SECONDARY SCHOOL STUDENTS' AND MATHEMATICS TEACHERS' PERCEPTION OF THE ROLES SECONDARY SCHOOLS SHOULD PLAY TO ENHANCE STUDENTS' ACHIEVEMENT IN MATHEMATICS.

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Abstract
The study adopted the descriptive survey design to investigate Secondary students' and Mathematics teachers' perception of the roles secondary schools should play to enhance students' achievement in mathematics. The Purposive sampling technique was used to sample 159 secondary school students and 43 mathematic teachers from 14 States and Federal Capital Territory of Nigeria. The instrument used for collecting data was the researchers' developed structured questionnaire of the Likert type on students' and teachers' perceptions of the roles the school should play to enhance students' achievement in mathematics at the Junior and Senior Secondary school levels in Nigeria. The instrument was validated and the reliability index of 0.79 was obtained. Five (5) research questions and Three (3) hypotheses tested at 0.05 level of significance guided the study. The research questions were answered using percentages and the hypotheses were tested using independent t-test statistics. The results of the study indicated that provision of competent teachers, learning materials, well equipped library, regular counseling of students on the importance and how to study mathematics, use of activity based learning strategies, motivation of students and teachers, good class size, low workload of mathematics teachers, and other similar roles were agreed by students and mathematics teachers as the roles the school should play to enhance students' achievement in mathematics. The study recommended that schools should effectively carry out the roles identified in the study to enhance the achievement of students' in mathematics.

Key Words: *Perception, Mathematics, Teachers, Students' Achievement*

Introduction

The importance of the teaching and learning of mathematics to any nation cannot be overemphasized. Mathematics has been described as the bed rock of science, technology and modern development (Ukeje, 2005, Odili, 2006., Bolaji, 2012). Tella (2013) concurred with the saying that the line of gap between the advanced and the under- developed nations depends on their level of mathematics

attainment and ingenuity. Mathematics helps to prepare students for the numeracy demands at the workplace, raise the overall skill levels of the workplace and lays stronger foundations to skills for life -long learning (Stephen & Sue, 2001). In Nigeria like many other nations, mathematics is made compulsory at the primary and secondary school levels (FGN, 2013). As a result of this, nations make frantic efforts in terms of policies and provision of human and material resources for the improvement of the teaching and learning of mathematics in schools. These take the form of provision of teachers, teaching aids, classrooms, laboratories and other facilities that are expected to enhance the teaching and learning of mathematics in schools. The availability of these facilities vary from school to school and most times quite inadequate. Research has indicated that the factors that affect students' achievement in school are school factors, pupil factors, family factors, teacher factors and location factors. These include lack of qualified teachers, lack of interest on the part of the students, lack of instructional materials, lack of motivation for both teachers and students, poor condition of service for teachers, inadequate supply of facilities and equipment, lack of motivation, inappropriate method of teaching,and poor remuneration of teachers (Emaiku & Nwogu, 2005; Onah, 2012; Terna, Kuje & Abdullahi, 2018). Ingvarson, Beavis, Bishop, Peck, and Elsworth (2004) pointed out that the four main factors affecting the effectiveness of students' learning outcome in mathematics include school enabling conditions, teacher enabling conditions, capacity of the teachers, and teachers' practice.

The West African Senior School Certificate Chief Examiners report (2010 – 2015), observed the followings reasons for poor performance in Mathematics in Nigeria: some students could not interpret a given problems into mathematical statement and solve them correctly. Other reasons include poor understanding of the basic mathematical principles and concepts, such as inability to interpret word problems and draw required diagrams correctly. Similarly, Iwuoha (2007) identified the lack of thorough grooming in Mathematics concepts, unsuitable teaching environment, wrong evaluation techniques by the teachers in school, lack of incentives to mathematics teachers as major factors that lead to low achievement in Mathematics.

Adeyanju (2006) pointed out that student factors such as physical, health, truancy, emotional problem, personality factors, poor study habit, self-concept; continued failure, lack of basic cognitive skills, examination strategies, restiveness, and attitude, among others affect students' achievement in mathematics. Other factors have been suggested for the poor performance of students in Mathematics. Such factors includes reasoning and numerical ability, problem solving skills, Mathematics Phobia and instructional strategy attitude and self – concept among others (Onabanjo, 2007; Bature, 2006).

In Nigeria, the performance of students in mathematics in both internal and national examinations falls below the expectations of all stake holders including

government, school, parents, teachers, students and the society. Many students find it difficult to pass the mathematics examinations and in some cases attempt to engage in examination malpractices due to the fear of not passing the examination. Also, teachers find difficulty in teaching some topics in mathematics. From 2004 to 2016 Nigeria did not obtain up to 60% credit pass in mathematics in West African Senior Secondary School examination. For instance, from 2011 to 2016 Nigeria had 38.8%, 49%, 36%, 31.3%, 34.18% and 35.68% credit pass in mathematics respectively in West African Senior Secondary School examination (Zalmon & Wonu, 2017). Hence, research is on- going to find solution to this national problem.

The activities of the school including the teachers is fingered as one of the major factors affecting the achievement of students in Mathematics. The school is expected to provide the human and material facilities and policies for effective learning by the students. These include teachers, classrooms, offices, library, laboratories, workshops, textbooks, overhead film and slide projectors etc. Teacher's method of teaching and effectiveness in mathematics are influenced by the kind of resources and facilities made available by the school. Also, the teaching method determines the quality of participation and performance in mathematics by learners. For instance, the availability of a mathematics laboratory in a school would encourage student centered learning in a mathematics classroom. Otherwise, the teacher would use lecture method of teaching. Bosker and Witzer (1996) found out that school effects accounts for approximately ten percent of the variation in student achievement. Also, Hay Mcber (2000) in his study claimed that 30% of the variance in pupils' progress was due to the teachers. Teachers have been found to be at the heart of effective teaching in schools (Posamentier& Stepelman,1999; Siti, Masita & Lawrence,2014). Supporting this Stronge (2010) asserted that there is no more powerful influence on student success than the teacher. Therefore, the teacher needs to be well qualified and well trained on the methods of teaching mathematics in schools.

Interest is an important variable in learning as interest is an energizer of learning without which learning may not take place (Obodo, 2002, Abakpa, 2011). Hence, schools are expected to put strategies in place to arouse and sustain the interest of students in Mathematics. Some of the strategies that lead to improve students' interest and achievement in mathematics are effective counseling of students, use of mathematical games (Azuka, 2018), acquisition of emotional intelligence skills(Azuka, 2014), and Computer assisted instruction (Harbor Peters, 2002). Also, Albert (2018) in a study found out that students taught trigonometry with Triangular Solver Game achieved higher than those taught with expository method.

The importance of teaching aids in the teaching and learning of mathematics cannot be overemphasized. The availability of teaching facilities in a school is very important in determining the achievement of students in mathematics. Teaching

aids help to concretize abstract mathematical concepts and formulae. Students taught mathematics using laboratory based approach are expected to have positive interest in mathematics and perform better in the subject. For instance, the use of computer aided instructions including recorded videos improve the achievement of students in mathematics (Ekwueme & Umedo, 2018). .Also, Etsu and Ahmad (2018) in a study found out that mathematics laboratory based approach is more effective than the conventional approach in enhancing slow learners achievement in Geometry. Also, there was no significant difference in gender performance of the slow learners. Hence, many schools are encouraged to provide teaching aids and mathematical laboratories for the teaching of mathematics. But in Nigeria many secondary schools do not have mathematics laboratory.

Reinforcement is a very important factor in arousing and sustaining interest of students in mathematics. When students are reinforced by their schools and teachers, they tend to strive harder in the study of the mathematics. Supporting this, Ogoke, Anyanwu, Osuji and Nwaneri (2018) in a study found out that the use of immediate reinforcement learning strategy in the teaching and learning of trigonometry is effective and can enhance the achievement of students in Mathematics. Therefore, schools and teachers are expected to initiate reinforcement strategies that could improve the achievement and interest of students in Mathematics.

Another area that has continued to generate interest among researchers and mathematics educators is the problem of instructional approaches adopted by teachers. If an uninspiring approach is applied by a teacher, this could affect the attainment of the objectives of the lesson (Omenka, Kyeleve & Tali, 2018). In most mathematics classes in Nigeria students sit each on a chair and a table learning alone; while in some few cases students sit round a table and learn together called collaborative learning. The art of working with another person or group of people to create or produce something is called collaboration (Hornby, 2015). Collaborative learning approach is the learning that emphasizes group or co-operative efforts among students (Tsebee, 2008). Omenka, Kyeleve & Tali (2018) in their study found out that Collaborative teaching approach significantly improved students' achievement than the conventional learning strategy. Salami and Poopola (2016) noted that collaborative learning helpsstudents to decode difficult concepts and prevent lack of learning interest.

Teachers are very important resource in mathematics teaching and learning process but their efforts can be rendered ineffective by the following factors: large classes that overburden and overload the teacher; poor training, lack of retraining programmes, poor qualifications, inadequate in-service programs, lack of aids, textbooks, and other teaching materials needed by the school. These are expected to be provided by the school to ensure effective teaching and learning process. Unfortunately, the provision of these facilities vary from school to school. Hence,

we have variations in the achievement of students in mathematics and sciences from school to school. Some proprietors establish schools without considering the necessary roles expected of them in the provision of facilities for effective teaching and this affects the image of the school and the academic achievement of the students. In particular, schools should organize capacity building workshops for mathematics teachers to update their knowledge of mathematics subject matter and methods of teaching. Azuka, Oluwaniyi, Ojo, Ajie and Durojaiye (2017) reported that there was a significant difference in the pre-test mean and post-test mean in mathematics knowledge score of teachers exposed to capacity building workshop. In another report, Azuka and Ajie (2018) reported that the mean score of teachers exposed to capacity building workshop in mathematics subject matter rose from pre-test mean of 42.08 to post- test mean of 75.8 showing an increase mean of 33.72 Therefore, the school factor accounts for the reason why parents sought to enroll their children in some chosen schools. For example, in Nigeria many parents struggle to enroll their children in Federal Unity schools, University secondary schools and good private schools. This is due to their belief that these schools possess the required teachers, facilities and policies that enhance the study of school subjects including Mathematics. Many children from wealthy homes attend these schools while the general schools are left for the children of the poor.

If school factors affect the students' achievement in mathematics, then it is necessary to find out those things a school is expected to do to enhance students' achievement in mathematics as perceived by mathematics teachers and students. This is the focus of this study. The findings of this study would guide policy makers, school administrators and teachers in the provision of facilities for the teaching of mathematics in schools.

Research Questions

I. What are the roles that school should play to enhance students' achievement in mathematics as perceived by students?

II. What are the roles that school should play to enhance students' achievement in mathematics as perceived by mathematics teachers?

III. Is there any significant difference in the perception of male and female students on the roles that school should play to enhance students' achievement in mathematics?

IV. Is there any significant difference in the perception of male and female mathematics teachers on the roles that school should play to enhance students' achievement in mathematics?

V. Is there any significant difference in the perception of mathematics teachers and students on the roles that school should play to enhance students' achievement in mathematics?

Hypotheses:

The following hypotheses were tested at0.05 level of significance:

H_{01}: There is no significant difference in the perception of male and female students on the roles that school should play to enhance students' achievement in mathematics?

H_{02}: There is no significant difference in the perception of male and female mathematics teachers on the roles that school should play to enhance students' achievement in mathematics?

H_{03}: There is no significant difference in the perception of mathematics teachers and students on the roles that school should play to enhance students' achievement in mathematics?

Methodology

The research design adopted for the study was descriptive survey design. The population for the study was the Junior and Senior secondary schools in Nigeria. The purposive sampling technique was used to sample 159 students and 43 mathematics teachers from many secondary schools that visited the Centre for excursion and Olympiad Competition Examination between August 2018 and March,2019. There were 86 male students and 73 female students while the teachers were 30 males and 13 females. The students and teachers were from secondary schools in 14 outof 36 States and Federal Capital Territory of Nigeria including Lagos, Imo, Ogun, Enugu, Adamawa, Rivers, Kogi, Abia, Ondo, Kano, Yobe, Oyo and Federal Capital Territory. The instrument used for collecting data was the researchers' developed structured questionnaire of the Likert type on students' and teachers' perceptions of the roles the school should play to enhance students' achievement in mathematics. The responses were structured Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD) weighted 4.3, 2, and 1 respectively. It was a twenty-item questionnaire on the roles expected of secondary schools. A face validity and content validity of the instrument was carried out by experts at the National Mathematical Centre Abuja with a logical validity of 0.85. The reliability of the instrument was determined using Cronbach Alpha to obtain an index of internal consistency of 0.79. The questionnaires were distributed by the researchers and collected back and so the percentage of return was 100%. The research questions were answered using percentages and the hypotheses were tested using independent t-test statistics.

Results

Research Question 1: What are the roles schools should play to enhance the students' achievement as perceived by students?

100% of the students strongly agreed that competent teachers should be provided to teach Mathematics. 98.8% are in agreement that learning materials such as graph books/boards, Mathematical sets, and four figure tables etc. should be provided for teachers and students. Pertaining to increasing the number of periods for teaching Mathematics 78.7% agreed however, 21.3% disagreed on this. Also, 79.9% of the students strongly indicated that schools provide library equipped with standard and self – teaching Mathematics textbooks. On teachers practicalizing mathematics concepts for students using Active Based Learning strategy (ABLS), 68.6% of the students strongly agreed. 87.4% of the students agreed that students should be arranged in groups during Mathematics lessons to enable them exchange ideas during lessons. This indicates that majority of the students are in agreement that grouping in Mathematics lessons will enable them exchange ideas during lessons while a few do not agree. 76.7% of students agreed on the availability of videos on the teaching of Mathematics topics. Finally, 95% of the students were in support that Mathematics games should be provided and played in the school. The results above showed that a higher percentage of the students strongly perceive that the aforementioned roles that schools should play would enhance the performance of students in Mathematics. Among all the items, item 3showed the least percentage in agreement. This indicates that the students do not considerincreasing the number of period for mathematics teaching to be the key factor necessary in enhancing students' achievement in Mathematics.

Research Question 2: What are the roles schools should play to enhance the students' achievement as perceived by mathematics teachers.

(100%) of the mathematics teachers were in agreement that schools should provide competent teachers to teach Mathematics. 88.3% ofthe Teachers' agreed on increasing the number of periods for teaching Mathematics. Regular counseling of students on the importance of and how to study Mathematics shows strong agreement of 97.7% by teachers. 90.7% of the teachers indicated strong perception on motivating students in the study of Mathematics through awards to best students while 9.3% showed little or no perception. 81.4% of the teachers strongly agreed on the motivation of teachers of Mathematics using some incentives to make them happy with the job. The role of maintaining good class size of not more than 30 to enable teachers give attention to all students was strongly agreed at 79.1% by the teachers. 74.4% of the teachers strongly agreed on ensuring that teachers' workload (number of periods per week) is 20.

From the results above, it could be seen that the roles school play (from Item1 to Item 20) as perceived by the teachers received a positive agreement with little or no disagreement among the teachers. Items 1 and 2 had the highest percentage of strong agreement with 90.7% while Item 19 had the lowest percentage of strong

agreement with 39.5%. This could mean that teachers perceive the provision of competent mathematics teachers and learning materials as the most essential and necessary roles school should provide in order to enhance the performance of students in Mathematics. Item 19 showed the lowest percentage of strongly agreed as perceived by the teachers. This could mean although they are in support of teaching mathematics using videos to be provided by the school yet they did not consider it as the most important role.

H_{01}: There is no significant difference in the perception of male and female students on the roles that school should play to enhance students' achievement in mathematics.

T-test analysis of Perception of Male and Female Students on the Roles that School should Play to enhance Students' Achievement in Mathematics.

	Students	N	Mean	Std. Deviation	Std. Error Mean	df	Sig(2 - tailed)	Decision
Scores	Male	86	70.8140	6.41416	.69166	157	0.095	Not Significant
	Female	73	72.4110	5.41304	.63355			

The table above shows a 2 – tailed significant value of 0.095 which is greater than 0.05. Since the t –test significant value is greater than the confidence level of significant we do not reject the hypothesis. Thus, there is no significant difference between the perception of male and female students on the identified roles schools should play to enhance students' achievements' in mathematics.

H_{02}: There is no significant difference in the perception of male and female Mathematics teachers on the roles that school should play to enhance students' achievement in mathematics.

T-test Analysis of Perception of Male and Female Mathematics Teachers on the Roles that School should Play to Enhance Students' Achievement in Mathematics.

	Teachers	N	Mean	Std. Deviation	Std. Error Mean	Df	Sig. (2 - tailed)	Decision
Scores	Male	30	73.2333	5.23044	.95494	41	0.888	Non-Significant
	Female	13	73.4615	3.82133	1.05985			

The table above has a 2 – tailed significant value of 0.888 which is greater than 0.05. Since the t –test significant value is greater than the confidence level of significant, .we accept the hypothesis. Thus, there is no significant difference between the perception of male and female mathematics teachers on the identified roles schools should play to enhance students' achievement in mathematics.

H_{03}: There is no significant difference in the perception of mathematics teachers and students on the roles that school should play to enhance students' achievement in mathematics?

T-test analysis of perception of teachers and students on the roles that school should play to enhance students' achievement in mathematics.

	Group	N	Mean	Std. Deviation	Std. Error Mean	Df	Sig -(2-tailed)	Decision
Scores	Teachers	43	73.3023	4.80345	.73252	200	0.79	Non-Significant
	Students	159	71.5472	6.01022	.47664			

The table above shows a 2 – tailed significant value of 0.79 which is greater than 0.05. This means that since the t –test significant value is greater than the confidence level of significant. Therefore, we do not reject the hypothesis. Thus, there is no significant difference between the perception of teachers and students on the identified roles schools should play to enhance students' achievement in mathematics.

Discussion of Results

The role of providing competent teachers to teach mathematics was found to be 100% as perceived by both the teachers and students. This indicates that both students and teachers find this role to be an important role in enhancing the performance of students in mathematics. As the sayings goes, teachers are the bedrocks of any school without them learning cannot take place. Therefore, it is vital that schools should provide competent mathematics teachers for effective learning to take place. This result supports the findings by Hay Mcber (2000) in his studythat claimed 30% of the variance in pupils' progress was due to the teachers. It also supports the Posamentier and Stepelman(1999); Siti, Masita and Lawrence(2014) that Teachers have been found to be at the heart of effective teaching in schools. It also lends supporting to Stronge (2010) assertion that there is no more powerful influence on student success than the teacher. Both the students and the mathematics teachers agreed that mathematics teachers should be given

opportunity for in-service training to update their knowledge of subject matter and method of teaching. This supports the finding by Azuka, Oluwaniyi, Ojo,Ajie, and Durojaiye (2017) and Azuka and Ajie (2018) which indicated that capacity building workshops improves the knowledge of teachers in mathematics subject matter.

Also, on providing learning materials such as graph books/ boards, mathematical sets, four figure tables etc. for teachers and students, 100% of the teachers and 99% of the students were in total agreement that this role is an effective way of enhancing students' performance in mathematics. The use of such learning materials would make the learning of mathematics more meaningful. Students with well-equipped learning materials could learn better and discover life – long skills for future purposes. This result is in support of Ekwueme and Umedo (2018); Albert (2018); and Etsu and Ahmad (2018) who found out in their studies that instructional materials enhance the achievement of students in mathematics.

On provision of adequate and conducive classrooms with all relevant facilities for learning, it was discovered that 100% of the teachers and 98.7% of the students perceived this role as one that should be provided by the school to enhance students learning and performance in mathematics. Also, on mathematics teachers should be given opportunity for in – service training to enrich their knowledge content and methodology of teaching content, 97.7% of the teachers and 98% of the students were in agreement that schools should play the role. This result shows that the perception of both teachers and students towards the role is important. This means that knowledge of content and methodology of teaching content enhances students' performance in mathematics. Thus, it is imperative that mathematics teachers should be given the opportunity to enrich their knowledge in mathematics and update their teaching methodology. The findings support the need for the provision of in- service training for mathematics teachers.

The study reveals that both students and teachers agreed that there is need to motivate the students while learning mathematics in the school. This supports the findings by Ogoke, Anyanwu and Nwaneri (2018) that reinforcement learning strategy enhances students' achievement in mathematics. The result of the study shows that both students and teachers agreed that students should sit together during the teaching of mathematics. This lends support to the findings by Omenka, Kyeleye and Tali (2018) that collaborative teaching approach significantly improve students' achievement. It also supports the findings of Poopola (2018) which indicated that collaborative learning enhances students' interest in studying mathematics.

Recommendations

The following recommendations are made based on the findings of this study:

1. Schools should provide enough competent mathematics teachers and maintain average workload for the teachers.

2. Conducive classrooms with good class size and relevant facilities should be made available by the schools for effective teaching and learning of mathematics.

3. Opportunities for in – service training should be given to teachers to update and upgrade their mathematics content and methodology by the schools.

4. Provisions of all necessary learning materials for effective teaching and learning of mathematics.

5. Group learning and participation during mathematics lessons should be encouraged by the schools.

6. Schools should provide counseling sessions for students including how to study mathematics, emotional intelligence training and how to answer WAEC and NECO questions.

7. Arrangement should be made to reinforce and motivate students in the study of mathematics

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