

Strategies for Improving Teachers’ Effectiveness in Teaching and Learning of Mathematics in Aguata Local Government Area of Anambra State

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Abstract

The study was conducted to find out the strategies for improving teachers’ effectiveness in teaching and learning of mathematics in primary schools in Aguata Local Government Area of Anambra State. The study adopted a survey research design with a population of 2065 primary six pupils and 74 primary six teachers in all the 30 public primary schools in Aguata Local Government Area of Anambra State. From the population, a sample of 500 primary six pupils and 29 teachers was drawn using simple random sampling technique and disproportionate stratified allocation. The instrument for data collection was researchers’ constructed questionnaire. Four research questions were posed to guide the study. The collected data were analyzed using mean and standard deviation. The findings of the study revealed that the strategies for improving teachers’ effectiveness in teaching and learning of mathematics in Aguata local government area of Anambra state include among others use of motivation, adequate use of humour and enthusiasm and use of examples. Teachers’ qualification and regular attendance to workshops and conferences also help in improving mathematics teachers’ effectiveness in teaching and learning of the subject. Based on the findings, recommendations were made which included among others that mathematics teaching and learning should be characterized with relaxed atmosphere punctuated with humours and that teaching aids should be used.

Key words: *Teachers’ effectiveness, teaching and learning of mathematics, primary schools.*

Date of Submission: 08-12-2020

Date of acceptance: 24-12-2020

I. Introduction

Mathematics is one important and core school subject taught at all levels of education in many countries including Nigeria. To Bahago and Attah (2014), it permeates every fabric of the society and its role in solving societies’ problems is undebatable. According to Hornby, (2006), mathematics is a science of size and of numbers of which arithmetic, algebra, trigonometry and geometry are branches. Mathematics as a school subject is recognized as the foundation of science and technology without which as stated by Iweka, Onwuka and Moseri, (2010), a nation cannot become prosperous and economically independent. Mathematics methods are no longer the prerogative of only scientists, engineers and technologists, it is increasingly being used to analyze individual behavior, to study attitudes and trends in opinion within the society as a whole. This shows that there is no way a society or individual can develop without the knowledge and principle applications of mathematics which as a discipline is indispensable to scientific progress and national development. To take this further, Charles-Ogan, (2015) affirmed that application of mathematics on the national economy will definitely result in rapid national development. Hence, mathematics is an important subject as knowledge of it enhances a person’s reasoning, problem-solving skills, and in general, the ability to think critically. For this knowledge to be developed and made lasting in students, effectiveness on the part of teachers is highly required.

According to Stanford (2001), teacher effectiveness is the degree to which a teacher achieves desired effects upon students. In other words, teacher effectiveness is how much and how well students achieve and demonstrate commitment and resilience in the face of adversity. In general, in terms of Mathematics instruction, best practice is typically thought of as a teaching strategy that generates the desired results and promotes deep student understanding. An effective mathematics teacher transfers knowledge in such a way that the pupils understand the teaching and learn with ease. He has a broad range of specific teaching strategies available to him with communicates the subject matter to the pupils.

However, there are important factors that influence pupils learning which include; pupils’ attitude, background, teachers’ knowledge of the subject matter, study and learning skills, amount of time pupils spend on learning, their emotional readiness to learn and others. In support of the notion, Samuel and Adekunle (2019)

posited that for the fundamental learning to take place, the skillful teacher need to use different methods and techniques at his command.

Since there is clearly a shared responsibility between the teacher and the pupils as to what the pupils learn and because many pupils are able to learn in spite of teacher, while others fail to learn despite all the best efforts of a skilled practitioner, it becomes difficult to actually define what constitutes teacher effectiveness as it appears to be an act of faith. What is needful is for the teachers to do their best to develop pupils' interest so as to get them committed to the learning of the materials being presented to them. Obodo (2008) has it that lack of interest is the main factor that leads to poor performance of pupils in mathematics, he further stated that there is generally poor interest in the study of mathematics and mathematics related disciplines among Nigerian pupils.

This study therefore seeks to examine the various strategies that endanger the effectiveness of teachers in teaching and learning of mathematics in primary schools considering the failure rate of pupils in mathematics after each term examinations which points to ineffectiveness despite the fact that efforts are being made for them to succeed.

Statement of the Problem

Available record so far shows that performance of pupils in mathematics in primary schools in Aguata local government area of Anambra state is not encouraging due to the constant failure of pupils in the subject. It becomes so imperative to find out the factors that that are responsible for these and possible strategies to remedy the situation of the subject. The amount and quantity of learning that takes place in the school will depend to an extent in the effectiveness of the teachers in that school, therefore efforts aimed at the improvement of mathematics education should be focused on the effectiveness of mathematics teachers. It is against this background that the study is aimed at finding strategies for improving these factors.

Purpose of the Study

The main purpose of the study is to investigate the strategies for improving teachers' effectiveness in teaching and learning of mathematics in Aguata Local Government Area of Anambra State. Specifically, this study seeks to find out:

1. the factors that influence teachers' effectiveness in the teaching of mathematics in primary schools in Aguata Local Government Area of Anambra State
2. the pupil-related factors that influence pupils' performance in mathematics in Aguata Local Government Area of Anambra State
3. the possible learning strategies that can improve pupils' performance in mathematics in Aguata Local Government Area of Anambra State
4. the strategies for improving teachers' effectiveness in teaching of mathematics in Aguata Local Government Area of Anambra State

Research Questions

The following research questions have been formulated to guide the study:

1. What are the factors that influence teachers' effectiveness in the teaching of mathematics in primary schools in Aguata Local Government Area of Anambra State
2. What pupil-related factors influence pupils' performance in mathematics in Aguata Local Government Area of Anambra State
3. What are the possible learning strategies that can improve pupils' performance in mathematics in Aguata Local Government Area of Anambra State
4. What are the strategies' for improving teachers' effectiveness in teaching if mathematics in Aguata Local Government Area of Anambra State

II. Method

The study was carried out using a survey research design. The population of the study was all the 2065 primary six pupils and 74 primary six teachers in all the 30 public primary schools in Aguata local government area of Anambra State. 40 % of the pupils and 24 % of the teachers were selected using simple random sampling technique. The sample therefore is 29 teachers and 500 pupils. Two instruments, one for teachers and the other for pupils were used to collect data for the study. Teachers' instrument was a 21-item questionnaire tagged teacher-related factors that influence pupils' achievement in mathematics (TRFPAM) while pupils' instrument comprised a 6-item questionnaire tagged learner-related factors that influence pupils' achievement in mathematics (LRFPAM). The data was collected by the researchers and collected on the spot to avoid item mortality. The collected data were analyzed using arithmetic mean and standard deviation.

III. Results

The collected data were presented and analyzed in line with the research question as shown in the Table that follow:

Research Question 1:

What are the factors that influence teachers' effectiveness in the teaching of mathematics in primary schools in Aguata Local Government Area of Anambra State?

Table 1: Mean rating and standard deviation of the factors that influence teachers' effectiveness in the teaching of mathematics in primary schools in Aguata Local Government Area of Anambra State

S/N	ITEMS	SA	A	D	SD	N	X	Std dev	Remarks		
1.	Over-loading teachers with too many Subjects influence teaching and learning of Mathematics	15	10	3	1	29	3.3	0.93	agree		
2.	Sufficient mathematics teaching aids influence teachers' effectiveness in the teaching of mathematics			20	9	0	0	29	3.5	0.95	
3.	The number of pupils in the class influence teachers' effectiveness	20	6	1	2	29	3.8	1.02	agree		
4.	Nature of environment influences teacher effectiveness in teaching mathematics	15	13	1	0	29	3.48	0.94	agree		
5.	over-crowded classrooms influence teaching of mathematics			20	7	0	2	29	3.55	0.98	agree
6.	qualification of teachers influence teacher effectiveness in teaching mathematics	15	12	2	0	29	3.44	0.94	agree		
7.	primary mathematics teachers are not competent enough to teach mathematics			25	4	0	0	29	3.9	1.04	
8.	mathematics teachers' regular attendance to workshops/conferences influence teaching of mathematics in primary schools			15	10	4	0	29	3.37	0.91	agree
Grand Mean								3.58	agree		

The data in Table 1 shows that the respondents agree that all the items listed influence teachers' effectiveness in teaching and learning of mathematics in primary schools in Aguata Local Government Area of Anambra State of Nigeria. This is evident from the fact that all the items have mean score above 2.5 which is the cut-off point.

Research Question 2:

What pupil-related factors influence pupils' performance in mathematics in Aguata Local Government Area of Anambra State?

Table 2: Mean rating and standard deviation of pupil-related factors that influence pupils' performance in mathematics in Aguata Local Government Area of Anambra State

S/N	ITEMS	SA	A	D	SD	N	X	Std dev	Remarks
1.	pupils see mathematics as a difficult subject	257	210	30	3	500	3.44	0.94	agree
2.	concentration during mathematics class influence pupils' achievement in mathematics	270	200	26	4	500	3.47	0.95	agree

3.	pupils lack interest in learning mathematics	350	100	44	6	500	3.08	0.72	agree
4.	lack of consultation of textbooks by pupils after each lesson affect their performance	200	200	75	25	500	3.15	0.76	agree
5.	pupil may at times avoid mathematics lesson for no reason	350	100	44	6	500	3.58	0.97	agree
6.	pupils are not prepared to learn; they lack relevant textbooks and other items	315	155	20	10	500	3.55	0.90	agree
Grand Mean							3.46		agree

The data presented in table two reveals that the respondents all agree that all the listed items constitute the pupil-related factors that influence pupils' performance in mathematics in Aguata Local Government Area of Anambra State. This is because the grand mean of 3.46 is greater than the cut-off point of 2.5 and in all the items the respondents also recorded mean greater than the cut-off point.

Research Question 3

What are the possible learning strategies that can improve pupils' performance in mathematics in Aguata Local Government Area of Anambra State?

Table 3: Mean rating and standard deviation of possible learning strategies that can improve pupils' performance in mathematics in Aguata Local Government Area of Anambra State

S/N	ITEMS	SA	A	D	SD	N	X	Std dev	Remarks		
1.	teachers should relate mathematics with real life examples when teaching the subject	20	6	1	2	29	3.5	0.96	agree		
2.	use of enthusiasm and humour to make pupils have interest in mathematics influence pupils' achievement in mathematics	15	12	1	1	29	3.4	0.94	agree		
3.	mathematics teachers should regularly use questioning skills in teaching mathematics			25	4	0	0	29	3.86	1.09	agree
4.	teaching and learning of mathematics is done using motivation	20	7	2		0	29	3.62	0.97	agree	
5.	use of problem-solving method	25	4	0		0	29	3.9	1.04	agree	
6.	use of discussion method	19	7	3		0	29	3.6	0.97	agree	
Grand Mean							3.65		agree		

Table 3 shows the grand mean score of 3.65 which is above the cut-off point of 2.5. This shows that, in the view of all the respondents, all the items listed are considered to influence teachers' effectiveness in teaching and learning of mathematics in Aguata Local Government Area of Anambra State.

Research question 4

What are the strategies' for improving teachers' effectiveness in teaching of mathematics in Aguata Local Government Area of Anambra State.

Table 4: Mean rating and standard deviation of the strategies' for improving teachers' effectiveness in teaching of mathematics in Aguata Local Government Area of Anambra State.

S/N	ITEMS	SA	A	D	SD	N	X	Std dev	Remarks	
7.	teachers should not be over-loaded with too many subjects	25	4	0		0	29	3.9	1.04	agree

8.	schools should provide sufficient mathematics teaching aids to teachers	19	7	3	0	29	3.6	0.92	agree
9.	there should be conducive learning environment	25	4	0	0	29	3.86	1.02	agree
10.	the number of pupils in the class should be manageable.	25	4	0	0	29	3.86	1.02	agree be
11.	teachers should make the pupils to know that mathematics is not a difficult subject	20	7	2	0	29	3.62	0.92	agree
12.	classrooms should be spacious enough for an effective teaching and learning of mathematics	17	6	4	2	29	3.31	0.94	agree
13.	qualified mathematics teachers should be employed to teach mathematics in primary school.	25	0	0	0	29	3.9	1.04	agree
Grand Mean							3.72		
agree									

From Table 4, the respondents agreed with items 7-13, each with mean rating above 3.00. The grand mean of 3.72 is also above the cut-off point of 2.50. This means that they all are of the view that the listed items all influence teacher effectiveness in teaching of mathematics in Aguata Local Government Area of Anambra State.

IV. Discussions

The major focus of this study was to find out the strategies for improving teachers' effectiveness in teaching and learning of mathematics in Aguata Local Government Area of Anambra State, Nigeria. Finding from research question 1 show that the factors that influence teachers' effectiveness in the teaching of mathematics in primary schools in Aguata Local Government Area of Anambra State include excess work load, insufficient mathematics teaching aid, unconducive learning environment, overcrowded classrooms, poor teacher qualification, incompetency on the part of the teacher and poor attendance to workshops/conferences by teachers. This finding aligns well with the findings by Ismaila, Shahrillb and Mundia (2015) who in their study on Factors Contributing to Effective Mathematics Teaching in Secondary Schools in Brunei Darussalam enumerated the school enabling conditions, teachers' experiences and professional developments, the capacity of the teachers and what teachers do in their classroom as some of the factors influencing teacher effectiveness in the mathematics classroom. They then advised that teachers being at the heart of effective Mathematics education should try to discover the negative factors affecting teachers' effectiveness in teaching Mathematics; an awareness of which can help increase a teacher's effectiveness if they are dealt with successfully.

Arising from research question 2, it was observed that respondents agreed with all the items enumerated as seen from Table 2. This is so because there is a grand mean of 3.46 which is higher than the cut-off point of 2.50. Hence, the respondents agreed that the pupil-related factors that influence pupils' performance in mathematics in Aguata Local Government Area of Anambra State include: their perceived notion that mathematics is difficult, lack of interest and concentration, laziness in consulting textbooks, absenteeism during mathematics lessons and unwillingness to learn. This was because the grand mean score in Table 2 was 3.46 which is above the criterion mean of 2.5. The result concurs well with the findings of Acharya (2016) who reported that mathematics anxiety, lack of interest, negative feeling towards mathematics, laziness on the part of pupils and teaching/learning environment contribute to pupils' poor performance in mathematics. Habtamu (2017) further supported the findings by stating that lack of interest has a lot to do to mar teacher effectiveness in mathematics as it is difficult to teach pupils who demonstrate gross lack of interest in a subject.

From Table 3, the respondent with grand mean of 3.65 have a consensus that the possible learning strategies that can improve pupils' performance in mathematics in Aguata Local Government Area of Anambra State are those pupil-centered strategies like relating mathematics to real life situation, use of enthusiasm and humour, questioning skills, motivation, problem-solving and discussion methods. The finding aligns with that of Long and Dunne (2014) who emphasized the importance of using learner-centered and participatory strategies in the teaching of mathematics especially at primary school level. The researcher encourages strongly the

process approach like problem-solving and discussion which to them will get the learners involved in constructing their learning with enthusiasm.

In Table 4, it was shown from the result that the respondents all agree that are the strategies' for improving teachers' effectiveness in teaching of mathematics in Aguata Local Government Area of Anambra State are avoidance of excess workload, use adequate teaching aids, work in conducive environment, work with reasonable class size, use such methods as to make mathematic look like fun, avoid working in an overcrowded classroom and strive to attain the required qualification to teach mathematics. In all these items, the respondents recorded the mean rating score of 3.72 which is higher than the cut-off point of 2.50. The finding agrees with suggestion of Khan (2012) that mathematics teacher training program emphasize problem solving strategy and provide would be teachers with core knowledge of mathematical principals and their interrelationship, and also enable them to test the mathematical ideas for effective teaching of mathematics.

V. Conclusion

Strategies for improving teachers' effectiveness in teaching and learning of mathematics in Aguata Local Government Area of Anambra State was the focus of the research. Based on the findings of the study, it was concluded that so many factors both teacher- and pupil-related affect teacher-effectiveness in the teaching and learning of mathematics. Sequel to this, strategies that could be used to improve mathematics teacher-effectiveness were proffered and accepted by respondents to be effective.

VI. Recommendation

1. Mathematics teachers should be encouraged to regularly attend workshops/conferences to upgrade themselves with the recent innovations in mathematics education
2. government should provide conducive environment for effective teaching and learning of mathematics in schools
3. government should ensure that only qualified teachers are employed to teach mathematics in primary schools and that the teachers already serving are made to upgrade themselves
4. mathematics teachers should be trained to utilize learner-centered approaches like problem-solving, questioning and others teaching mathematics co as to sustain the pupils interest in the subject.
5. Mathematics teachers should be adequately motivated by the government
6. School administrators should provide mathematics teachers with the required teaching aids to discharge their duties well and mathematics teachers should be encouraged to improvise in case the teaching aids are not readily available

Suggestions for future research

Based on the findings, the researchers have made the following suggestions for future research

1. Strategies for improving primary school teachers' effectiveness in teaching and learning of mathematics in other local government areas of Anambra state
2. Same studies to be done in other core subjects outside mathematics like English language.

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