STRATEGIES TO IMPROVE CLASSROOM SITUATION IN TEACHING AND LEARNING MATHEMATICS IN SECONDARY SCHOOLS IN EBONYI STATE

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Abstract

This study focused on strategies to improve classroom situation in teaching and learning mathematics in secondary schools. Seventy-one (71) Secondary school mathematics teachers and five hundred and fifty six senior (565) secondary school students were used for the study. Five research questions and two hypotheses were developed to guide the study. The study was descriptive survey designed that made use of 56 items questionnaire of five points rating. The data obtained from the respondents were analyzed and results showed that; mathematics teacher are always ready to teach while mathematics students/learners most a times were not prepared to study mathematics. The study discovered that there is total lack of mathematics teaching materials in all secondary schools in State and that most teachers use ineffective or inappropriate methods and materials in teaching and learning of mathematics. Z-test statistics on the two hypothesis showed that there is no significant difference on the opinion of both teachers and students and that of urban and rural respondents on the strategies to improve classroom situation in teaching and learning mathematics in secondary schools in the state. The researcher recommended among other measures use of learner centered method of teaching such as demonstration method, practical/laboratory method and mathematics teachers are to set-inducting their students before and during teaching and learning of mathematics. He also want Government to provide enough teaching aid/materials for the teaching and learning of mathematics with regular workshops, seminars and conferences for secondary school mathematics teachers.

Keywords: Strategies, Classroom, Improvement, Teaching and Learning Mathematics.

Introduction

The name mathematics is already a household name in every educational institution. It is a singular subject that finds its uses in all other subject or courses of any educational institution. Arts courses make use of mathematics in numbering, recording and in logical reasoning while science courses make use of mathematics in their calculations. It is this unique nature of

mathematics that made it to be regarded as the language of science and the organizer of art courses (Nweke and Ali, 2020). Abubaar and Ibrahim (2010), said that mathematics makes students to find meaning in their environment. Oji and Kalu, (2009) stated that mathematics is an indispensable subject in the realm of human affairs. It is this strategic nature of mathematics that made it to be among the few subjects that are used to determine promotion of students from one class to another, to rate the performance of candidates in both external and internal examinations.

The teaching and learning of Mathematics has not been judged to be adequate by the most researchers of such topic. Such research like Nweke and Ali (2020) who said that the teaching and learning of mathematics has been be deviled by many problems thereby resulting to poor performance of students in the subject both in internal and external examinations while Oji and Kalu, (2009) see mathematics as a problematic subject to the majority of learners. It is impossible for one to be a student in any education institution and have nothing to do with mathematics. It is on that note that, Ukobizaba, et al (2019) stated that effective teaching and learning of mathematics are vital not only for examination or assessment purposes but also for empowering learners to live in a modern age of science, mathematics and engineering and enable them role-play to the social and economic development of the developing countries and the whole world as well. This is to show how important mathematics is to students and to the society.

Classroom is the major place where formal teaching and learning of any subject mathematics inclusive take place. It is the place where the learner and the teacher interact with teaching materials and teaching methods in order to acquire a new knowledge and experience by the learner. It is believed that successful transfer of knowledge and experience between teacher and learner will result among other things happiness and eager for more to both parties. But contrary to the above, secondary school students hate both mathematics and mathematics teacher. Reports of students' hatred for mathematics as seen in Nweke and Nwachukwu (2015), who stated that, 'students shy away from studying mathematics with reasons such as; mathematics is a difficult subject, mathematics can make me mad, mathematics has no real practical use, mathematics is too abstract'. They also reported that students dislike mathematics and even the teacher teaching mathematics. The hatred is a pointer that all may not be working well in the classroom between the students and the teachers. Based on the above assumptions it

is very important to investigate the activities that take place in the classroom between mathematics teachers and his or her students during teaching and learning of mathematics. This investigation will among other things look into; teaching methods, teaching materials, the teacher and the learner.

The teacher is that person who has taken the responsibility of leading another person (the Learner) to gain a new knowledge (Irma, Marsigit and Dwi, 2021)). It will not be wrong to say that a teacher is that person who plants a seed of knowledge in another person. The teacher as the planter will prepare planting site (prepare the learner), water the seed (re-enforcement), remove weed from the seed (clear learner wrong idea) and even apply fertilizer on the seed (encourage the learner). The question now is; are teachers actually acting like good planter as above? It is this study that will prove it or otherwise.

The learner is the planting ground. It accepts the seed (ready to learn), supply nutrients for the seed (provide necessary things). That will make him/her to gain the knowledge), carry the seed as it turns plant (retain the knowledge). The same question asked of teachers also goes to learners, that is; are learner willing to learn by providing themselves as above.

It is very important to note that if all the necessary conditions are fulfilled, teaching and learning will smoothly take place but if any of the conditions fails, there will be likelihood that learning will not take place and even if it take place it will be half-hazard. From the above illustration it is clear that both learner and teacher need to perform their own using suitable and reliable teaching materials and method duty during teaching and learning for it to be effective.

Statement of Problem

It is not news that mathematics is problematic subject of study in secondary schools. Both parents and students always wish their ward to pass the subject at a seating since it is compulsory to all secondary school students no matter the subject combination. Contrary to the above wishes many students still fail to pass the subject in any given secondary school examination. Mathematics teachers are on constant attack as having not teach or make them (students) or their

ward to pass mathematics examination. The evidence to these submissions were in Nweke and Ali (2020), Abubaar and Ibrahim (2010) and Isack M. (2015) who all feel worried about the danger at which people react to students failing mathematics.

This study was aimed at unveiling remote course of students poor performance in mathematics since it is must that secondary school student to pass it for him/her to considered as having passed such examination no matter the student's area of study. To this end, this study wish to investigate the classroom activities of both teachers and students, the materials used in teaching and learning the mathematics and method mathematics teachers employ in teaching the subject. It is believed that this study will unveil the secret behind consistence failure of secondary school students in mathematics. The study will not only unveil secret but also proffer solution to the problem.

Purpose of the Study

`The main purpose of this research is to determine the strategies to improve classroom situation in teaching and learning mathematics in secondary schools in Ebonyi State. Specifically the study seeks to;

1. Find out the effectiveness of mathematics teachers in in classroom during teaching and learning mathematics in secondary schools in Ebonyi state.
2. Ascertain the preparedness of mathematics students in classroom during teaching and learning mathematics in secondary schools in Ebonyi state.
3. Find out the level of availability of mathematics teaching materials use in teaching and learning mathematics in secondary schools in Ebonyi state
4. Ascertain the effectiveness of teaching methods being applied by mathematics teachers in teaching mathematics in secondary school in Ebonyi state.
5. Find out the most appropriate materials that will improve the teaching and learning of mathematics in secondary schools in Ebonyi State.

Research Questions.

This study seek to answer the following research questions;

1. How effective are mathematics teachers in classroom during teaching and learning mathematics in secondary schools in Ebonyi State?

2. How prepared are mathematics students/learners during teaching and learning mathematics in secondary schools in Ebonyi State?

3. What are the levels of teaching materials available for teaching and learning mathematics in secondary schools in Ebonyi State?

4. Which method/s will be the most effective method/s for teaching mathematics in secondary school in Ebonyi State?

5. Are mathematics teachers using appropriate methods and materials for teaching mathematics in Secondary School in Ebonyi State?

Research Hypotheses

Ho_1. There is no significant difference between the opinions of teachers and students on the strategies to improve classroom situation in teaching and learning mathematics in secondary schools in Ebonyi State.

Ho_2. There is no significant difference between opinions of rural and urban teachers/students on the strategies to improve classroom situation in teaching and learning mathematics in secondary schools in Ebonyi State.

Method

The study adopted a descriptive survey research design with population of 122,872 (60,360 male and 62,512 female) secondary school students and 4146 teachers in the 222 public or government owned secondary schools in Ebonyi State (EBSSEB, 2021). The study made use of multi-stage random sampling technique to get 585 secondary school students and 78 secondary school mathematics teachers for the study. Instrument for data collection was structured questionnaire called 'Strategies to Improve Classroom Situation in Mathematics Questionnaire (SICSMQ)'. It is made up of 56 items questionnaire designed to elicit information on the five research questions. Each item of the questionnaire has five point scale rating. The

researcher scored the instrument using weighted mean. That is Strongly Agree (**SA**) was scored 5 points, Agree (**A**) scored 4 points, Undecided (U) scored 3 points, Disagree (**D**) scored 2 points and Strongly Disagree (**SD**) was scored 1 point. Reliability of the instrument was ascertained using test - retest form of reliability test. The research questions were answered using mean and standard deviation. The mean response to each item in the questionnaire was used to determine the answer to each item of the questionnaire and the research questions was answered using the mean value of its cluster items. In order to interpret the result, the mean score of each item and the questionnaire was interpreted as; 4.50 and above as Strongly Agree, 4.49 – 3.50 as Agree, 3.49 - 2.50 as Undecided, 2.49 - 1.50 as Disagree whereas 1.49 and below was interpreted as Strongly Disagree. The mean score of each cluster was used to answer the research question under it while the null hypotheses were tested using z-test statistics under 0.05 alpha level of significance. Decisions on the hypotheses were based on; Reject Ho if z-calculated is greater than z-critical and Accept Ho if z-calculated less than z-critical.

Result Presentation

This section presents the analysis of data and interpretation of the results of the study. The presentation of responses from the respondents were given in tables and also interpreted. A total of 656 questionnaires were distributed to 71 mathematics teachers and 585 students in the Ebonyi state secondary schools. Among the respondents 281 of them are considered as urban based while the remaining 375 of them are rural respondents based on the location of their secondary school.

Research Question 1. How effective are mathematics teachers in classroom during teaching and learning mathematics in secondary schools in Ebonyi State?

TABLE 1: Effectiveness of Mathematics Teachers in Classroom during teaching and learning mathematics in secondary schools

	Effectiveness of Mathematics Teachers	$\bar{x}$	σ^2	Decision
1	Mathematics Teachers motivate their students before teaching	2.84	1.19	Undecided
2	Mathematics Teachers are always ready to teach	3.67	1.16	Agree
3	Mathematics Teachers use to set induce their	2.94	1.38	Undecided

	students before teaching			
4	They are always friendly with their students	3.51	1.31	Agree
5	They make use of teaching and learning materials during mathematics lessons.	3.14	1.17	Undecided
6	They always give enough of exercises and take home assignments	2.91	1.43	Undecided
7	They always make use of learner centered methods of teaching to teach mathematics.	2.88	1.29	Undecided
8	Students always like to make their mathematics teacher their role model	2.81	1.04	Undecided
9	Mathematics Teachers always make enough explanations and illustrations to help their students understand what they are taught.	3.54	1.29	Agree
10	Mathematics Teachers always prepare their lesson notes and diary to lesson.	3.51	1.36.	Agree
	Mean Value	**3.18**	**1.26**	

Key: $\bar{x} = mean\ of\ the\ responsses,\ \sigma^2 = Standard\ deviation\ of\ the\ responses$

Table 1 is used to answer research question 1, which sought to find out Effectiveness of Mathematics Teachers in classroom during teaching and learning mathematics in secondary schools in Ebonyi State. The result shows that items 1,3,6,7 and 8 were undecided meaning that the opinions of the respondents are balance and cannot be use to determine the answer to the statement of the item. While items 2, 4, 5, 9 and 10 were agreed.

Research Question 2. How prepared are mathematics students/learners during teaching and learning mathematics in secondary schools in Ebonyi State?

TABLE 2: Preparedness of Learners in Classroom During Teaching and Learning Mathematics in Secondary Schools

	Preparedness of Learners to Mathematics Lesson	$\bar{x}$	σ^2	**Decision**
1	Students are always ready to learn mathematics.	2.96	1.18	Undecided
2	Students always pay attention during mathematics lessons	2.96	1.17	Undecided
3	They do ask questions and answer questions during mathematics lessons	3.65	1.40	Agree

4	They always copy note and jot points in during mathematics lessons	3.51	1.43	Agree
5	Students always like their mathematics teacher	2.90	1.08	Undecided
6	Students use to do their mathematics assignment and home works.	3.71	1.32	Agree
7	Students are always willing to attend mathematics classes and lessons	2.49	1.36	Disagree
8	Students always read and reviews what they were taught at home.	2.99	1.10	Undecided
9	Students always like to study mathematics during their leisure time	3.10	1.20	Undecided
10	Students like to be friendly with their mathematics teachers	3.64	1.40	Agree
	Mean Value	**3.19**	**1.36**	

Key: $\bar{x} = mean\ of\ the\ responsses,\ \sigma^2 = Standard\ deviation\ of\ the\ responses$

Table 2 is used to answer research question 2, which sought to find out the preparedness of learners in classroom during teaching and learning mathematics in secondary schools in Ebonyi State. The result on show that items 1,2,5,7 and 8 were undecided meaning that the opinions of the respondents are balance and cannot be use to determine the answer to the statement of the item. While items 3,4,6,9 and 10 were agreed.

Research Question 3. What are the levels of teaching materials available for teaching and learning mathematics in secondary schools in Ebonyi State?

TABLE 3: Availability of Teaching Materials During Teaching and Learning Mathematics in Secondary Schools

	Availability Teaching Materials Teaching and Learning Mathematics	$\bar{x}$	σ^2	**Decision**
1	There are enough mathematics teaching and learning materials in my school	2.17	1.05	Disagree
2	Mathematics teachers do make use of teaching material during mathematics lessons.	2.73	1.37	Undecided
3	We are always allowed/encourage to make use of mathematics teaching material to learn mathematics.	2.55	0.98	Undecided

4	School use to replace spoiled mathematics teaching materials in time.	2.81	0.77	Undecided
5	Consumable mathematics teaching and learning materials are always available in my school.	2.72	1.11	Undecided
6	Mathematics teachers always improvise some teaching aid for their mathematics lesson.	3.06	0.35	Undecided
7	Students are made to improvise for their learning of mathematics.	3.05	1.39	Undecided
8	There is enough computers for mathematics lesson in my school.	2.76	1.20	Undecided
	Mean Value	**2.73**	**1.03**	

Key: $\bar{x} = mean\ of\ the\ responsses,\ \sigma^2 = Standard\ deviation\ of\ the\ responses$

Table 3 is used to answer research question 3, which sought to find out the level of availability teaching materials during teaching and learning mathematics in secondary schools in Ebonyi State. The result shows that items 1,2,3,4,5 and 8 were undecided meaning that the opinions of the respondents are balance and cannot be use to determine the answer to the statement of the item. While only items 6 and 7 were agreed.

Research Question 4. Which method/s will be the most effective method/s for teaching mathematics in secondary school in Ebonyi State?

TABLE 4: Effective Method of Teaching Mathematics in Secondary School

	Effective Method of Teaching Mathematics	$\bar{x}$	σ^2	**Decision**
1	Learner centered method of teaching mathematics should always be applied in teaching mathematics.	4.13	1.11	Agree
2	Practical methods should be encouraged in teaching mathematics.	3.85	1.17	Agree
3	Enough explanations and illustrations should be	3.96	1.25	Agree

	applied in mathematics lessons			
4	Teaching methods that encourage students participation should be use in teaching mathematics.	4.03	1.18	Agree
5	Lecture method is not good for teaching of mathematics	3.68	0.95	Agree
6	Peer and group method of teaching and learning favours students better understanding of mathematics.	3.46	1.10	Undecided
7	Game and play method makes learning of mathematics enjoyable and rewarding.	3.35	1.43	Undecided
8	Mathematics teacher should individualize their lessons for better and easy understanding.	3.35	1.14	Undecided
9	Student to student interactive during mathematics classes is beneficial to better understanding of mathematics.	3.19	1.26	Undecided
10	Explaining mathematics concepts in native language make easy and better understanding of the mathematics concepts.	3.21	1.34	Undecided
	Mean Value	**3.62**	**1.19**	

Key: $\bar{x} = mean\ of\ the\ responsses,\ \sigma^2 = Standard\ deviation\ of\ the\ responses$

Table 4 is used to answer research question 4, which sought to find out effective method of teaching mathematics in secondary schools in Ebonyi State. The result shows that items 1,2,3,4 and 5 were agreed while items 6,7,8,9 and 10 were undecided

Research Question 5. Are mathematics teachers using appropriate methods and materials for teaching mathematics in Secondary School in Ebonyi State?

Table 5: Mathematics Teachers Using Appropriate Methods and Materials in Teaching and Learning Mathematics in Secondary School

	Teachers Using Appropriate Methods and Materials	$\bar{x}$	σ^2	**Decision**
1	There should be use of local materials in teaching mathematics	3.32	1.37	Undecided
2	Audio-visual teaching material promotes better and	3.36	1.25	Undecided

	quick understanding of mathematics concept taught.			
3	Computer aided mathematics will be of immense benefit to students understanding of mathematics.	3.69	1.23	Agreed
4	Every mathematics lesson should be accompanied with concrete material demonstration.	3.72	1.15	Agreed
5	Every student should have a full access of teaching material during mathematics lesson.	3.68	1.21	Agreed
6	Teachers should educate their students on the necessary precautions and use every mathematics teaching and learning material.	3.61	1.06	Agreed
	Mean Value	**3.56**	**1.21**	

Key: $\bar{x} = mean\ of\ the\ responsses,\ \sigma^2 = Standard\ deviation\ of\ the\ responses$

Table 5 is used to answer research question 5, which sought to find out the effective methods of teaching mathematics in secondary schools in Ebonyi State. The result shows that items 3,4, 5 and 6 were agreed while items 1 and 2 were undecided.

Test of Hypotheses

Hypothesis 1: There is no significant difference between the opinions of teachers and students on the strategies to improve classroom situation in teaching and learning mathematics in secondary schools in Ebonyi State.

Variable	**N**	$\bar{x}$	σ^2	**Df**	**LS**	**z-cal**	**z-crit**	**Decision**
Teachers	71	3.43	1.01					
Student	585	3.24	1.33	654	0.05	0.783	1.960	Not Significant

Key: $N = no\ of\ resp., \bar{x} = mean,\ \sigma^2 = SD, Df = degree\ of\ freedom, LS = Level\ of\ sign.$

The analysis on table 6 above shows acceptance of hypothesis 1 that there is no significant difference between the opinions of teachers and students on the strategies to improve classroom situation in teaching and learning mathematics in secondary schools in Ebonyi State as the z-calculated of 0.783 is less than z-critical of 1.960 at 0.05 significant level.

Hypothesis 2: There is no significant difference between opinions of rural and urban teachers/students on the strategies to improve classroom situation in teaching and learning mathematics in secondary schools in Ebonyi State.

Variable	N	$\bar{x}$	σ^2	Df	LS	z-cal	z-crit	Decision
Urban	281	3.27	1.23					
Rural	375	3.25	1.13	654	0.05	0.814	1.960	Not Significant

Key: $N = no\ of\ resp., \bar{x} = mean,\ \sigma^2 = SD, Df = degree\ of\ freedom, LS = Level\ of\ sign.$

The analysis on table 7 above shows acceptance of hypothesis 2 that there is no significant difference between the opinions of rural and urban teachers/students on the strategies to improve classroom situation in teaching and learning mathematics in secondary schools in Ebonyi State as the z-calculated of 0.814 is less than z-critical of 1.960 at 0.05 significant level.

Discussion of Results

The discussions of results of this study were based on the answers to research questions. The results of research questions analysis shows that; Mathematics Teachers are always ready to teach, they are always friendly with their students, They make use of teaching and learning materials during mathematics lessons, they are always make enough explanations and illustrations to help their students understand what they are being taught with a prepared lesson notes. But they don't actually motivate their students before teaching, set-induct their students before teaching, don't give enough exercises and take home assignments and not always using learners centered method of teaching mathematics. On the part of the students they always pay attention in mathematics lessons, do their home work/assignments but not always willing to attend mathematics lessons and are always prepared to take any short cut to pass mathematics test/examination.

The opinion of the respondents shows that there is always short supply of mathematics instructional materials and maintenance of materials for teaching and learning of mathematics in all the secondary schools. Their opinion is not different from research discovery of Nweke and

Ali (2020) who observed that; both teachers and students teach and learn mathematics in abstract form and that they were no mathematics practical laboratory in all the secondary schools in the state.

As for method of teaching mathematics, the respondents are of the opinion that learner centered methods coupled with practical methods such as; demonstration method, laboratory method, Peer and group method, Game and play method with enough explanations and illustrations should be applied in teaching mathematics. The respondents abhor the use of lecture method, seminar or project method and any of the teacher learner centered method in teaching and learning of mathematics secondary school mathematics. This observation is supported by Nwachukwu and Nweke (2018) who recommended Cooperative Learning strategy and such alike in teaching mathematics.

Educational Implications

The following educational implication can be deduced from the study;

1 Teaching of mathematics should be learner centered making use of methods such as; demonstration method and laboratory method with enough explanation.

2. The study encourages adequate motivation and set induction before and during teaching and learning of mathematics

3. The study identified acute lack of teaching and learning materials which include both improvise and teaching aid in general .

4. Based on the study there is need for adequate sensitization of students on the importance of mathematics to them as an individual and to the society at large .

5. The study encourages better remunerations for both teachers and students involved in teaching and learning of mathematics.

Conclusion

This study was carried out in order to determine the strategies to improve classroom situation in teaching and learning mathematics in secondary schools. The summary of the study indicate that mathematics teacher are always ready to teach while mathematics students/learners most a times were not prepared to study mathematics. The study discovered that there is total lack of mathematics teaching materials in all secondary schools in State. Most teachers use ineffective or inappropriate methods and materials in teaching and learning mathematics. The study saw that both urban and rural teachers/students have common opinion on the strategies to improve classroom situation in teaching and learning mathematics in secondary schools.

Recommendations

Based on the results obtained from the analyzed data the following recommendations were made;

1. Teachers should always make use of learner centered made of teaching such as demonstration method, practical and laboratory methods to teach secondary school mathematics.
2. Teachers should set induct and motivate there students before and during teaching and learning of mathematics.
3. Government and education administrator should endeavour to provide enough teaching and learning materials for the teaching and learning of mathematics.
4. Teachers and students involved in teaching and learning of mathematics should be encouraged materially by education administrators.
5. Mathematics teachers should be made to attend regular workshops, seminars and conferences to update themselves on the recent trends in teaching of mathematics.
6. Government and educational administrators should always put academic research work to use.

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