STRATEGIES FOR IMPROVING MATHEMATICS LEARNING IN SECONDARY SCHOOLS (A CASE STUDY OF OREDO LOCAL GOVERNMENT AREA OF EDO STATE)

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A PROJECT WORK SUBMITTED TO THE DEPARTMENT OF EDUCATIONAL PSYCHOLOGY AND CURRICULUM STUDIES, FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY IN PARTIAL FUFILMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF SCIENCE B.Sc (Ed) DEGREE IN MATHEMATICS EDUCATION

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CERTIFICATION

We certify that this research work was carried out by Onuorah Ogonna Abraham, in the Department of Educational Psychology and Curriculum Studies, Faculty of Education, University of Benin, Benin City, Nigeria, in partial fulfilment of requirements, for the award of the B.Sc. (Ed) Degree in Mathematics.

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DEDICATION

This research work is dedicated to God Almighty for his mercies, Grace, strength love and care upon my life during the course of my studies. And to my loving mother Mrs. A.D. Onuorah.

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ABSTRACT

The study was carried out to investigate strategies for improving mathematics learning in Oredo local Government area of Edo state. To achieve this study, fifteen (15) schools were randomly selected within Oredo local Government Area. A total of ninety respondents were used. To achieve the fundamental purpose of this research and to ensure easy collection of data, Five (5) research questions were formulated. The research instrument employed for the study was questionnaire. Data collected were subjected to analysis using the simple percentage. The findings revealed that qualification of teachers affects students learning, there is need for in-service training for mathematics teachers. The findings also revealed that the use instructional materials will help to improve the study of mathematics and when teachers are well motivated it promotes effectiveness in the classroom. The research recommended that mathematics teachers should re-examine their teaching methods to include less lecture method and more student directed activities which involves the use of mathematical laboratory, government should provide instructional materials to help increase the learning of mathematics and the Federal ministry of education, state ministry of education and national mathematical center in Nigeria should provide special in-service programmes for mathematics teachers.

CHAPTER ONE

INTRODUCTION

Background to the study

From home to work place, mathematics tools have become part of our daily life. In many circles of computer literacy, technological and mathematical competencies are perceived as essential skills. Thus, schools had responded to this need for mathematical competencies by enhancing their course offering in mathematics. Also, as mathematics becomes part of our daily life, the need for proper teaching has become extremely essential because of the increase in needs, demand has also been placed on schools to educate students and make them mathematically equipped. However, prior to educating students, efforts must be made or committed to preparing teachers who can together help in fostering educational possibilities using practical knowledge and concrete materials in the classroom. However, mathematics stands out amongst all the subjects with which we one sufficiently develop his thinking or reasoning ability. It has the widest application in the activities of mankind. The Doctors, Engineers, Architects cannot

function effectively in their respective fields without the application of some specific concepts of mathematics.

In recent years students' academic achievement in mathematics in secondary school certificate examination has dwindled. Although the Federal and State government have concerned themselves with making mathematics interesting and beneficial to students (Mathematics Improvement Project, 2004). Despite the effort put in by government and various stake holders of education, mathematics learning still suffers a lot of problems and by extension has led to mass failure in external examinations. Although the modern trend in mathematics and the complex nature of learning it have made the role of the teachers more challenging. MIP (2004.) discovered that poor performance in the promotions/public examination has more to do with the methods of teaching mathematics rather than the content of curricula of the school mathematics. Mathematics as a subject encounters a lot of problems, and one may be quick to ask about qualification of mathematics teachers in secondary schools, use of instructional materials in class rooms, poor

attitude and performance of students towards mathematics and poor educational background of the area in other science related subjects.

A lot of changes have taken place in order to improve mathematics learning in Nigeria. In this study, the researcher will be taking a survey of strategies for improving mathematics learning in Secondary Schools. The National policy on Education (NPE, 2012) emphasized that our children should be educated properly so that they can acquire skills and competencies that would enable them function well and solve problems in the society. Apart from government, parents, the teachers and others have been worried in recent times of the differences that exist in performance between mathematics and other subjects in Secondary Schools Certificate Examinations. Having seen these discrepancies, the researcher has deemed it fit to go into the study in order to find out reasons behind these problems as well as proffering solutions to them. It is against this background that the researcher has decided to take an indebt look at the various strategies for improving mathematics learning in secondary schools.

Statement of the Problem

Despite the new approach to learning and instruction, mathematics at secondary school level in Nigeria has been plagued with poor results and low achievements. Annual results from WAEC revealed woeful performances from students who have made enrolment for mathematics examinations a yearly ritual. It is worrisome to note too that the performance of the students have continued to deteriorate year after year. It is understood that if the situation is not checked and mathematics continues to remain like this, it will affect both economic and technological growth of the Nigerian state. Based on the importance of mathematics on the society, it is expected that the performance of students on the subject should be relatively high considering the advancement of technology of the nation. But unfortunately, the reverse is the case. There's a decline in the performance of students in mathematics. Hence Onuoha (2003) revealed that students' performance in mathematics over the past ten years has been disappointing and negates the seriousness that the Nigerian educational policy attaches to the discipline.

This rate of decline in performance of students in mathematics has led to this research, to search for strategies for improving mathematics learning in secondary schools.

Research Questions

To guide the researcher through the study, the following research question were raised

i. Will the help of in-service training help to improve mathematics?
ii. Do teachers make use of teaching aids during the teaching of mathematics?
iii. Do mathematics teachers make use of mathematics laboratory when teaching mathematics?
iv. Are teachers well motivated to teach the subject mathematics?
v. Are there enough qualified mathematics teachers in our schools?

Purpose of The Study

The researchers intention is to seek the opinion of teachers in secondary schools in Oredo Local Government Area of Edo State in order to search for strategies for improving the study of mathematics learning in secondary schools under the National policy on education, to find out if in-service education or training is to be given to teachers handling the subject mathematics, to determine the qualification of teachers handling the subject mathematics, to find out if mathematical laboratory in schools are well equipped, to determine what motivates teachers and students and Also, to find out if teachers makes use of teaching aid in the classroom when teaching mathematics in secondary school.

Significance of The Study

The result of the study is expected to contribute immensely to the improvement in the teaching and learning of mathematics in secondary schools.

The study will provide the necessary information as to how the teachers can teach mathematics effectively in secondary schools. So the result will assist the educational administrator and Government of the outcome with functional policies as to how to improve the teaching and learning of mathematics in our schools.

Scope and Delimitation

The study is limited to all secondary schools in Oredo Local Government Area of Edo state and covers teachers in Junior to senior secondary schools.

Definition of Terms

In-service Education/Training: This is the developmental phenomenon with specified aims and objectives for the improvement of education at different level with various perspectives bearing in mind the discipline or subject matter under consideration.

Mathematics Improvement Project (MIP): Is an attempt by national mathematical center to revamp mathematics teaching and learning at the secondary school level.

Non-Professional/Qualified Teachers: Adaeze (1986) regarded them as "bird" of passage that create unnecessary vacuum whenever they see a greener pasture and better prospect in the profession they are originally trained for.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

The review of related literature for the study which investigated strategies for improving mathematics learning in secondary schools in Oredo Local Government area of Edo State was discussed under the following headings.

- Perceived need for In-service training and teacher's productivity in secondary schools.
- The availability and utilization of instructional material in the teaching of mathematics.
- Use of mathematics laboratory in the teaching of mathematics in our secondary schools.
- Motivation of students and teachers in mathematics learning/teaching.
- Availability of qualified teachers in the teaching of mathematics.
- Summary of related literature.

PERCEIVED NEED FOR IN-SERVICE TRAINING AND TEACHERS PRODUCTIVITY IN SECONDARY SCHOOL

Though generally, in Nigeria in-service education is yet to be accorded the same priority as pre-service education, the need for it is widely recognized. This is evident by the large number of conferences, seminars, workshops, symposia and other types of in-service education organized every year at the local, national, regional and international levels.

Handerson (2000), in his book "The evaluation of in-service teacher training" stated that the further training of teachers in-service work is like a tonic, like an injection that help to protect the most common diseases teachers suffer from that is long habits that become a second nature forcing them to act always in the old well established way, independently of the transformed world around them. In his appreciation of in-service training education Corey (2003) asserted that planned programme in-service education is essential to adequate professional improvement of school personnel.

Due to rapid growth of knowledge as well as the technological, social and cultural revolutions of our time, In-service education has much role to play as pre-service education in fulfilling this great responsibility. It is now generally agreed by educationists that initial teachers preparation is totally inadequate for continued success in teaching.

Weymart (2001) said that teachers have a role to play by improving on their performances and there by absorb the pressure of accountability if constantly exposed to new ideas and techniques through in-service education. Today, many Nigerians complain about the rate of mass failure of the subject mathematics in public examinations and the general public seem greatly disappointed in the present system of education.

Although many research findings tend to show that mass failures in public school examinations in the subject mathematics is not really the fault of the students. Cocksure (2009) findings repeatedly point to teachers attitudinal factors as the major cause of the poor performance of

students in public examinations in mathematics. He stated that having examined and found no serious attitude problems such that could hinder Children's learning process, the teacher attitudinal factors had to be closely and critically analyzed, while it is a fact that a teacher cannot study for the students, he can do much to stimulate their desire to learn. The role of teachers in guiding, directing and stimulating children to learn need not be over stressed.

Regarding the problems and needs in in-service mathematical program, the then minister of state for education Mr. Ezenwo Nyeson Wike in the 4th in-service education of teachers (INSET) management workshop for the strengthening of mathematics and sciences (SMASE) Nigeria held in conjunction with the embassy of Japan in Abuja, said that teacher training institutions should persuade teachers to come back to teacher training, colleges of education or universities and enroll in mathematics courses, since it was necessary for them to come back to enroll in mathematics courses and learn more. Over a dozen studies have estimated models of the relationship between teachers' education/training and students' achievements. Clotfetler (2005) and

Freg (2005) provided evidence that better trained and more experienced teachers tend to get students of greater ability and with fewer discipline problems.

Clotfeller (2005) in support of the point by Collrell (2005) added that through in-service training the teachers benefited in the areas of

- Acquisition of new knowledge
- Development of new skills
- Improved competencies and
- Enhance motivation.

All these when added together under a learning environment ensure improved academic performance of students.

Denes (2000) stated that the fact that mathematics is found difficult or unpleasant or both by so many people testify to the existence of real learning difficulties. The fact is that these difficulties have never been systematically or scientifically studied and consequently the process of learning mathematics is so scantly as to hardly amount to knowledge at all.

Linville (2001) asserted that in-service training in mathematics for secondary school teachers will be such that since some of the secondary school teachers were not adequately prepared to teach mathematics as some of them did not even have a degree in education, in-service education would help to update the skills of these secondary school teachers in teaching mathematics. It is intended to maintain and to improve the quality of teaching/learning and the quality of teachers' academic capability.

Any nation that wants to become industrialized must continuously train their teachers as to meet new modern requirements and standards. Many countries have successfully launched and benefited from in-service training of teachers handling the subject mathematics. UNESCO principal Regional office for Asia and the pacific in 2003 published a journal on Asia and the pacific program of educational innovation for development of in-service teacher education in science, technology and mathematics, the journal contained the national report for in-service education of teachers (INSET) workshop on improving the quality of mathematics and science education at the secondary school level. The

report brought out several trends of development. The INSET report on Asia noted that in-service training programmes in science and mathematics met the needs generated by National Policy imperatives and new curriculum development efforts. Various strategies adopted by the countries that participated include the following

- Distance learning
- Cascading strategy involving various tiers of training
- Attachment programmes with centers of higher learning for specialized areas in-service mathematics and science training.
- Mobile training teams
- Site visits by supervisors
- Training packages for teachers
- Development of professional schools and school complexes
- Setting based in service training, “in house” training, setting up of learning action cells
- Professional Associations of teachers and teacher support group.

This report showed a strong positive sign on their educational system in Asia and it is visible in the country's technological advancement today.

Although the Nigerian Government did not just sit back without doing anything in the country after observing the technological advancement in Asia and pacific. In 2005, Federal ministry of education (FME) partnered with the Japanese Government through the Japanese and international co-operation agency (JICA) in other to improve the quality of mathematics teachers in Nigeria. In 2006, strengthening mathematics and science education (SMASE) initiative was kicked off by the Federal ministry of education, the aim of this project was to improve the teaching and learning of mathematics and sciences in secondary school level through in-service training. In 2012, The former minister of state for education Mr. Ezenwo Nyesin Wike said the Federal ministry of education and Government will continue to support the training of teachers, especially in mathematics and science related subject. Wike also noted that the potential of improving the quality of teachers education is greatly influenced by

the nations ability to encourage the personal and professional development of singular training and retraining. The former minister stated this in the opening ceremony of the 4th in-service education of teachers (INSET) management workshop for the strengthening of mathematics and sciences (SMASE) Nigeria held in conjunction with the embassy of Japan in Abuja.

He also stressed the imperative of improving the quality of training and learning of mathematics and sciences, which were key to rapid socio-economic and technological transformation of Nigeria, He said the Government through the Federal ministry of education had continued to prove effective co-operation and support to the SMASE Nigeria project initiative since 2006.

THE PURPOSE OF IN-SERVICE EDUCATION

According to the Federal ministry of education (FME,2006), the purpose of in-service education is to provide teachers with the opportunity to

- Evaluate their own work and attitudes in conjunction with their professional collegues
- Develop their professional competence, confidence and relevant knowledge.
- Develop criteria which would help them to assess their teaching roles
- Advance their career

The National Policy on education (NPE, 2004) gave a summary of the significance of in-service education to teachers as follows: Promotion of professional growth, Improving pedagogical skills, Keeping teachers a breast with new knowledge, Needs, Curriculum, development and orientation, leadership, meeting particular responsibility help new teacher trainer to adapt in the teaching field, to recognize the need for modern teaching method, enhancement of salary and status, job security, source of revenue to in-service organizing technology development.

AVAILABILTY AND UTILIZATION OF INTRUCTIONAL MATERIAL IN THE TEACHING OF MATHEMATICS

Instructional materials are equipment which the teacher make use of in order to facilitate students learning during a teaching period. Instruction materials in mathematics are relevant materials utilized by a mathematics teacher during the mathematics instructional process of making the contents of the instruction more practical and less vague.

It should not be surprising that current research has established a substantial relationship between the use of instructional material and student's achievement in the mathematics classroom. Yusuf (1999) asserted that instructional materials are those materials and devices used to supplement the written or spoken words in the process of transmitting knowledge, attitudes, ideas and skills to the learners. He listed these materials to include chalkboards, charts, graphs, diagrams, flannel boards, flat pictures photograph, prints, 3D objects, motion pictures, objects, specimens and text books.

Learning theorists have suggested for some time that student concepts involve through direct interaction with the environment, and

materials provide a vehicle through which this can happen. Oluamero (1999) said that some group of professional graduates defined teaching aids in global, but simple term as "pedagogical devices designed to enhance and facilitate learning". In the words, they are those simply projected or illustrated or demonstrated instructional materials brought to the classroom to facilitate learning. Babalola (2004) noted that instructional materials are ways and means of making the teaching and learning process easy, more meaningful and understandable.

Agwagah (2000) noted that mathematics teaches in secondary schools in most cases do not make use instructional materials in their mathematics classroom, so most concepts are taught abstractly. This may be because some of the mathematical concepts are not in existent. This he concluded is one of the causes of students' poor performance in public examinations in mathematics in Nigeria. It was observed before that government (Federal, State and Local) have been taking responsibilities for providing some basic instructional materials for secondary schools however this is no longer true.

Etukudo (2002) conducted a study on the effect of computer assisted question on the performance of secondary school students in mathematics. This study was carried out in Rivers state, Nigeria. It adopted a quasi – experimental design with a population of 40 students. Result showed that the students in the experimental group achieved better than their counter parts in the control group. Again Abimbade (2004) had earlier noted that the approach of using improvised materials in mathematics class assist in proper introduction of new skill, and must importantly develop the understanding needed for student to pass examination

Essentially Essifilie (2000) is of the opinion that teaching aids is applied to teaching in order to appeal to more sensory organs to facilitate in the shortest possible term

Some of its importance is:

- To reduce the teacher from temptation of total verbalization
- To arouse or stimulate interest among the students
- To provide students the opportunity of experimentation

- It helps the teacher to conserve his energy that he would have used in talking throughout the lesson.

Essilifile (2000) further said their the application of essential and varied modern teaching aids to instruction is abysmally low due to the general view of pedagogical orientation and the lack of innovation. Mathematics as a subject is very wide and it cuts across so many discipline and therefore require a special treatment in the course of teching.

In support professor Ango (2001) viewed mathematics in schools as a complex piece which needs special and varied facilities for its discharge. He contended that as the study of science would require special rooms as laboratories and theatres with sufficient tools and materials so also will mathematics need. Wale (1999) who wrote on teaching aids and obstacles, has this to say “Teaching aids can make a good teacher teach better. It enables him increase his impact and his range as well as to converse to a degree of class of debth of

comprehension which help to build up students interest in the subject."

Opinions have been expressed that when the mathematics taught is dull, confusing, trivial and makes limited and sometimes meaningless demands on students intelligence, capabilities and talents, learning is bound to be stunted if it occurs at all (Ali, 2000). As experience has shown, young people nowadays pay attention only to what seems interesting. Therefore teaching mathematics through the use of instructional materials should be encouraged. Such mode of teaching mathematics tends to arouse curiosity and interest of the students and lays a foundation for creative and imaginative minds geared towards problem solving in the students.

AVAILABILTY OF QUALIFIED TEACHERS IN THE TEACHING OF MATHEMATICS

The system of education in Nigeria has began to wear "a coat of many colors". The horizon of its complexity is infinite. Over time, people have grown from dwelling in caves and huts to skyscrapers, from using bows and arrows to missiles and bombs, from walking

long distances to flying across the globe in a few hours, from eating raw meat to highly delicious diets, this list is endless, but it is hardly debatable to assert that education is the undisputed answer to this development question. The role the teacher stands to play in any society cannot therefore be underrated. Just as the facets of our life are constantly changing, so also must the content of our educational curriculum and its handlers be changing.

The potential for the success of any educational system is directly related to the ability and competence of teachers operating the system. Chuckwuemeka (1999) says that only the substantially trained professionally qualified mathematics teacher can be expected to communicate the excitement of mathematics and curiosity in students which are very essential and necessary if they are to learn mathematics very well. In support of this Ukije (2000) noted that teachers made schools what they are and the quality of education depends upon their competence. He went further to say that some schools are regarded as being good due to the quality of teachers and their effort in teaching. Another interesting work by Welinms (1978)

says that the qualities of a good teacher include the mastering of skills and teacher versatility. He went further to say that in teaching/learning it is a must that the teacher should be more knowledgeable them the learner. Balogun (2002) suggested that as mathematics teachers, effective mathematics teaching is not just a professional necessity, it is, he suggested that it's a matter of rational and racial pride because without the well trained and competent mathematics personnel, our nation and race will continue to depend on other nations and people to do virtually everything for us. This is supported by Fakuade (2003) when he said that a shortage of suitably qualified teaching staff will result in production of another generation of poor students.

Osigwe (2000) also conclude that lack of experienced and qualified teachers teaching mathematics is another cause for poor teaching and learning situation.

Adaralegbe and Adeniyi (1993), opined that “teaching touches the life of practically every citizen”. According to them, a poorly

trained teacher will likely produce a poor engineer, Doctor, Architect, fellow teacher and the like. No matter the efficiency of the pre-service training given to teachers, there will necessarily be areas of inadequacies contingent upon a development of a state of inactivity in which the performance of such teachers slowdown in relation to time. Before such teachers know it, their professional quality will begin to waive and gaps will be created between demands and actual achievement levels. It is the opinion to this researcher that in-service education of teachers will continue to fill these gaps.

Quality like knowledge is a very elusive concept. It is a difficult target always eluding the pursuer. The quality of a society is measured by the quality of its educational system which cannot rise above the quality of its teacher. Assuming a favorable practical climate, the relationship between the quality of the teacher and quality of the society is positive. The teacher are models of a society, the quality of the latter depends on the quality of the former to a large extent.

On teacher training, Fagbemi (1987) and West Africa Examination Council (2002) earlier found that decline in teachers performance could be traced to low esteem and shortage of trained teachers, irregular inspection and supervision of instruction, massive admission of secondary school dropouts into teachers' training colleges, and lack of formal training in education by most teachers.

Furthermore, the presence of fake and unqualified teachers with forged certificates and degrees might have worsened the matter. There is the likelihood that such deficient teachers would resort to stodgy teaching skills, become resistant to accept changes in the mathematics curriculum and exhibit capricious complacement towards student academic progress. They cannot after all display maximum competence and dexterity associated with tangible mathematics instruction. Hence, their insipid performance may continually act as a catalyst towards students' underachievement and hatred for mathematics.

Researches had shown that teachers' knowledge of specific subject matter, particularly at the secondary school level is a good predictor of students' achievement. Monk (1994) finds a strong correlation between teacher subject matter preparation in mathematics and student success for both low and high scoring students, while Goldhaber and Brewer (2002) noted that students do better in mathematics if taught by a teacher with a bachelor's or master's degree in mathematics. The professional needs of a teacher vary in relation to the stage he/she is in the profession. Teachers have different professional needs; hence the supports of an inexperienced teacher needs are different from that of a professional.

Academically qualified teachers are referred to those who have academic training as a result of enrolment into educational institution and obtained qualification such as HND, B.SC, B.A and M.A and so on, while professionally qualified teachers are those who got professional training techniques and aptitudes as different from the general education (Edu and Kalu, 2012). They hold degrees like, B.ED, B.SC, ED, B.A.ED, M.ED and so on.

According to Adaeze (1986) non-qualified and non-professional teachers in teaching profession are killing the profession because they are not really teachers. He regarded then as “bird” of passage that create unsucessary vacuum whenever they see greener pasture and better prospect in the profession they are originally trained for.

USE OF MATHEMATICS LABORATORY IN THE TEACHING OF MATHEMATICS IN OUR SECONDARY SCHOOLS

As defined by Adenegan (2003), the mathematics laboratory is a unique room or place with relevant and up-to-date equipment known as instructional materials, designated for the teching and learning of mathematics and other scientific work, whereby a trained and profesionally qualified person (mathematics teacher) readily interact with learners (students) on specified set of instruction.. Mathematics laboratory is relatively new in the teaching and learning of mathematics. It is the latest design to make mathematics real. The term “laboratory method” is commonly used today to refer to an approach to teaching and learning of mathematics which provides the opportunity to the learner to abstract mathematical ideas through their own experiences that is to

relate symbols with realities. It is uncommon in our schools today possibly as a result of lack of fund or the absence of any government policy on the provision of such laboratory facilities. In short, it's non-existence in our schools is one of the major contributory factors to mass failure in mathematics. Thus as highlighted by Adenegan (2003), the function of mathematics laboratory include the following.

- Enabling students to learn concepts through concrete experiences and they increase their understanding of those ideas.
- Arousing interest and motivating learning
- Cultivating favourable attitudes towards mathematics
- Enriching and varying instruction
- Encouraging and developing creative problem solving ability
- Allowing for individual differences in manner and speed for which students learn
- Making students to see the origin of mathematical ideas and participating in "mathematics in the making"

- Allowing students to actually engage in the doing rather than being a positive observer for recipient of knowledge in the learning process.

The abstract nature of mathematics should be reduced through demonstrations and practical methods. Agwagah (1997) observed that the problem of ineffective teaching can be tackled through planned and intelligent application of the mathematics laboratory. Thus Agwagah recommended use of laboratory approach to the study of mathematics. The method of drill and verbal recitation makes learning boring and lacks motivation for further learning. Scrinavasa (1998) had earlier recommended the use of mathematics laboratory in teaching mathematics. According to scrinivasa, this will lead the students to formation of concepts out of experiences with discrete objects. In this case the vague theories and imaginary objects take real shape and the students understand better and perform better. It is important therefore to consider strategies that may help to improve the performance, with the view of considering their effect in teaching and learning of mathematics.

Such strategies include the use of mathematics laboratory (Ogunkunle, 2000).

Mathematics laboratory is a place where students can learn and explore various mathematical concepts and verify different mathematics teaching/learning. Ohuche (1990) advocated the need for moderately equipped mathematics laboratories. Ogunkunle (2000) itemized the advantage of using mathematics laboratory which includes

- Display mathematics information
- Pool of storage of mathematics materials for easy access
- Removing abstractness and increasing effective teaching/learning

Evidence of poor performance in mathematics by secondary school students point to the fact that the most desired technological, scientific and business application of mathematics cannot be sustained. This makes it paramount to seek for a strategy for teaching mathematics that aims at improving its understanding and performance by students. Evidence abound (Scrinivasa, 1978, Ogungaye, 2000), that lack of mathematics laboratory and mathematics teacher non-use of laboratory

technique in teaching mathematics is one of the major factors that contribute to poor achievement in mathematics by secondary school students.

Donnipad Manjunath in 2010 conducted a study on strategies for teaching mathematics in a mathematics laboratory. He found out that the use of mathematical laboratory was more effective than the traditional method. He also concluded that mathematics teaching could be carried out in the laboratory by integrating mathematics laboratory into regular curriculum

Theresa (1993) addressed three (3) goals with the use of mathematics laboratory in secondary schools.

- First, mathematics laboratory provides an opportunity for on-grade level mathematics skills to be previewed
- The second goal addressed ways to identify individual students mathematical strengths and weakness in order to strengthen each students mathematical foundation.

- The third goal addressed was for students to improve basic skill and fact finding.

Also Ebele and Osuefor (1990) investigated the effect of using mathematical laboratory in teaching on student's achievement in secondary school mathematics. The study involved in J.S.S 3 mathematics students. The study concluded and recommended that teachers should be encouraged to use mathematics laboratory in teaching pure geometry and algebra expression and mathematics student teachers should be trained on its use in their methodology class.

It is expected that the 21st century mathematics educators/teachers should be readily acquainted with the modern day technique of teaching mathematics in rear school and possibly facilitate their pedagogies with the aid of modern mathematics laboratories to be able to achieve the objectives of mathematics education in the the 21st century project (Adenegan, 2011).

MOTIVATION OF STUDENTS AND TEACHERS IN MATHEMATICS LEARNING/TEACHING

The desire of any political regime at any point in time is to make the society “grow”. But in order to develop the society, perhaps the best approach is to develop its human resources, the human resources will in turn be in a position to harness or channel the available material resources into more productive ventures. The optimum use of available resources is synonymous with the ability of teachers to translate paper formulas into concrete realities. This task will not be accomplished if educators are not given opportunities for training to put them in a better stead to help the government and other agencies in the execusion of their developmental plans and in their strategies for stress management. The teacher as an instrument of change and development in a society must be given in-service education from time-to-time. In any country, teachers are the bridges across development bars and in order to sustain a consistent upward movement, the bridges must be constantly maintained and serviced. The giving of incentives will in no small measure enhance a healthily environment and bring about a positive attitude towards mathematics.

Motivation is an essential aspect of teaching and learning, A teacher can plan a lesson that is perfectly sequenced and well-presented yet fail to teach and students end up being bored and restless during periods of passive learning. Motivation has also been regarded by experienced and in experience teacher alike as a prerequisite for effective learning and the greatest challenge that many teachers face is to make their students want to learn (Petty,2004). Therefore the teacher needs to provide motivational activities or strategies to hold the learners attention and sustain it throughout the lesson.

Wentzel (1998) stated that interest in activities tends to increase the likelihood that individuals formulate goals relating to that activity and invest time and effort to achieve them. He also mentioned that individual characteristics such as intelligent cognitive styles and personality play an important role in learning and instruction as does the context of learning. Other research findings have shown that individual students characteristics variables such as motivational orientations, self-esteem and learning approaches are important factors influencing academic achievement.

In the effort to improve students cognition and affective outcomes in mathematics and school learning, educational psychologists and mathematics educators have continued to search for variables (personal and environmental) that could be manipulated in favour of academic gains.

Of all those personal and psychological variables that have attracted researchers in the area of educational achievement, motivation seems to be gaining more popularity and leading other variables (Teller, 2003). Aremu (1998) explained that, when students express lack of interest in the subject, it affects the way they react or listen to the teacher, and when many of the students believe they cannot pass, the teacher is also affected. This is because aside from the negative responses from the students, the teacher as well is already being confronted by a list of other factors (e.g low income, low status in a society, large teacher pupils ratio) and so on. This may cause him or her to resort to the easiest way of disseminating knowledge that is chalk and talk method without the use of instructional materials. He may not also bother to vary his

teaching styles to suit individuals, therefore the cycle goes on (Aremu, 1998).

One unfortunate outcome of this is that, the negative attitude towards the subject is passed down from one generation of students to another and therefore the cycle keeps enlarging. The issue of motivating learners in seen as an important aspect of effective learning. In fact psychologist believe that motivation is a necessary ingredient for learning (Biehler and Snowman, 1986). They (psychologist) believe that satisfactory school learning is unlikely to take place in the absence of sufficient motivation to learn (Foitares, 1981). Hall (1989) believes that there's a need to motivate students so as to arouse and sustain their interest in learning mathematics. "Motivation raise questions on why people behave in the way they do it". In general mathematics and science teachers are faced with poor conditions.

According to Jacobson(2010), it has become clear that Nigerians technological development in 21st century depends on the quality and quantity of mathematics teachers in our secondary schools and

mathematics teachers need to be equipped to face this challenges and also they have to be provided with a lot of incentives that will motivate them to accept and withstand the risks and demands of mathematics teaching. He noted that this is done by

-Paying them enhanced salary to take care of their socio-economic need to avoid divided attention in their duty.

-They should be given financial support to enable them improve and acquire higher knowledge in mathematics by sponsoring them in further studies, conferences and workshops.

With these incentives introduced in our educational system, mathematics teachers will also motivate students to learn and become good mathematicians. These incentives will also motivate students to learn mathematics after witnessing the fulfillment and benefits enjoyed by their teachers as the bright future awaits them.

SUMMARY OF LITERTURE REVIEW

In addressing this study, a wide range of literature related to the subject is reviewed.

Mathematics as a school subject affects all aspects of human life at different degrees, geographical, scientific and technological aspect of man because it is centered on the use of numbers which is an integral component of every aspect of knowledge and as such a good knowledge if the student is to make a meaningful contribution in the development of technology of his/her society.

The importance of mathematics as a school subject which cannot be ignore by any society that wants to embark on technological and scientific advancement has been highlighted. It is therefore emphasized that knowledge of mathematics serves as a bed-rock for further acquisition of the knowledge of the physical and natural science, medicine, pharmacy and so forth. In spite of its importance, the poor performance of students and mass failure in the subject especially in

senior secondary school certificate examinations has been a great concern to all stakeholders concerned.

A number of factors for improving the study of mathematics already discussed by some intellectual minds in journals and seminars were also reviewed. The factors include improving mathematics teaching by in-service education, availability and utilization of instructional materials, availability and effective usage of mathematical laboratory and motivation of teachers and students for effective teaching of mathematics.

CHAPTER THREE

RESEARCH METHODOLGY

This chapter described the procedure used to carry out the study. It is organized under the following subheadings

- Research design
- Population of the study
- Sample and sampling technique
- Research instrument
- Validation of the instrument
- Reliability of the instrument
- Data collection method
- Method of data analysis.

Research design

This is a survey research design. It has been specifically designed to investigate strategies for improving mathematics learning in secondary schools in Oredo local government area of Edo state

Population of the study

The population of the study is all private and public secondary schools mathematics teacher in Oredo local government area of Edo state.

Sample and sampling technique

The sample used for this study is made of ninety teachers (90) drawn from fifteen secondary schools. The fifteen (15) schools as well as the teachers were selected by the researcher out of the thirteen (13) public and fifty (50) private schools in Oredo. Six teachers were selected from each of the 15 schools.

Research instrument

The instrument used for this study is the questionnaire. The questionnaire has 25 items. It is divided into two sections, section 'A' contains items with demographic and personal data while section 'B' contains items relating to the research questions raised.

Validation of the instrument

Items formulated in the questionnaire were given to two experts in the field and the project supervisor for validation. The made corrections and modifications to ensure content and construct validity.

Reliability of the instrument

The Cronbach Alpha reliability was computed to determine the instruments measures of internal consistency. The value of the Cronbach Alpha based on standardized items was o.67

Administration of the instrument

The questionnaires were administered by the researcher on a face to face method to sampled secondary school mathematics teachers after obtaining permission from the school authority. In doing this, the researcher went to the selected sample school personally.

Method of data collection

The questionnaire were administered and completed after a brief instruction given on how to complete the items. The questionnaires were collected back the same day.

Method of data analysis

After the collection and collation of the data generated with the instrument, the data obtained was analyzed using simple percentage calculation.

CHAPTER FOUR

PRESENTATION, ANALYSIS OF DATA AND DISCUSSION OF FINDINGS

This chapter is mainly concerned with the presentation, analysis and interpretation of data collected from the returned questionnaire.

Research question 1:

Will the help if in-service training help to improve mathematics learning?

Table 2 : Perceived need for in-service training and teachers' productivity in secondary schools.

S/n	Items	Agree	%agree	Disagree	%disagree
1	Lack of in-service training for teachers affect the performance of students	74	91.35	7	8.43
2	In-service training for teachers improve the performance of students in mathematics	75	92.26	6	7.4
3	In-service training helps teachers to advance their career.	80	98.77	1	1.23
4	In-service training helps teachers to develop teaching competence, confidence, and relevant knowledge.	72	88.89	9	11.11
5	In-service training help teachers to develop new skills	80	98.77	1	1.23

From the above table, it shows that 91.35% of teachers agree that lack of in-service training affect the performance of students in mathematics while 8.65$ disagree to this item.

The second item on the table shows that 92.62% agreed that in-service training for teachers improve the performance of students in mathematics while 7.4% disagree to this item.

The third item on the table shows that 98.77% agree that in-service training helps teachers to advance their career while 1.23% disagrees to this item.

The fourth item shows that 88.89% agree that in-service training for teachers helps the teacher to develop teaching competence, confidence and relevant knowledge while11.11% disagrees to this item.

With respect to the last item on the table 98.77% of teachers agree that in-service training helps teachers to develop new skills while 1.23% disagree.

Question 2: Are there enough qualified mathematics teacher in our school?

Table 3: Availability of qualified teachers in teaching mathematics.

s/n	ITEMS	AGREE	%AGREE	DISAGREE	%DISAGREE
1	There are enough qualified mathematics teachers in your school.	32	39.5	49	60.49
2	Teachers' qualification has an effect on the performance of students in examinations.	64	79.01	17	20.99
3	Experienced and well trained mathematics teachers are able to improve students interest in learning	80	98.77	1	1.23
4	The potential for the success of any educational system is directly related to the ability and experience of teachers operating the system.	80	89.77	1	1.23
5	Some classes do not learn mathematics well because of lack of qualified mathematics teachers.	80	98.77	1	1.23

From the above table it shows that 39.5% of teachers agree that there are enough qualified mathematics teachers in their school while 60.5% disagree to this item.

From item two on the table, it shows that 79.01% agree that teachers' qualification has an effect on the performance of students in examinations to this item while 20.99% disagree.

From item 3 it shows that 98.77% agree that experienced and well trained mathematics are able to improve students' interest in learning while 1.23% disagree to this item.

From table 4, 98.77% agree that the potential for the success of any educational system is directly related to the ability and experience of teachers operating the system and 1.23% disagree to this item.

From the last item in the table 3, 98.77% of teachers agree that some classes do not learn mathematics well because of lack of qualified mathematics teachers while 1.23%di9sagree to this statement.

In summary though a higher percentage (98.2%) of teachers agree that experienced and well trained mathematics teachers are able to improve students interest in learning but a higher percentage (60.40%) agree that there are not enough mathematics teachers in their schools and 98.77% of teachers agree that some classes do not learn mathematics well because of lack of qualified mathematics teachers.

Question3: Will the use of instructional materials in schools help to improve the study of mathematics.

Table4: The availability and utilization of instructional material in the teaching of mathematics.

S/n	Items	Agree	%agree	Disagree	%disagree
1	Providing good and adequate instructional materials in schools will help to improve the study of mathematics	64	79.01	17	20.99
2	Instructional materials rescue the teacher from temptation of total verbalization.	80	98.77	1	1.23
3	Students show better ability to solve problems on topics taught with instructional materials.	80	98.77	1	1.23
4	There's an increase in students understanding of the topics taught with instructional materials.	72	88.89	9	11.11
5	Lack of instructional materials for teaching mathematics has a negative effect on students' performance in mathematics examinations.	72	88.89	9	11.11

From table 4; it shows that 79.01% of teachers agree that providing good and adequate instructional materials in schools will help to improve the study of mathematics while 20.99% of teachers disagree with this item.

Item 2 shows that 98.77% agree that instructional materials rescue the teacher from total verbalization while 1.23% disagrees to this item.

Item 3 on the table shows that 98.77% agree that the students show better ability to solve problems on topics taught with instructional materials while 1.23% disagree to this item.

Item 4 on the table shows that 88.88% of teachers agree that there's an increase in students understanding of the topics taught with instructional materials while11.11% disagree to this item.

Item 5 shows that 88.89% agree that lack of instructional materials for teaching mathematics has a negative effect on students' performance in mathematics while 11.11% disagree.

Question 4: Do teachers make use of mathematics laboratory when teaching mathematics?

Table 5: Use of mathematics laboratory in the teaching of mathematics in our secondary school.

S/n	Items	Agree	%agree	Disagree	%disagree
1	I am aware of mathematics laboratory.	40	49.31	41	50.6
2	Mathematics laboratory is a tool of teaching.	80	98.77	1	1.23
3	Mathematics laboratory encourages interaction during learning.	80	98.77	1	1.23
4	Mathematics laboratory reinforces mathematical ideas	80	98.77	1	1.23
5	Mathematics laboratory inculcates scientific attitudes, encourages social development and improves the learning of mathematics.	80	98.77	1	1.23

In table 5above, item one shows that 49.38% of teachers are aware of mathematics laboratory while 60.61% are not aware of it.

Item 2 shows that 98.7% of the teachers sees mathematics as a tool of teaching while 1.23% do not.

Item 3 shows that 98.89% of teachers agree that mathematics laboratory encourages interaction during learning while 11.11% disagree.

Item 4 shows that 98.77% of teachers agree that mathematics reinforces mathematical ideas while 1.23% disagree.

Item 5 shows that 98.23% agree that mathematics laboratory inculcates scientific attitudes, encourages social development and improve the learning of mathematics while 1.23% do not agree.

In summary a higher percentage (50.6%) are not aware of mathematic laboratory in their school although 98.77% sees it as a tool for teaching and that it also reinforces mathematical ideas. This implies that many teachers do not make use of mathematical laboratory when teaching mathematics.

Question 5: Are teachers well motivated to teach the subject mathematics?

Table 6: Motivation of students and teachers in mathematics learning/teaching.

S/n	Items	Agree	%agree	Disagree	%disagree
1	Group study and class interactions serve as a motivator to students studying mathematics.	80	98.77	1	1.23
2	Giving of incentives will in no small measure enhance a healthy environment and bring about a positive attitude towards mathematics.	80	98.77	1	1.23
3	Giving teachers enhanced salary to take care of their social- economic needs will avoid divided attention in the profession.	80	98.77	1	1.23
4	Teachers should be given financial support to enable them improve and acquire higher knowledge in mathematics by sponsoring them in further studies, conference and workshops	80	98.77	1	1.23
5	Student positive attitude forwards mathematics serve as a motivator to teachers	72	88.89	9	11.11

From table 6, it shows that 98.77% of teachers agree that group study and class interactions serve as motivator to students studying mathematics while 1.23% disagree to this item.

From item2, it shows that 98.77% agree that giving of incentives will in no small measure enhance a healthy environment and bring about a positive attitude towards mathematics.

Item 3 shows that 98.77% agree that giving teachers enhanced salary to take care of their social-economic needs will avoid divided attention in the profession while 1.23% disagrees to this item.

Item 4 shows 98.77% agree that teachers should be given financial support to enable them improve and acquire higher knowledge in mathematics by sponsoring them in further studies, conferences and workshops.

88.89% agree that student's positive attitude towards mathematics serve as a motivator to teachers.

Discussion of findings

For research question 1: will in-service training help to improve mathematics learning?

The findings show that in-service education will improve mathematics learning in secondary schools.

In line to the above statement, the findings of cocksure(2009) as he repeatedly point to teachers attitudinal factors as the major cause of the poor performance of students in public examinations in mathematics, he stated that having examined and found no serious problems such that could hinder children's learning process, the teacher attitudinal factors has been closely and critically analyzed because it is a fact that a teacher cannot study for the student but he can do much to stimulate their desire to learn. Then Weymart (2001) said that teachers have a role to play by improving on their performances and thereby absorb the pressure of accountability if constantly exposed to new ideas and techniques through in-service education.

Research question 2: Are there enough qualified teachers in our secondary schools?

The findings show that experienced and well trained mathematics teachers are able to improve students interest in learning but there is a

high shortage of qualified mathematics teachers in secondary school and because of this some classes do not learn mathematics well. In line with the above statement there are not enough qualified teachers in our secondary schools. Ukeje (2000) who noted that teachers made schools what they are and the quality of education depends on their competence. He also went further to say that some schools are regarded as being good due to the quality of teaching and teacher's effort in teaching.

Question3: Will the use of instructional materials in schools help to improve the study of mathematics?

The findings show that the use of instructional materials will in no small way help to improve the study of mathematics in secondary school if provided. In line to this statement Ali (2000) encouraged teachers to teach mathematics through the use4 of instructional materials. Such mode of teaching mathematics tends to arouse curiosity and interest of the students and lays a foundation for creative, imaginative minds geared toward problem solving in the students.

Question 4: Do teachers make use of mathematical laboratory when teaching mathematics?

The findings show that although mathematics laboratory is a tool for teaching mathematics and that it also reinforces learning but many teachers are not even aware of it and do not make use of it. In line with this, Agwagoh (1997) recommended the use of laboratory approach to the study of mathematics after he observed that the problem of ineffective teaching can be tackled through planned and intelligent application of mathematics laboratory. Also Ebele and Osuefor (1990) after investigating the effect of using mathematical laboratory in secondary school mathematics, recommended that teachers should be encouraged and trained to use mathematics laboratory.

Question 5: Are teachers well motivated to teach the subject mathematics.

The findings shows that giving of incentives, enhanced salary to take care of their socio-economic needs, financial support to enable them improve and acquire higher knowledge can motivate the teachers to

teach the subject mathematics. In line to this Petty (2004) regarded motivation as a pre-requisite for effective learning and the greatest challenge that many teachers face is to make students want to learn.

CHAPTER FIVE

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the summary, findings, conclusions, contribution to knowledge, recommendations of the research work and suggestions for further studies.

Summary

The study investigated strategies for improving mathematics learning in Oredo local Government Area of Edo state for the study. To attain the purpose of the study, five (5) research questions were formulated and tested. Questionnaire was used for the collection of the data and simple percentage calculation was used to analyze the data.

Findings

Although some teachers re qualified in secondary schools, there is need to improve on their conditions of service through in-service education.

Qualification of teachers affects students' performance in mathematics, but there are enough mathematics teachers in our schools.

The use of instructional materials in schools helps to improve the study of mathematics

The use of mathematics laboratory will in no small way help to improve mathematics teaching and learning.

When teachers are well motivated, it promotes teachers effectiveness in the classroom.

Conclusion

The conclusion reached in the study is that teachers' qualification is of high importance to students learning. Adequate and well equipped laboratory should be provided in schools. Teachers should make use of instructional materials when teaching. Mathematics teachers should undergo in-service training preferable funded by the government. In other to motivate the teachers in Oredo local government Area of Edo state.

Recommendations

1. The following recommendations were based on the findings of the study
2. The teacher should re-examine his teaching methods to include less lecture and more student directed activities which involves the use of mathematical laboratory
3. The government should provide instructional materials to help increase the learning of mathematics.
4. The Federal ministry of Education, state ministry of education and national mathematical center in Nigeria should provide special in-service programmes for mathematics teachers
5. The Federal, state and local governmpents and Education boards should roll out plans that can motivate mathematics teachers to do their work effectively.

Suggestions for further studies

- A replica of this study should be carried out to ensure consistency or other wise of the study

- A study should be carried out on factors affecting students achievement in mathematics in junior secondary school certificate examination.
- A study on students' performance in mathematics should be carried out in different localities and other states.

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APPENDIX

FACULTY OF EDUCATION

DEPARTMENT OF EDUCATIONAL PSYCHOLOGY AND CURRICULUM STUDIES

UNIVERSITY OF BENIN, BENIN CITY

DITRECTIVES: This questionnaire is designed to investigate strategies for improving mathematics learning in Oredo secondary schools, Benin City, Edo state. The honest response to the following questions asked will enable the researcher get some vital information to successfully conduct this research. Your response will be handled with utmost confidentiality.

SECTION A: DEMOGRAPHIC DATA

NAME OF SCHOOL: ……

EDUCATIONAL QUALIFITION: NCE [ ], OND/HND [ ], B.SC [ ],

B.SC.Ed [ ], M.SC [ ], M.ED [ ].

SEX: MALE [ ], FEMALE [ ]

NO OF YEARS IN SERVICE: 1-5yrs [ ], 6-10yrs [ ], 10-15yrs [ ],

16-20yrs [ ],20-25yrs [ ], 25yrs above [ ].

SECTION B: Please tick [√] one of the options each in the 25 items in the statement below. You are expected to respond in a four point scale (Strongly agree [SA], Agree [A],Disagree [D] and Strongly Disagree [SD])

S/N	ITEMS	SA	A	D	SD
1..	Lack of In-service training for teachers affect the performance of students in mathematics.				
2.	In-service training for teachers improve the performance of students in mathematics				
3.	In-service training helps teachers to advance their career.				
4.	In-service training helps teachers to develop teachers competence, confidence and relevant				

	knowledge				
5.	In-service training helps teachers to develop new skills.				
6.	There are enough qualified mathematics teachers in your school.				
7.	Teachers' qualification has an effect on the performance of students in examinations.				
8.	Experienced and well trained mathematics teachers are able to improve students interest in learning				
9.	The potential for the success of any educational system is directly related to the ability and experience of teachers operating the system.				
10.	Some classes do not learn mathematics well because of lack of qualified mathematics teachers.				

11.	Providing good and adequate instructional materials in schools will help to improve the study of mathematics				
12.	Instructional materials rescue the teacher from temptation of total verbalization.				
13.	Students show better ability to solve problems on topics taught with instructional materials.				
14.	There's an increase in students understanding of the topics taught with instructional materials.				
15.	Lack of instructional materials for teaching mathematics has a negative effect on students' performance in mathematics examinations.				
16.	I am aware of mathematics laboratory.				
17.	Mathematics laboratory is a tool of teaching.				
18.	Mathematics laboratory encourages interaction during learning.				

19.	Mathematics laboratory reinforces mathematical ideas				
20.	Mathematics laboratory inculcates scientific attitudes, encourages social development and improves the learning of mathematics.				
21.	Group study and class interactions serve as a motivator to students studying mathematics.				
22.	Giving of incentives will in no small measure enhance a healthy environment and bring about a positive attitude towards mathematics.				
23.	Giving teachers enhanced salary to take care of their social- economic needs will avoid divided attention in the profession.				
24.	Teachers should be given financial support to enable them improve and acquire higher knowledge in mathematics by sponsoring them in further studies, conference and workshops				

25	Students positive attitude towards mathematics serve as a motivator to teachers				