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FACTORS INFLUENCING THE ATTITUDES OF STUDENTS TOWARDS THE STUDY OF MATHEMATICS IN PUBLIC SECONDARY SCHOOLS IN NSUKKA L.G.A, ENUGU STATE

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ABSTRACT

The aim of the research work was to identify the factors influencing the attitudes of students towards the study of mathematics in public secondary schools. A survey research design was adopted for the study. The population of the study was made up of teachers and students from twenty secondary schools in ten communities of Nsukka local government area of Enugu state, Nigeria. A simple random sampling technique was used to select 450 respondents made up of 100 teachers and 350 students in public secondary schools in Nsukka local government area. The instrument for data collection is A-18 items research questionnaire designed by the researcher to elicit information from the literature review titled "Factors influencing the attitudes of students towards the study of mathematics in secondary school's questionnaire" (F.I.A.S.T.M.Q). The instrument was validated by two experts from the department of Measurement and Evaluation and two from department of Educational Administration and Planning, Abia State University, Uturu. Three research questions and three null hypotheses guided the study. Mean and Standard deviation (SD) was used for data analysis while z-test was used to test the three null hypotheses of the study. Mean was the main statistics used to analyze the data collected while 2.50 and above was the acceptable level and 2.49 was the rejected level using the four-point type like scale of Very Great Extent (V.G.E), Great Extent (G.E), Little Extent (L.E) and Very Little Extent (V.L.E). The study among other findings workshops, In-service training and On-the-job training will enhance their skills in teaching mathematics while using relevant instructional materials, having qualified teachers, mastering of the content and subject matter as well as removing parental influence instilling confidence on the students will help remove anxiety and mathematics phobia from students. Conclusions and Recommendations were made on the way forward.

Keywords: Factors, Influencing, Attitudes, Mathematics.

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Introduction

The need to teach students mathematics in public secondary schools is to develop interest and remove fear in the subject cannot be overemphasized. This is because, having a positive attitude towards the study of mathematics as a subject will help students individually to function effectively in any society. This stems from the fact that the knowledge of mathematics will assist him or her to learn how to count, calculate and use it in solving his personal problems at any levels of his life being it trade, commerce, school and home activities. This is because, mathematics as a subject is regarded as a body of knowledge that centers on concepts of quality, structure, space and change. In other words, mathematics is an abstract representational system that helps to foster positive relationships between the user of the concepts and the real-world applications which when effectively utilized will foster more positive student's attitudes towards the subject. It is in realization of its role in all scientific and technological development of the country that the National Policy on Education (F.R.N, 2013) made it one of the cores as well as compulsory subjects that every child in Nigeria public secondary schools must study and offer mathematics at the Primary, Junior and Senior secondary school levels. That is why today, mathematics is regarded as the king of all science that must be learned because it cut across all spheres of human life. The versatility of the subject made it possible for it to be applied to different subjects and occupation (Efobi, Okoye and Okeke, 2023).

Unfortunately, events in the public secondary schools throughout the country, particularly in Nsukka local government area of Enugu State are not as expected. The attitudes shown by the students and teachers towards its study have shown that despite efforts made by government in the state to remove mathematics phobia amongst students, develop in them the mind of critical thinking and foster positive attitudes towards the learning of the subject, students still develop negative attitudes towards the subject. It is against this background that the study sought to identify the factors influencing the attitudes of students towards the study of mathematics in public secondary schools in Nsukka local government area of Enugu State, Nigeria, with a view to find a lasting solution to mathematics phobia. This is because, this Lukewarm attitude if unattended will affect our quest for development in science and technology.

Literature Review

In recent years, Students performance in science subjects at the Junior and Secondary school levels especially mathematics has been on a decline (Olisakwe, 2020), Nwokolo (2021) as cited by Nwafor (2020) stated that in (2018), less than 10% of those who entered for Senior Secondary School Certificate Examination (S.S.S.C.E) in Nigeria scored credits in Mathematics. The poor performance and non-achievement in Mathematics by

students have been blamed on several issues among whom were students' lack of interest, fear and lack of confidence and anxiety among students while others were blamed on teacher's teaching methodology and ineffectiveness in all spheres of teaching, organization, management and administration.

This shows that some behaviors external and internal to both the students and teachers have very significant influences on student's academic achievement and teacher's teaching methodology in mathematics. According to Okafor (2018), a capable trait which must equip him to teach, induce, promote and impact knowledge and skills of solving problems in Mathematics to students. This is because, a teacher according to Udensi and Oteh (2023) is the most important component of educative process who must know the content of his subject, understand his students, aspirations, expectations and be able to inspire him to make value judgement, develop his latent potentials, resourcefulness and ready to learn. Thus, a capable teacher is an effective one who knows the teaching strategies and applies them adequately. This means, a teacher has a significant role to play on student's level of self-concept and understanding of Mathematical symbols.

Another major factor identified as a key towards the study of mathematics in public secondary schools is the teacher's use of interactive hands-on-activities to relate mathematical concepts to real world applications in order to foster more positive student attitudes towards the study and learning of Mathematics. This will help mathematics teachers, whether it is traditional lecture based or play way method to actively engage students to learn the subject as it will impact on students attitudes positively (Onwuka; 2014).

Related to this, is teacher's competence and attitudes towards the students. According to Udensi (2019) and Kalu (2016), the mathematics teachers own knowledge, teaching skills and enthusiasm for the subject can shape how students perceive and engage his students in mathematics. This is because, teachers who demonstrate strong desire to teach mathematics, show competence and a genuine passion for the subject are more likely to cultivate positive student's attitudes towards the study of mathematics. Thus, a good teacher of mathematics must be creative by using his initiative in making the best of every situation in order to ensure effective and resourceful teaching and learning of mathematics. This will help him in enriching his teaching by making optimal use of what is at his deposal, thereby improving the negative effects of teaching mathematics to students.

In order to correct the negative thought about mathematics by students, Aglazor (2017) was of the opinion that teacher's methods of teaching must be relevant and applicable because students are more likely to have positive attitude towards

mathematics if they can see its relevance and practical applications in their lives and future careers. In other words, connecting mathematical concepts to student's interest and experience can increase their motivation and student's interests, likeness and appreciation for the subject.

Therefore, there is no gain saying that confidence and anxiety levels can affect students pre-existing mathematics anxiety due to lack of confidence in their abilities to learn, understand and solve problems in mathematics which if not well handled can negatively impact on their attitude and performance. It is therefore, the duty of the teacher to provide support and encouragement to students.

Teacher's qualification and lack of professional training, growth and development is another factor identified as having influence on student's attitude towards the study of mathematics in public secondary schools. According to Mkpom (2023) and Onuoha and Chidiebere (2013), when a teacher is not well trained or expose to needed skills that will not be able to bring about learning to the students such as mathematical symbols and concepts like fractions, subtractions, substitutions, ratio, diameter, radius, circumference, etc. will not be understood by him. It is therefore important that a teacher of mathematics participates in activities that will enrich his professional skills by attending conferences, seminars, workshops and in-house or in-service or on-the-job training whose activities will help update his knowledge, skills and competence of his subject, mathematics.

Recent studies by Mkpom (2023), Efobi, Okoye and Okeke (2023) and Onuoha and Chidiebere (2013) as well as those of Olisakwe (2020), Nwokolo (2021) and Nwafor (2020) have shown that, parental disposition and terms of his socio-economic background can influence student's attitudes towards the study of the subjects, in terms of student's academic performance, real life applications, career goals, peer group influence and student's negative perception of the subjects. They therefore recommend that for students to have positive attitudes towards the study of the subject, the learning environment must be conductive in terms of provision of infrastructural facilities and equipment, teaching personnel, curriculum reforms and teachers and parent's support. This is why Nwafor (2020) was of the view that bringing mathematics teaching to real life situation by teaching students how to use it in buying and selling inform of addition, subtraction, multiplication, fraction, ratio and percentage can make students to have a positive attitude towards the learning of mathematics as a subject. This shows that parents and teacher's attitude towards the teaching of mathematics in schools can generate and sustain learner's interest and curiosity about the subject (Okechukwu; 2018).

This is the reason why the researcher therefore resolved to research on the "Factors influencing the attitude of students towards the study of mathematics", believing that if the causes are identified and solution be put in place that it will go a long way in improving student's attitudes towards their performance and study of mathematics. Government and supervisors of education services (School's administrators, planners, curriculum experts, parents, guardians and teachers) will have cause to motivate students to take the study of mathematics in secondary schools seriously.

Statement of the Problem

Secondary school education has long been recognized as a vehicle for socio-economic and political development of the country. This is why the National Policy on Education (F.R.N; 2013) regarded attainment and tertiary education. Section 3, sub-section 38.1 also recognize mathematics as a core and compulsory subject that must be studied by all secondary school students. However, the teaching and learning of the subject by the students particularly in Nsukka local government area of Enugu state has witness a number of challenges in recent years due to the attitudes of students towards its teaching and learning. Although teachers are alleged to be the root cause of the problem, which has In the past years adversely influence the attitudes of students pertinent to identify these factors influencing the attitudes of students which were left unintended in the past.

Purpose of the Study

The main purpose of the study was to identify the factors that are influencing the attitude of students towards the study of mathematics in public secondary schools in Nsukka local government area, specifically, the study sought to:

1. Identify the factors influencing the attitude of students towards the study of mathematics in secondary schools.
2. Determine the benefits, influences of mathematics can have on student's attitudes towards the study of the subject.
3. Ascertain ways for improving the students' attitudes towards the study of mathematics in public secondary schools.

Research Questions

The following research questions guided the study:

1. What are the factors that influence the attitudes of students towards the study of mathematics in public secondary schools?
2. What are the benefits, influences that mathematics have on student's attitudes towards the study of the subject in public secondary schools?
3. What are the ways for improving the student's attitudes towards the study of mathematics in public secondary schools?

Hypotheses

The following null hypotheses were formulated at 0.05 level of significance guided the study.

Ho1, there is no significant difference in the mean scores of teachers and students on the factors influencing the attitude of students towards the study of mathematics in public secondary schools.

Ho2, there is no significant difference in the mean score of teachers and students on the benefits that can influence student's attitudes towards the study of mathematics in public secondary schools.

Ho3, there is no significant difference in the mean score of teachers and students on ways for improving the student's attitudes towards the study of mathematics in public secondary schools.

Research Method

A survey design aimed at identifying the factors that are influencing the attitudes of students towards the study of mathematics in public secondary schools in Nsukka local government area of Enugu state was adopted for the study. The population of the study was 4,500 teachers and students made up of 100 teachers and 3,500 students while ten percent (10%) of the entire population of the study was used for the study from twenty secondary schools in ten communities of Nsukka local government area (L.G.A) namely; Mkpunano, Nru, Ihen Owerre, Ede-oballa, Obimo, Edem, Opi, Ejuona-obukpa, Umugboguru and Nsukka. The population includes 1,000 teachers and 3,500 students. Simple random sampling technique was used to sample four-hundred and fifty thousand (4,500) respondents. After ten percent (10%) sampling, 100 teachers and 350 students were used for the study, bringing the total to 450 respondents. The instrument for data collection was the research questionnaire which has eighteen items designed to elicit information on the "Factors Influencing the Attitudes of Students towards the Study of mathematics in public secondary school's questionnaire" (F.I.A.S.T.M.Q). "The instrument was first validated by two experts from the department of Measurement and Evaluation and two from the department of Education Administration and Planning, Abia State University, Uturu. The reliability test was done using spearman's Rank order coefficient correlation methods. The results of the coefficient were 0.78. This shows that it was supposed to measure. A-18 item survey was structured on a Likert four-point type rating scale of Very Great Extent (V.G.E), Great Extent (G.E), Little Extent (L.E) and Very Little Extent (V.L.E). A mean of 2.50 and above were considered high and effective or accepted (A) while any score below 2.49 were considered low and ineffective and rejected (R). z-test was used to test the three null hypotheses.

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Presentation of Results

The following are the results of data analysis of the study:

Research Question 1: What are the factors that influence the attitude of students towards the study of mathematic in public secondary schools?

Table 1: Mean responses of teachers and students on the factors that influence the attitude of students towards the study of mathematics in public secondary schools.

S/N	Factors influencing the attitudes of students towards the study of mathematics.	Teachers			Students		
		$\bar{X}$	SD	Decision	$\bar{X}$	SD	Decision
1	Teacher's competence and attitudes.	3.02	0.76	A	2.87	0.86	A
2	Relevance and applicability of the subject in real life situation.	3.25	0.89	A	2.91	0.81	A
3	Confidence and anxiety level of students.	3.20	0.66	A	3.60	0.68	A
4	Parental influence and their socio-economic background.	3.20	0.66	A	3.51	0.79	A
5	Qualification, professional, growth and development of the teacher.	2.85	0.86	A	3.25	0.76	A
6	Use of instructional facilities and equipment.	3.12	0.70	A	3.20	0.88	A
	Grand mean	**3.16**	**0.75**	**A**	**3.22**	**0.79**	**A**

Source: Field Survey, 2004.

The Table 1 shows that items 1-6 were rated high by the two respondents. This was clearly indicated from their respective mean scores of 3.02, 3.25, 3.20, 3.20, 2.85 and 3.12 for teachers while that of students was 2.87, 2.91, 3.60, 3.51, 3.25 and 3.20 which are above the criterion of acceptance level of 2.50 and above. It means that these factors identified were factors influencing attitude of students towards the study of mathematics. The grand mean score of both respondents is 3.16 and 3.22 respectively.

Research Question 2: What are the benefits the influences of mathematics can have on students' attitudes towards the study of the subject in public secondary schools?

Table 2: Mean responses on the influences of mathematics on student's attitudes in public secondary schools.

S/N	Influences of mathematics on student's attitudes.	Teachers			Students		
		$\bar{X}$	SD	Decision	$\bar{X}$	SD	Decision
7	It fosters positive relationships between the students and the teachers.	2.95	0.76	A	3.51	0.69	A
8	It helps students to apply their knowledge to different subjects and occupation.	3.04	0.80	A	3.23	0.67	A
9	It helps to remove phobia amongst students.	3.02	0.83	A	3.30	0.91	A
10	It helps them to learn how to count, calculate and solve problems in their daily lives.	3.15	0.87	A	2.82	0.88	A
11	It helps to develop in them the mind of critical thinking and reasoning.	3.18	0.91	A	3.51	0.86	A
12	It helps to reshape student's behavior in their daily activities.	3.30	0.68	A	3.40	0.75	A
	Grand mean	**3.09**	**0.80**	**A**	**3.28**	**0.79**	**A**

Source: Field Survey, 2004.

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The Table 2 shows that items 7-12 were clearly rated high by the two respondents. This was clearly indicated from their respective mean scores of 2.95, 3.04, 3.02, 3.05, 3.18 and 3.30 while that of students was 3.51, 3.23, 3.30, 2.82, 3.51 and 3.40 while the grand mean scores were 3.09 and 3.28 which are above the criterion of acceptance level of 2.50. It means that the factors that influences student's attitude on mathematics are all accepted based on the mean scores from item questionnaire 7-12 and grand mean score of 3.09 and 3.28.

Research Question 3: What are the ways for improving the student's attitudes towards the study of mathematics in public secondary schools?

Table 3: Mean responses of teachers and students on the ways for improving the student's attitudes towards the study of mathematics in public secondary schools.

S/N	Ways for improving student's attitudes towards the study of mathematics.	Teachers $\bar{X}$	Teachers SD	Teachers Decision	Students $\bar{X}$	Students SD	Students Decision
13	Using of instructional materials in teaching.	2.90	0.79	A	3.08	0.93	A
14	Helping to develop/stimulate student's interest in mathematics by creating good organizational climate for learning mathematics.	2.86	0.73	A	3.57	0.91	A
15	Encouraging the students to remove the phobia while studying the subject.	2.96	0.80	A	3.22	0.82	A
16	Creating room for critical thinking and reasoning.	3.18	0.91	A	3.20	0.81	A
17	Motivating teachers of mathematics to develop themselves professionally.	3.12	0.86	A	3.25	0.97	A
18	Encouraging students to develop genuine passion for mathematics.	3.12	0.96	A	3.60	0.89	A
	Grand mean	**3.22**	**0.84**	**A**	**3.53**	**0.88**	**A**

Source: Field survey; 2024.

The *Table 3,* above shows that items 13-18 were rated high by the two respondents. This was clearly indicated from their respective mean scores of 2.90, 2.86, 2.96, 3.18, 3.12 and 3.30 while that of students was 3.08, 3.57, 3.22, 3.20, 3.25 and 3.60 which are above the criterion of acceptance level of 2.50. It means that all the above items questionnaire from 13-18 were acceptable to both the teachers and students as ways of improving student's attitudes towards the study of mathematics with the grand mean score of both respondents (teachers and students) as 3.22 and 3.53 respectively.

Hypotheses

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Table 4, z-test analysis of the responses of teachers and students on the mean scores of factors influencing the attitude of students towards the study of mathematics in public secondary schools in Nsukka

Variables	N	X̄	SD	Df°	Level of sig	z-cal	z-tab	Decision
Factors influencing the attitude of students towards the study of mathematics.				448	0.05	-8.09	1.96	*Accepted*
Teachers.	100	3.16	0.75					
Students.	350	3.22	0.79					

From the results in table 4, the null hypotheses of no significant difference in the mean score of teachers and students on the factors influencing the attitude of students towards the study of mathematics in public secondary schools in Nsukka local government areas. In other words, the calculated z value at 448 degree and 0.05 level of significance is -8.09. Since the calculated value of -8.09 is less than the critical value of 1.96, the null hypothesis is accepted.

Table 5: z-test analysis of the mean score responses of teachers and students on the benefits that can influence student's attitudes towards the study of mathematics in public secondary schools.

Variables	N	X̄	SD	Df°	Level of sig	z-cal	z-tab	Decision
Benefits that can influence the study of mathematics.				448	0.05	-0.02	1.96	*Accepted*
Teachers.	100	3.09	0.80					
Students.	350	3.28	0.79					

From the results in table 5, the null hypothesis of no significant difference in the mean score of teachers and students on the benefits that can influence the study of mathematics in public secondary schools in Nsukka local government area. In other words, the calculated z-value at 448 degree and 0.05 level of significance is -0.02. Since the calculated value of -0.02 is less than the critical value of 1.96, the null hypothesis is accepted.

Table 6: z-test analysis of the mean score responses of teachers and students on the ways for improving the teachers attitudes towards the study of mathematics in public secondary schools

Variables	N	X̄	SD	Df°	Level of sig	z-cal	z-tab	Decision
Ways of improving the attitudes of students towards the study of mathematics.				448	0.05	-0.03	1.96	*Accepted*
Teachers.	100	3.22	0.84					
Students.	350	3.53	0.88					

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From the result in table 6, the null hypothesis of no significant difference in the mean score of teachers and students on the ways of improving the attitude of students towards the study of mathematics in public secondary schools in Nsukka local government area. In other words, the calculated z-value at 448 degree and 0.05 level of significance is -0.03. Since the calculated value of -0.03 is less than the critical value of 1.96, the null hypothesis is accepted.

All the three null hypotheses in tables 4, 5 and 6 returned no significant difference in the mean scores of teachers and students on the factors identified to have effect on the student's attitude towards the learning of mathematics as a subject in secondary schools in Nsukka local government area. The same thing is applicable to the study of mathematics and the ways to improve the study of the subject in secondary schools. All the calculated z-calculated have less than 1.96 on critical table with each returned score of -8.09, -0.02 and -0.03 for tables 4, 5 and 6 meaning accepted.

Discussion of Findings

The result of the analysis of research question 1, shows that teacher's competence and attitudes, relevance and applicability of mathematics in real life situation, confidence and anxiety level of students, parental influence and their socio-economic background, qualification, professional growth and development of teachers in teaching are factors identified as influencing student's attitudes towards the study of mathematics in public secondary schools. These findings are In line with Okafor (2018) who noted that certain traits which must equip teachers to teach, induce, promote and impact knowledge and skills of solving problems in the study of mathematics in secondary schools include, effective application of teaching strategies such as play way method and engagement of students to study mathematics are the best option to encourage students to learn mathematics.

The result of the analysis of research question 2, shows that the benefits students can derive from the study of mathematics in public secondary schools include, fostering of positive relationship between the students and teachers, application of mathematical knowledge and skills to different subjects and occupations, create phobia among students, help them to learn how to calculate, count, solve problems, develop knowledge of critical thinking and reasoning and re-shaping of students behavior in its daily activities. These findings are in agreement with Onwuka (2014), Udensi (2019) and Kalu (2016) observed that mathematics teachers own knowledge of teaching skills and their enthusiasm for the subject can shape how students perceive and engage in the subject. These they noted is because teachers who demonstrate strong desire to teach mathematics, show competence and genuine passion for the subject because of the benefits students are

likely to derive from it is likely to help them learn how to count, calculate and solve problems which are more likely to help them activate positive attitudes towards the subject.

The result of research question 3, shows that using instructional materials to teach will help stimulate student's interest in the subject, remove mathematical phobia, create room for critical thinking and reasoning, motivate teachers to develop themselves professionally and encourage students to develop more passion and love for the subject. These findings are in line with Udensi and Oteh (2023) observation that teachers knowledge of the content, subject matter and understand his students aspirations, expectations and needs is likely to know how to inspire him to learn, make value judgment and develop his latent potentials by being resourceful and ready to use interactive hands-on activities to relate mathematical concepts and symbols to real world applications is likely to foster more positive students attitudes towards the study and learning mathematics in secondary schools.

Conclusion

Identifying the factors that is influencing the attitudes of students towards the study of mathematics in public secondary schools, the benefits to be derived from the study of the subject and the ways teachers and students can help in the enhancement of the subject in order to achieve academic success in schools should be the concern of teachers, students and all stake holders in education. The problems of inadequate teaching materials and equipment for the subject, professional growth and development of teachers, teachers knowledge of the content and subject matter, training and re-training of mathematics teachers through conferences, seminars and workshops or in-service training to ensure what the teachers teaches the students are in line with their needs, aspirations, expectations and relevant to the societal needs should be paramount in teachers mind if national development is to be achieved through science and technology.

Recommendations

Based on the issues highlighted, the following recommendations were made:

1. Qualified, competent and trained mathematical teachers should be recruited in all secondary schools.
2. There is the need to identify factors influencing the attitudes of students towards the study of mathematics in public secondary schools.
3. There is the need to educate the students, parents and stake holders in education services on the importance of mathematics education to the nation building and technological advancement.
4. There is the need to expose teachers through workshop, seminars, conferences, in-house training, in-service training and on-the-job-

training on the modern methods of teaching and learning of mathematics so as to help remove mathematical phobia on students using different methodologies of teaching such as peer group method, project method, assignment method and play way methods.

Contributions to Knowledge

This study will serve as a strategy that public secondary school administrators and teachers can use to enhance the teaching and learning of mathematics in the classroom. The findings of the study would help remove the phobia for mathematics and add to the existing literature and also act as spring board for further studies on why student's attitudes towards mathematics as a subject is always negative. It will also assist teachers to know their areas of strength, weakness and how to improve on it, while on the part of students, it will instill self-confidence, interest, self-reliance and love for the subject having realize that without it, they cannot aspire to be scientists.

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