown in Table 1, the results relate to the seven statements assessing the effect of teacher approach in teaching mathematics and student attitude towards the subject in secondary schools in Nigeria. The results show that for the first statement, the majority of respondents strongly agreed that the methods and activities used by the teacher reflect attention to learners' experience, with a mean value of 4.5, and a high positive correlation standard deviation of 0.71. The second statement asked respondents whether teacher attitude towards Mathematics is significantly related to high achievement in students. The results showed that the majority of respondents strongly agreed with this statement (M=4.2, SD=0.68). For the third statement, teachers' instructional methods and activities reflect attention to issues of access, equity and diversity for learners, the majority of respondents agreed with this statement, with a mean of 4.2 and a very positive and high standard deviation correlation of 0.75. The fourth statement asked whether the learner draws from the teacher's disposition to form his own attitude which may affect her learning outcomes. Respondents strongly agreed with this statement, with an average mean of 3.9 and a very strong positive standard correlation of 0.96. The next item was whether attitudes and practices of teaching Mathematics are complexly affected by beliefs, emotions. The majority of them

strongly agreed that statement with a mean of 4.1 and a very high positive standard deviation of 1.05. The next item respondents were asked whether teachers' exhibition of self-confidence when teaching Mathematics motivates student achievement in Mathematics, the respondents agreed that statement (M=3.5, SD=1.22). On the last statement respondents were asked if teachers' beliefs about Mathematics affect their attitude towards the subject and impact on students' performance, the majority of respondents strongly agreed and agreed that statement with a mean score of 4.1 and positive correlation standard deviation of 0.86. From the results, it implies that the majority of respondents strongly agreed and agreed that all of the above are key elements of factors influencing the attitude of students towards the study of mathematics in among secondary schools in Nigeria

Correlation Analysis

The findings of the correlations between the independent variables and the dependent variables are summarized and presented in Table 3

According to the findings reported in Table 2, the Pearson correlation analysis showed that Teaching approach in teaching mathematics ($r=0.738, p=0.000$) is positively and significantly related to students' attitude towards the subject in selected secondary schools in

Table 2: Correlation between variables

		Teaching approach	Students' attitude
Teaching approach	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	162	
Students' attitude	Pearson Correlation	.738**	1
	Sig. (2-tailed)	.000	
		162	162

** Correlation is significant at the 0.01 level (2-tailed).

Uyo, Akwa Ibom State. The correlation was deemed to be statistically significant since the p-value was less than 5%. The findings therefore showed that there is a positive and statistically significant relationship between teaching approach in teaching mathematics and to students' attitude towards the subject in the secondary schools in Uyo, Akwa Ibom state.

These findings are similar with Freise (2010) reinforce this by contending that teachers should use problem – solving teaching methods that create a challenge to experiment, explore and look for links between concepts. As students look for answers, they are likely to develop

functional understanding because they go through the reasoning involved in the development and application of the concepts they learn. Students must learn how to use subject- matter concepts in the solution of relevant problem.

Multiple Regression

The study used multiple regression to test the following hypothesis:

H_{01} There is no significance between teacher approach in teaching mathematics and student attitude towards the subject in secondary schools in Uyo, Akwa Ibom State.

Table 3: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.758 ^a	.575	.562	.39768

a. Predictors: (Constant), teaching approach

The R-squared shows the variation in the dependent variable that can be explained by the independent variables being studied. The R-squared in this study was 0.702, which implies that the independent variable can explicate 57.2% of the dependent variable whereas the remaining 42.8% variation is explained by other factors which are not included in the model.

In an attempt to test the significant of the model, the study

used ANOVA. From Table 7 the P-value is 0000^b which is less than 0.05 thus the model is statistically significance in predicting how teaching approach in teaching Mathematics affects students' attitude. The F critical at 5% level of significance is 66.538, and this shows that the overall model was significant. There exists significant relation between the dependent variable (students' attitude) and the independent variable (teaching methods).

Table 4: Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	182.035	4	45.509	66.538	.000 ^b
	Residual	77.287	113	.684		
	Total	259.322	117			

a. Dependent Variable: students' attitude

b. Predictors: (Constant), teaching approach

DISCUSSION

From the findings, the study found that teaching approach in teaching mathematics affects students' attitude toward the subject, as the methods and activities used by the teacher reflect attention to learners' experience, also the teacher attitude towards Mathematics is significantly related to high achievement in students. Teachers' instructional methods and activities reflect attention to issues of access, equity and diversity for learners. The learner draws from the teacher's disposition to form his own attitude which may affect her learning outcomes. Attitudes and practices of teaching Mathematics are complexly affected by beliefs, emotions and teachers' exhibition of self-confidence when teaching Mathematics motivates student achievement in Mathematics and lastly Teachers' beliefs about Mathematics affect their attitude towards the subject and impact on students' performance. These findings are relevant with Sharma (2014) who stated that the teachers' teaching method have a major influence on students' attitudes. Teachers can do many things to facilitate the classroom learning to alleviate

students' engagement level and confidence in learning mathematics. According to Fraser and Kahle (2007), teachers can find ways to encourage student engagement and confidence in learning mathematics. This can be achieved by implementing meaningful activities embedded in real-life contexts.

In the same angle Christou (2008) stated that teachers' beliefs about the utility of Mathematics are often found to correlate with either a more positive or negative attitude towards the subject. It is believed that a teacher who sees no usefulness of Mathematics in the real world and believes that Mathematics should be learnt as a set of rules and algorithms will require his students to memories procedures and rules without meaning. This is a negative outlook that will make his students develop a negative attitude towards the subject. Also, a teacher who believes that girls are poor in Mathematics is likely to impact negatively on girls in his class who will begin to believe that they cannot do Mathematics. Another aspect of the teacher's attitude towards Mathematics is the teacher's behavior in relation to Mathematics.

Such Mathematics-related behavior as avoidance of Mathematics, pursuit of Mathematics and instructional behavior in the classroom all affect student attitude and performance

CONCLUSION

The results showed that perceived teacher affective approach is significant predictor of attitude toward mathematics. This may affect the performance of students in mathematics and mathematics related subjects in the study. Several factors play a vital role in influencing student's attitude towards mathematics in Nigeria among them is teaching approach. This has found that there is a significant relationship between methods of instruction and students' attitude towards the subject. The way the teacher presents the lesson, guides them on problem solving in class and involvement of the students in problem solving, improves their mathematics response ability which lead to better performance. This study supports the claims that how teachers/instructors teach may determine whether. This study supports the idea that learning environment-related variables produces an increase in the explanation of the variability of attitudes and performance.

Those with low mathematics abilities are likely to have a more negative attitude towards the subject. They do not have the inclination to improve their skills in mathematics. Although the majority of research indicates that poor attitudes towards mathematics are related to poor presentation of the subject, but it has not always been found to be so, although the present study did seek to establish the cause-effect relationship with students' attitudes towards Mathematics subject. Therefore, based on the findings, hypothesis testing results show that teaching approach in teaching mathematics have an effect on students' attitudes towards the subject. The research hypothesis was tested; verified and then it is rejected referring to the statistical (regression analysis) findings and then according to the research, the correlation of 73.8% categorized as positive and very high correlation; this leads to confirm that there is significant relationship between teaching approach and students' attitudes in secondary schools in Nigeria.

RECOMMENDATIONS

It was recommended that attitudes are deeply related to motivation and social support, teachers can leverage on this information and develop strategies in educational contexts, to improve their support and student engagement in order to improve not only attitudes but also mathematical performance among students throughout their schooling. Besides, it is highly recommended that the maximum effort should be given to improve the students' attitude towards mathematics by organizing forums such as seminars and workshops where teachers and other education stakeholders can support, motivate and cultivate positive attitudes among their students.

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