EFFECTS OF TEACHER –LED PROFESSIONAL AND MENTORING SUPPORT ON TEACHERS' EFFECTIVENESS AND PUPILS'PERFORMANCE IN MATHEMATICS IN ZARIA, KADUNA STATE

BY

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PhD/EDUC/18910/2008-09
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A DISSERTATION SUBMITTED TO SCHOOL OF POST GRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA. IN PARTIAL FULLFILMENT OF THE REQUIREMENT FOR THE AWARD OF PhD DEGREE IN MATHEMATICS EDUCATION
DEPARTMENT OF SCIENCE EDUCATION AHMADU BELLO UNIVERSITY, ZARIA

JUNE 2012

DECLARATION

I declare that this dissertation entitled "Effects of Teacher –Led Professional and Mentoring Support on Teachers' Effectiveness and Pupils' Performance in Mathematics in Zaria, Kaduna State " is my personal research work. It has never been presented anywhere either wholly or partially for the purpose of the award of a higher degree. All the quotations and sources of information are dully acknowledged by means of references in this work.

Maruf Olasunkanmi IBRAHIM _____ _____
Signature Date

CERTIFICATION

This dissertation entitled ""Effects of Teacher –Led Professional and Mentoring Support on Teachers' Effectiveness and Pupils' Performance in Mathematics in Zaria, Kaduna State " written by me has been read and approved as meeting the regulations governing the award of the degree of Doctor of Philosophy (PhD) of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literacy presentation.

Dr. Mamman Musa Chairman Supervisory Committe	Sign…….	Date……
Prof. Y.K. Kajuru Member Supervisory Committe	Sign…….	Date……
Prof. C. Bolaji Member Supervisory Committe	Sign…….	Date……
Dr. Mamman Musa Head, Science Education Department	Sign…….	Date……
Prof. A.A. Joshua Dean, School of Postgraduate Studies	Sign…….	Date……

DEDICATION

This dissertation is dedicated to ALL talented Primary School Pupils in Nigeria who were "underprivileged" to exhibit their talents due to their teachers' inappropriate teaching techniques or as result of administrative lapses.

ACKNOWLEDGEMENT

First I wish to express my gratitude to Allah (SWT) for keeping me healthy to see to the completion of this work. I wish to acknowledge the enormous contribution of my supervisor Dr. Mamman Musa; I also wish to appreciate the contributions made by Prof. Y.K. Kajuru, the second supervisor for his unrelenting effort in the supervision of the dissertation and the excellent supervisory roles played by Prof. C. Bolaji, the third supervisor. I thank Prof. I.O Inekwe and Dr Babangida Sani of Mathematics Department ABU, Zaria for their support towards the completion of this study. I also thank Dr. (Alhaji) Isa Usman, Prof. J.S. Mari, Dr. S. S. Bichi, Dr S.S. Obeka, Dr. Mrs S.B.Olorukooba and Prof. (Mrs.) E.F. Adeniyi without whose support, this study would not have been possible. I really thank them all.

The support given by the entire staff of the Faculty of Education ABU, Zaria, most especially Dr. Sadiq Mohammed (The Former Head of Education Department) and Prof. J.A.Gwani the (The Former Dean of the Faculty of Education), as well as Mrs. Aderibigbe, Mal. Abubakar Magaji and host of others is highly appreciated. Also my profound gratitude goes to my late mother Hajiya Salamatu Ibrahim, my late father, Alhaji Ibrahim Abdul-Kadiri, my late sister Musilimat Taiye Ibrahim, my late friend Abdullahi Nuhu and my late mentor Dr I.U.Jahun whose words of advice and motivations triggered off my academic ambition. May Almighty Allah bless them all with “aljana firdausi”

The acknowledgement will not be completed if my wife Mrs. Misitura Ibrahim, and my children Zainab, Ismail, Aishat, Bashiru, Abdullahi and Abubakar are not mentioned for their patience during the course of the study.

Finally I appreciate the assistance rendered by Mr Saliu Rabiu Yunusa, Mal. Sani Saidu and all the primary school teachers who gave me their maximum cooperation in the course of the study.

ABSTRACT

The aim of this study was to provide a new approach for remedying the problem of poor performance of primary school pupils' in mathematics. A target population for the study comprises of ninety (90) teachers and twenty nine thousand four hundred and forty two (29442) pupils of classes 4, 5 and 6 in the six Educational District within Zaria Local Government Area. Using stratified and simple random sampling techniques a sample size of thirty (30) teachers and one thousand five hundred and eighty five (1585) were selected. The teachers and pupils were classified into Experimental Group and Control Group, that is, Pupils and Teachers that are exposed to the treatment of Teacher-led professional and Mentoring Support (TLPMS) and those that are not exposed to the treatment respectively. Quasi-experimental method with pre-test post test design was adopted and four hypotheses were formulated, t-test statistics and analysis of variance was used to analyze the hypotheses. The results revealed significant difference between performance of pupils in the experimental group against those from the control group and there was significant difference between the performance of boys and girls, pupils from urban and rural areas as well as difference in performance of pupils from the four Educational Districts exposed to the treatment. Part of the recommendations and suggestions drawn from the study is for stake holders in primary schools to ensure that teachers are given more exposure to mathematics content knowledge and pedagogical content knowledge by adapting to this new approach of teaching.

ABBREVIATIONS

TLPMS: Teacher-Led Professional and Mentoring Support

TLPSMCK: Experimental Group1 = Teachers Exposed to Teacher –Led Professional and Mentoring Support with Mathematics Content Knowledge Only

TLPSPCK: Experimental Group2 = Teachers Exposed to Teacher-Led Professional and Mentoring Support with Pedagogical Content Knowledge Only

NTLPS: **Control Group = Teachers** Not Exposed to Teacher-Led Professional and Mentoring Support

PCK: Pedagogical Content Knowledge

MCK: Mathematics Content Knowledge

PEO: **Principal Executive Officer**

LGA: **Local Government Authority**

Exp. Group: **Experimental Group**

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OPERATIONAL DEFINITION OF TERMS

Collaborative Teaching: Teaching mathematics jointly with another person or group in order to achieve Educational Objectives

.**Control Group:** Pupils whose teachers were NOT exposed to Teacher-Led Professional and Mentoring Support (NTLPS)

Cooperative Teaching: obliging, helpful, supportive, accommodating, willing, compliant, complaisant Teaching

Experimental Group: Pupils whose teachers were exposed to Teacher-Led Professional and Mentoring Support (TLPS)

Inter-School level: Between Schools

Intra-School level: Within the same School

Teacher-Led Professional Support: Teaching strategy aimed at the fulfillment of teachers' upliftment through cooperative and coordinative interaction between mathematics teachers of some selected schools and the researcher

Mentoring Support: Observation carried out by the researcher to oversee the proper implementation of the professional support

Teachers' Effectiveness The possession of both Mathematics and Pedagogical Content Knowledge

Pedagogical Content Knowledge: The possessions of credit pass in Education only at NCE level or more and at least five years teaching experience

Mathematics Content Knowledge: The possessions of credit pass in Mathematics only at NCE level or more and at least five years teaching experience

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CHAPTER ONE

THE PROBLEM

1.1 Introduction

Teacher-Led Professional and Mentoring Support on the Mathematics performance of Pupils is a proposed wholistic teaching strategy aimed at activating Collaborative, Cooperative, Interactive, and Participatory teaching and learning of Mathematics at both Inter-School as well as Intra-School levels. It is a strategy that involves periodic gathering of Primary Schools Mathematics Teachers and one or more experts in the field of Mathematics to rub minds on content and pedagogical issues in Mathematics Education and a follow-up on the interactions.

Every subject has its own values and peculiarities. Mathematics is a core subject in all Nigerian Primary and Secondary Schools. It is also to some extent a compulsory or cognate subject in many disciplines in some tertiary institutions. Mathematics plays very crucial and important roles in the development of any country. The values of Mathematics to man was noticed as far back as the pre-historic dark age, when counting and computations were rigorously done with the use of stick, stones, strokes on walls, days of the weeks, markets days or any other eventful or memorial phenomena. Presently, Mathematics is used for calculations, computation and manipulations of numbers in a more reliable, efficient and accurate manner born out of the creed of technological advancement (Computer-Electro-mechanical devices) Ibrahim (2006). Ironically, the performance of students in this utility subject most especially in Zaria Local Government Authority (LGA) is not pleasing (WAEC, NECO 2010) and even the performance of pupils at the grassroots' level of education in the local government is nothing to write home about as depicted in the common entrance examination and junior secondary certificate examination (JSCE-NECO 2010). There is an upsurge need for Nigerians, teachers and students alike, to put in more efforts in the teaching and learning of Mathematics, if the country wants to attain the 2020 technological advancement creed. It is therefore necessary to emphasize the need to improve on the

teaching and learning of Mathematics and to provide solution to the persistent problems faced in the teaching and learning of the subject. This is the basic philosophy behind this study, “Effects of Teacher-led Professional and Mentoring Support on Primary Schools Mathematics Performance in Zaria”

In recognition of the valuable contribution of Mathematics to man, Willoughby (2000) highlighted that the role the subject Mathematics plays today is more significant than ever before and that it promises to be even more significant in future. It is obvious that man’s day to day activities such as buying and selling, social interaction, economics interdependence, political integrity, communication and even domestic work like cooking, eating and many more require some Mathematical precaution and precision. Harbour-Peter (2000) described Mathematics as a culture that affords man the opportunity to know and access things and objects within his immediate and remote surrounding. She went further to say that Mathematics enables man to be disciplined and orders the pattern of his life. This is true because assessment of oneself requires planning, setting objective, making decisions and taking better steps for a better living. All these requirements are solutes that need Mathematics as solvent to attain meaningful as well as worthwhile solution to the problem of life. Kolawole and Oluwatayo (2002) in their own support for the valuable roles Mathematics plays in Scientific and Technological development of this country opined that Mathematics is a gate way , a precursor and a queen of Sciences , Commerce as well as Technology whose application is indelible , universal ,useful and valid everywhere. Adetula (1994) however, express his strong believe about Mathematics as follows:

> it is reasonable to argue that Mathematics is the mirror of our civilization. If Mathematics were suddenly obliterated from the mind of human race, there will be no blue prints for new building, all engineering construction will cease, banks will close and all commercial activities will grind to a halt except primitive method of barter.

It is non-trivial to promulgate that Mathematics is the key to all human endeavors. In fact, courses such as Administration, Arts, History, Languages, Law and all other Social Sciences as well as the Physical Sciences alike benefit from Mathematics the same way muscles benefit from exercises

Probably, this is the reason why credit pass in Mathematics is required as entry point into major courses in Nigerian universities. More so, the emphases placed on teaching and learning of Mathematics in National Policy on Education (FRN, 2007) and the Universal Basic Education Programmed (UBE) (1999) are all pointers to the fact that Mathematics is inevitable in all facets of life.

The performance and achievement of students in Mathematics is so disheartening in spite of the advantages, values attached to the teaching and learning of Mathematics, and the laudable programs, workshops, seminars, conferences, competition, scholarships, and other educating programs offered by both government and non-governmental bodies to boost the morale of teachers and students in the utility subject, Mathematics. Most especially in Nigerian Primary Schools, the story is the same in even the Secondary Schools (Folayan & Ibrahim 2001, Salman 2003 and Kolo, Ibrahim & Kuzu 2004). This study, therefore, seeks to investigate the effects of Teacher-led Professional and Mentoring Support on the performance of Primary Schools Pupils in Mathematics in Zaria Kaduna State.

Professionalism in teaching Mathematics as observed by the researcher, can be viewed from two perspectives, one as a career and the other as structural organization of program. Career based Professionalism in teaching Mathematics however, has been issues of concern to stakeholders of Education generally, and Mathematics Educators specifically. Dodon-Doma (2006) highlighted that the era of any Jack and Harry taking up teaching profession as a last resort to their unemployment problem is over. Every teacher must be registered and possess the prerequisite skills and training. Adekola (2007), sees Professionalism in teaching Mathematics from a different perspective. He maintained that Professionalism does not imply having career oriented, registered teachers, rather, it entails structural organization of teachers' education programmes such as in-service training and retraining, workshops, conferences and seminar and ensuring the quality of these education programmes.

Therefore, Teacher-led Professio nal Support and Mentoring on the performance of Zaria Local Government Primary Schools Pupils in Mathematics is a study that is geared towards the fulfillment of teachers' professional upliftment in spite of the difficult education policy. It is the hope of this researcher

that this unique research on the teaching and learning of Mathematics will probably afford primary school pupils the ability to develop critical, reflective and creative thinking as well as enhance imaginative and skillful problem solving techniques.

1.2 Statement of The Problem

The general low performance of pupils in mathematics in Nigerian primary schools could be traced to the crop of teachers who are of different subject specializations and as a result of this, ill-prepared to impart adequate knowledge of Mathematics to their pupils. The poor methods of teaching some topics in Mathematics have made pupils to perceive such topics to be difficult. Salman (2005) confirmed from her research work that pupils dislike certain topics in Mathematics because of the belief that they are difficult, while the teachers also dislike teaching certain topics because of the belief that they are difficult to teach.

In order to make the teaching of Mathematics more relevant to the immediate needs of

the learners, the societies, and the nation at large, it is imperative to improve the quality of

Nigerian primary school teachers through direct involvement in Teacher-Led Professional and Mentoring Support as a means of rectifying the differences in their background and subject specializations.

Also evidences from other research works and over twenty years of teaching experiences in mathematics by the researcher have shown that mathematics is the most difficult subject dreaded by students and the most demanding subject painstakingly handled by teachers (Bulus, 2001; Falodi & Fagbade, 1999; Folayan & Ibrahim, 2001; Awodeji, 2003 and Etukudo 2003. Many factors have been highlighted as possible reasons for the general non-performance of students at all levels in the subject, Korau (2000), blamed the problem on abstractness of the subject. Azuka (2003), Ochepa and Olarinoye (2003) maintained that students' negative behaviour is the major obstacle hindering performance in Mathematics, while Habour-Peter (2002) and Etukudo (2003) attributed the problem of students' poor performance in mathematics on teachers' carefree attitude. Olaofe et-al (2004) sees beyond the individualistic approach to the problem of teaching and learning, they opined that lack of teacher-led

professional support for teaching and learning is the major obstacle that affects students' performance in writing, reading and arithmetic in primary schools.

Efforts made as shown above (using the individualistic approaches) to solve the problem of poor performance of Primary School Pupils in particular and Secondary School Students generally seem not to be yielding desired effects. Therefore, Teacher-Led Professional Support and Mentoring on the Mathematics performance of Pupils in Zaria Education zone is as mentioned above, a proposed wholistic teaching strategy aimed at activating Collaborative, Cooperative, Interactive, and Participatory teaching and learning at both Inter-School as well as Intra-School level. This strategy would not only take into cognizance students and teachers' factors as inhibitor of performance, it would also consider the Mathematics Content Knowledge (MCK) and Pedagogical Content Knowledge (PCK) of the teachers, the availability of instructional materials and even the conduciveness of the environment as each one affects directly or indirectly the performance of students in Mathematics.

1.3 Research Questions

The following research questions were raised to aid this study.

i. What is the difference in mathematics performance of pupils whose teachers were exposed to Teacher-Led Professional and Mentoring Support and the pupils whose teachers were not exposed to Teacher-Led Professional and Mentoring Support?

ii. In what way would Teacher-Led Professional and Mentoring Support bring about differences (if any) between the performance of pupils whose Teachers possess Mathematics Content Knowledge and those whose Teachers were not exposed to Teacher-Led Professional and Mentoring Support?

iii. What are the differences (if any) between the performance of pupils whose Teachers possess Pedagogical Content Knowledge and those whose Teachers were not exposed to Teacher-Led Professional and Mentoring Support?

iv. What are the differences (if any) in performances comes between pupils whose Teachers possess Pedagogical Content Knowledge and those whose Teachers possess Mathematics Content Knowledge with respect to Teacher-Led Professional and Mentoring Support?

v. Does the Effect of Teacher-Led Professional and Mentoring Support influence (or otherwise) gender disparity in Mathematics Performance of Pupils whose teachers were exposed to Teacher-Led Professional and Mentoring Support?

vi. How does differences in school location affect Mathematics performances of pupils despite the introduction of Teacher-Led Professional and Mentoring Support?

1.4 Null Hypotheses

In line with the research questions raised, the following null hypotheses are formulated for testing at an alpha (α) value of 0.05

1 There is no significant difference in the mean Mathematics performance of pupils whose Teachers were exposed to and those whose teachers were not exposed to Teacher -Led Professional and Mentoring Support (TLMS)

2 There is no significant difference in the mean Mathematics performance of pupils whose teachers possess Mathematics Content Knowledge as entailed in TLMS and those whose teachers were not exposed to TLMS

3 There is no significant difference in the mean Mathematics performance of pupils whose teachers possess Pedagogical Content Knowledge as enshrined in TLMS and those whose teachers were not exposed to TLMS

4 There is no significant difference in the mean Mathematics performance of pupils whose teachers possess Pedagogical Content Knowledge and those whose teachers possess Mathematics Content Knowledge as enshrined in TLMS

5 There is no significant difference in the mean mathematics performance of male pupils and female pupils whose teachers were exposed to TLMS

6 There is no significant difference in the mean Mathematics performance of pupils exposed to TLMS located in rural areas and those from urban areas

7 There is no significant difference between the mean Mathematics performance of pupils exposed to TLMS from the six Educational districts in Zaria Local Government Area

1.5 Objectives of the Study

The major purpose for which this study was carried out was to determine whether or not the use of Teacher-Led Professional and Mentoring Support strategy would bring about improvement in the general performance of primary school pupils in the subject Mathematics and to provide solution to persistent learning difficulties faced by students at both primary school and secondary school levels. Specifically the objectives of the study are to

1. determine whether the Effect of Teacher-Led Professional and Mentoring Support will improve pupil' performance in Mathematics
2. determine the Effect of Teacher-Led Professional and Mentoring Support on gender performance of any primary school pupils
3. determine the effect of Mathematics Content Knowledge of Teachers as contained in Teacher -Led Professional and Mentoring Support on their pupils' performance in mathematics
4. determine the effect of Pedagogical Content Knowledge of Teachers as contained in Teacher -Led Professional and Mentoring Support on their pupils' performance in mathematics
5. determine whether school location can affect Mathematics performance despite the introduction of Teacher-Led Professional and Mentoring Support for Teaching and Learning Mathematics

1.6 Significance of the Study

The study was aimed at determining the effects of Teacher-led Professional and Mentoring Support on Primary School Pupils' Performance in Mathematics in Zaria Local Government generally. Therefore, this study was significant in the sense that:-

- The findings of the study will provide useful information to the teachers on an appropriate teaching technique (Collaborative Teaching) that will univocally address the persistent teaching and learning difficulty faced in primary school Mathematics,

- Since teachers of primary schools within the scope of the study are made to teach all core subjects, the findings of the study is a guide to curriculum designers to incorporate inter-school and intral-school collaborative teaching in Mathematics curriculum. Administrators, Headmasters, Teachers, Parents Teachers Associations and other stake-holders in Primary Schools shall all be guided by this study on certain attendant problems in variation of teaching tecniques for primary school Mathematics.

- The study would avail the pupils to develop interest in Mathematics as their teachers would have acquired professional sense of belongingness in teaching the subject.

- It is the hope of the researcher that the study would also be of help to text book publishers to localize the content of their books (avoid the use of foreign example) since some of the mathematics teachers in primary schools do not posses subject content knowledge and pedagogical content knowledge.

- It is also the hope of the researcher that the study would encourage further interest for more researches on the topic in other level as well as higher level, and in other subjects. Therefore, fellow researchers can make use of this study for further researches.

- Above all, from the findings and recommendations of this study, it is hoped that stakeholders of primary education (politicians and PTA) would be enlightened on proper way to promote better teaching and learning of Mathematics.

In essence, it is the hope of the researcher that the study would expose the teachers to modern techniques of teaching and incorporate skill of learning in the students. This study would also afford the teachers to gain academically and develop professional sense of belonging, while the pupils would learn better, perform better, enjoy lesson and become good achievers.

1.7 Basic Assumptions for the Study

The following assumptions were made

1. It is assumed that all the pupils under study are given equal treatment in terms of syllabus coverage.
2. The pupils' heterogeneity in terms of socio-economic background and psychological differences were overlooked.
3. Since Teachers in primary school are meant to teach all subjects, it assumed in this study no school is given preferential treatment with respect to teachers' qualifications and experiences

1.8 Scope of the Study

This study is specifically concerned with the effects of Teacher-Led Professional and Mentoring Support for Teaching and Learning of Mathematics in Zaria Local Government Primary Schools. The said support which is combination of both administrative program and academic strategy have variety of versatile components among which are all elements of curriculum studies such as students themselves, the teachers, the contents, teaching techniques, the environment, the school settings and many more. Therefore, this study focuses on teachers, contents, teaching techniques and the students as well as the school location.

The study was delimited to primary four, five and six pupils of Zaria Local Government Primary Public Schools, while little or no emphasis was placed on co-educational schools, boarding or day schools and privately owned schools, as well as institutional (staff) schools.

The duration for this research study was one complete academic term of intensive Teacher-Led Professional and Mentoring Support for Teaching and Learning. The researcher with the agreement of his supervisors believe that the period was enough for reasonable academic coverage on the area of study if there would be a hitch free and conducive environment for an experimental study, and so it was.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.01 Introduction

In this chapter, relevant materials and related literatures are extensively reviewed. Hence, the chapter is presented in the following sub headings:

- Theoretical Framework
- Conceptual Overview of Mathematics
- Mathematics Teaching Techniques
- Traditional Method of Teaching Mathematics
- Teacher-led Professional and Mentoring Support in Teaching Mathematics
- Learning Theories
- Cooperative Learning
- Participatory Learning
- Interactive Learning
- Collaborative Teaching/Learning
- Teachers Qualification as Bases for Mathematics Content Knowledge and Pedagogical Content Knowledge
- Gender Difference and Performance of Pupils in Mathematics
- Effect of School location on The Performance of Pupils in Mathematics
- Implication of Literature Reviewed on The Present Study

2.02 Theoretical Framework

The theoretical framework of this study was rooted in Shulman's work of pedagogical content knowledge. Although subject content knowledge and pedagogical content knowledge are very important to the teaching profession, Shulman has described PCK as the understanding of how topics and strategies in specific subject areas are understood and misunderstood Shulman's (1986) work

showed that pedagogy content knowledge may not be enough to understand student misconceptions. Teachers must possess PCK of their subject area in order to facilitate students' learning

(Ball, 2000). The current study focused on mathematical and pedagogical content knowledge. Mathematical content knowledge MCK is part of mathematical knowledge needed to perform the recurrent tasks of teaching mathematics to students" (Ball, Thames, & Phelps, 2008, p. 399). Many studies have shown that the MCK is a predictor of student achievement in mathematics (Hill & Ball, 2004; Hill, Rowan, & Ball, 2005; Hill, Schilling, & Ball, 2004; Koellner, Jacobs, Borko, Scheider, Pittman, Eiteljorg, Bunning, and Frykholm, 2007) maintained that PCK is a very important part of MCK.

2.03 Conceptual Overview of Mathematics

Meaning of Mathematics:

Mathematics can be describe as a subject from which Science, Social Science and even Arts draw aspiration and substance. Eraikhuemen (2003) maintained that background knowledge of Mathematics is a necessary condition for the study of science. This is an oblivious statement because the need for Mathematics in these present days has gone beyond the need for study of science only; rather Mathematics is required in all field of life.

Pilant (2004), described Mathematics as the relationship between numbers and other measurable quantities. He iterated that "Without mathematics to describe physical phenomena, we might be living in a world with beautiful art, literature and philosophy, but no technology".

Mathematics is beauty: - Mathematics is beauty, this is because Mathematics symbolize aesthetic feature of nature. It is beauty because any design made with mathematical inscription on it, always forms a beautiful pattern. For example any number inscribe on a paper or cloth or any other plane object will form a beautiful design as the numbers eight -888888888888888888888888888888888888

88888888888888888888888888888888888888888888888888888888888888888888888888888888888888

888888

or the numbers five-

55555555555555555555555555555555555555555555555555555555555555555555555555555 5555555555555555555555555555555555555555555555555555 as well as any other mathematical symbols or shapes

Mathematics is a fact: - Mathematics is a fact because at any point in time, in all cases, the axioms, postulates, theorems, proofs and other properties of Mathematics are all facts, the whole facts and nothing but the facts. The sum of two or more mathematical numbers now, today, tomorrow and forever more will always be the same.

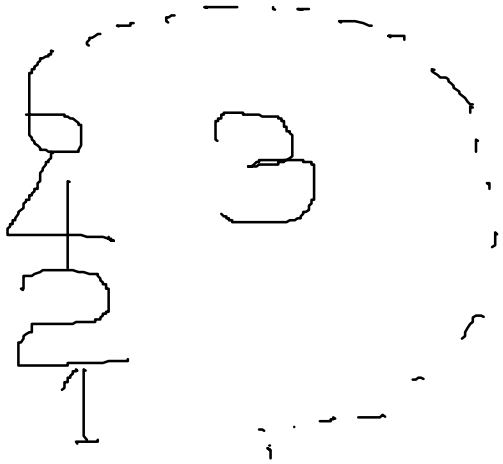
E.g. 3 + 4 = 7, 5 + 2 = 7, 8 + 9 = 17, 5 – 8 = -3 and so on in Nigeria as well as any where in the whole world, probably the same thing is applicable in heaven or the world beyond.

Mathematics is universal language: - A person in a strange land can conveniently demonstrate numbers by the use of fingers. Mathematics (Numbers) are the easiest and surest lingual franca for businesses transactions and also the language for technological development

Mathematics is a fun: - Excitement and entertainment can be enjoyed through mathematical games such Ludo, Chess, Shuffle cards as well as riddles and jokes such as (i) prove that a number twelve when slashed into two gives seven (ii) A manipulated number three plus a manipulated number four equals a manipulated number five, what is the manipulation? The solution to the two riddles above are (i) a roman number twelve with a strike in the middle ~~XII~~ gives a roman number seven VII above the strike. (ii) the manipulation is simply squaring each number, thus $3^2 + 4^2 = 5^2$ i.e. 9 + 16 = 25.the manipulation is squaring the numbers. Also vertically joined arrangement of numbers 6, 4, 2 and 1 with dotted semicircle, and an imbedded three form a funny diagram of human skull as shown below

Figure 2.1 Exciting Numeric Human Skulls to Entice

Primary School Pupils



In addition, a bit to create fun, student's curiosity to get more atterns developed and this enhances powerful intrinsic motivation which makes them develop far greater and more intelligent interest in the subject. For example, are the patterns below not exciting enough?

37 X 3 = 111

37 X 6 = 222

37 X 9 = 333

37 X 12 = --------

37 X 15 = ----------

e.g. $(1)^{2 =} 1$; $(11)^2 = 121$; $(111)^2 = 12321$; $(1111)^2 = 1234321$

$(11111)^2$ = ----------?

$(111111)^2$ = ----------?

The solutions to the incomplete equations are as follows

37 x 12 = 444; 37 x 15 = 555

and $(11111)^2$ = 123454321; $(111111)^2$ = 12345654321 respectively.

Scope of Mathematics

There are five branches of Mathematics as contained in Nigerian Mathematics Curriculum. They are Arithmetic, Algebra, Geometry, Trigonometry and Statistics

Arithmetic, literally mean the art of counting. The word comes from the Greek arithmētikē, which combines the ideas of two words: arithmos, meaning "number", and technē, referring to an art or skill. Arithmetic is fundamental of mathematical operations: counting, operations—addition, subtraction, multiplication, division, and place holding—form the basis of the mathematics that we use regularly. In many Nigeria, prior to independence till early 80's and some other countries, arithmetic was and is still the primary area of Mathematical study during the first six years of school,

Algebra, branch of mathematics in which symbols represent relationships. Classical algebra grew out of methods of solving equations; it represents numbers with symbols that combine according to the basic arithmetical operations of addition, subtraction, multiplication, division, and the extraction of roots. However, arithmetic cannot generalize mathematical relations such as Pythagoras' theorem, which states that in any right-angled triangle, the area of the square drawn on the hypotenuse is equal to the sum of the areas of the squares drawn on the other two sides. Arithmetic can produce only specific instances of these relations (for example, 3, 4, and 5, where $3^2 + 4^2 = 5^2$). Algebra, by contrast, can make a purely general statement that fulfils the conditions of the theorem: $a^2 + b^2 = c^2$. Any number multiplied by itself is termed squared, and is indicated by a superscript number 2. For example, 3×3 is notated 3^2; similarly, $a \times a$ is equivalent to a^2. Modern algebra has evolved from classical algebra by increasing its attention to the structures within mathematics. Mathematicians consider modern algebra to be a set of objects with rules

for connecting or relating them. As such, in its most general form, algebra may fairly be described as the language of mathematics.

Geometry, (Greek geō, “Earth”; metrein, “to measure”), branch of mathematics that deals with the properties of space. In its most elementary form geometry is concerned with such metrical problems as determining the areas and diameters of two-dimensional figures and the surface areas and volumes of solids. Other fields of geometry include analytic geometry, descriptive geometry, topology, the geometry of spaces having four or more dimensions, fractal geometry, and non-Euclidean geometry.

Trigonometry, this is another branch of mathematics that deals with the relationships between the sides and angles of triangles and with the properties and applications of the trigonometric functions of angles. The two branches of trigonometry are plane trigonometry, which deals with figures lying wholly in a single plane, and spherical or solid trigonometry, which deals with triangles that are sections of the surface of a sphere.

Statistics, branch of mathematics that deals with the collection, organization, and analysis of numerical data and with such problems as experiment design and decision-making

Mathematics can also be defined as the study of relationships among quantities, magnitudes, and properties of logical operations by which unknown quantities, magnitudes, and properties may be deduced.

The numbers used for counting are called the positive integers or positive whole numbers. These are generated by adding 1 to each preceding number in an unending series. Different civilizations throughout history have developed different kinds of number systems. One of the most common is the one used in all modern cultures, in which objects are counted in groups of ten called the Base 10, or Decimal or Denary system.

In the base 10 system, digits expressing various powers of 10 represent integers. For example, take the number 1534. Every digit in this number has its own place value, and these increase by another power of 10 as they move to the left. The first place value is a unit value (here, 4 × 1); the second is tenth value (here, 3 × 10 = 30); the third place value is (10 × 10) hundredth place value (here, 5 × 100 = 500); and the fourth place value is 10 × 10 × 10, thousandth place value (here, 1 × 1,000 = 1,000).i.e. 4 + 30 + 500 + 1000 = 1534. Similarly, base sixteen (hexadecimal), base eight (octal), base two (binary) are all counted or operated in the same manner.

Other literal definitions for Mathematics are as follows:-

Mathematics Objectives

At different times and in different cultures and countries, mathematics education has attempted to achieve a variety of different objectives. These objectives include:

- The teaching of basic numeracy skills to all pupils
- The teaching of practical mathematics (arithmetic, elementary algebra, plane and solid geometry, trigonometry) to most pupils, to equip them to follow a trade or craft
- The teaching of abstract mathematical concepts (such as set and function) at an early age
- The teaching of selected areas of mathematics (such as Euclidean geometry) as an example of an axiomatic system and a model of deductive reasoning
- The teaching of selected areas of mathematics (such as calculus) as an example of the intellectual achievements of the modern world
- The teaching of advanced mathematics to those pupils who wish to follow a career in science
- The teaching of heuristics and other problem-solving strategies to solve non routine problems.

Educational Objectives in Mathematics

It is a known fact that no nation exist without technology and science. Thus, National Policy on Education and Nigeria Educational Research and Development Council (NERDC, 2007) formulated some objectives that need to be attained in teaching and learning Mathematics at different level of education in Nigeria as stated by Obodo (2001). These objectives include

I. Pre- Primary Mathematics Objectives : this include transition from home to school; developing the spirit of enquiry and creativity; introducing rudimentary numbers, letters, colours, shapes etc.
II. Primary Mathematics Objectives : inculcating permanent literacy and numeracy; developing basis for scientific, creative and imaginative thinking; and providing tools for further educational advancement
III. Objectives Of Secondary Mathematics: to make provision for more solid foundation for the graduating pupils of primary schools; to develop and equip the students with reflective, logical and abstract thinking as well as to develop computational and problem solving skill.
IV. Objectives of Tertiary Mathematics: With the diversity of tertiary institution in Nigeria, a realization of unique Mathematics objectives would be perceptual illusion. However, it is expected that every autonomous institution of higher learning would have specific Mathematics objectives.

Since the focus of this study is Secondary School Mathematics content, it become imperative to highlight the syllabi with which the objectives are to be implemented (see appendix V)

Instructional Objectives in Mathematics: Instructional objectives show the level of proficiency and conditions of performance that are expected of the students at the end of the lesson (Ashlock, 1999). Usually, they are stated with actions verbs most of the recent secondary and primary school books carry instruction objectives at the beginning of each chapter (Rabiu, 2001; Kalejaiye,Garba, Chima & Macrae 2004).

1. Statements of objectives should be made known to the students at the beginning of a lesson in order to arouse student interest. When the students know their destination they will strive harder to achieve the objective. Other Instructional Objectives in Mathematics according to Ibrahim (2010) include (a)

Mastery or development (b) Ultimate or immediate (c) Single or multiple and (d) Stated or functional o0bjectives.

Pairs of instructional objectives:

A(i) Mastery Objective: This is concerned with the minimum but essential tasks to be achieved in lesson. It deals wth the basic learning tasks which must be mastered byt eh student so as to be successful e.g. students of EDUC 402 ought to have mastered concept on mean, median and mode.

(ii) Developmental Objective: This is a complex learning outcome which cannot be achieved in full e.g. No one can boast of mastering all concepts in mathematics or social studies etc we can only say that the objectives are attained to some extent.

B (i) Ultimate Objective: This deals with the typical performance of an individual in an actual or life situation e.g. performance to enhance self-reliance. This often takes place after the programme.

(ii) Immediate Objective: Deals with expected behaviour immediately after a lesson or after the class work e.g. observable (behavioural and non-observable (non behavioural objectives).

C (i) Single Course Objective: This is an objective is unique for a programme or a single course e.g. laboratory skill, here experience from other subject do not or may not affect its objective.

(ii) Multiple Course Objective: This is an objective that is interwoven with some other courses e.g. communication skill is required for many other courses. So objective in communication skill can affect objective of other associated courses.

D (i) Stated Objective: This is an objective given or written in a given course.

(ii) Functional Objective: On the other hand is the objective that is implicitly in the teaching and learning process.

Academic Achievement in Mathematics

Different people have defined the word achievement in different ways. Webster's Third New International Dictionary defined achievement as 'a result brought about by resolve persistence or endeavor'. Inyang (1998) defined academic achievement as assessment of how much pupils have learnt or attained after learning period.

Academic achievement can be defined as the level of success attained by a learner as a result of the instructions/training he/she received from his teacher. Inyang (1998) defined academic achievement as assessment of how much pupils have learnt or attained after learning period. While Marshall (1971), defined academic achievement as the "extent to which a person has achieved something, acquired certain information or mastered certain skills, usually as a result of planned instruction or training".

2.03 Mathematics Teaching Techniques:

Teaching is systematic presentation of facts, ideas, skills, and techniques to students. Willboughby (2000) highlighted five focal points that should serve as operating principles for acquiring knowledge in mathematics. These include

1. All students should become proficient with both the traditional basic skills and the higher order thinking skills of Mathematics
2. Mathematics should be developed from the learner's viewpoint and experience

3. Students should learn to understand the power and beauty of mathematics

4. Students should learn to communicate clearly and correctly about mathematical situations

5. Graduate of a good mathematics program should enjoy using and learning mathematics.

If the teacher is interested in mathematics, his student will also show interest in it. If, on the other hand, he dislikes mathematics his student/pupils will also dislikes it. A teacher who is interested in mathematics will regularly practice it and use variety of techniques to entice his pupils, because of this he will be strong in it and teach it with enthusiasms.

In Nigeria however, teaching is seen as a means to an end rather than being an end by itself. This is because according to Adekeye (2003), people enter the teaching profession for varying reasons, some among whom he said took to teaching in order to satisfy their exalted sense of vocation, while majority are in the profession to use it as a springboard. Ibe-Enwo (2003), maintained that some Mathematics teachers do not possess the requisite pedagogical skills required for teaching the subject. This according to him resulted in many unanswerable serious problems that befall educational institutions in Nigeria.

The present researcher, do completely agree with Ibe-Enwo about the crisis in the teaching profession, and the notion that the problem should be seen from different perspectives. Many teachers have had to be confronted with such problems as overcrowded classrooms, dilapidated facilities, students suffering from malnutrition and other manifestations of poverty, increased drug and alcohol abuse among students, and reduced federal funding for education (F.M.E. 2007 See Appendix 1). In addition, the problem can be entangled onto lack of teacher-led professional support and mentoring programs that would have made provisions (by means of improvisation) for some of the shortfalls or non-availability of educational infrastructural materials.

2.04 Traditional method of teaching Mathematics

The traditional method of teaching lay more emphasis on teacher centeredness. This method of teaching includes the indigenous, non-formal and informal techniques of education such as rote memory, imitation, dictation, repetitive recitation, observation and to some extent the formal lecture teaching style. Although, these methods are obsolete, they give room for diversity in training and permit the students to develop long and retentive memories. [Eve (1998), as contain in Zakariyya (2002)] sees some loop holes in this teaching technique when he narrated his observation using the techniques thus:

"Traditionally we asked do the students understand the materials that are presented. We also traditionally asked are there any questions about the materials? , the response is usually chorus answers YES! and NO! respectively. Somehow I know that many students do not understand or are confused about what I am trying to teach them".

In another remark on traditional method of teaching mathematics, Jonathan and Henri (2003) iterated that Teachers in most schools shape their curricula (divert from given curriculum), design their lessons, and establish their expectations of students/pupils for their own convenience to the detriment of these pupils.

Effective use of Instructional Materials in Traditional Method of Teaching Mathematics

Instructional materials are materials that help the teachers to pass the knowledge (message) to the pupils more effectively. Aprebo (2000) in Shafi and Areelu (2010), opined that instructional materials help to reduce the level of abstraction in teaching and learning of a concept. Instructional materials help to capture the learner interest. They also keep the students busy and active. They give room for effective retention of mathematical concepts.

Timku and Mari (2010) maintained that Teachers uses as their main resource chalkboard and textbooks, however, by the present researcher's 20 years of teaching experience, he observed that in Teaching

Mathematics most especially at tertiary institutions, the use of handouts is the reign of day. The students relied solely on these handouts, which take the form of photocopied text or teacher-prepared notes hence, one can rightly say that the practice of "spoon-feeding" is the persistent style of teaching.

Assessment using the Traditional Method of Teaching Mathematics

The constructivist and reflective approach calls for different methods of assessment than the traditional types. However, the most common method of assessment is tests and this is indicative of the dominant teaching method, that is, exposition. At junior primary classroom level pupils were assessed through questions, which they responded to verbally and through class exercises.

From the afore mentioned citations, one would see that the lapses in the use of traditional methods for teaching mathematics are too glaring that the shift from this method is very necessary if there must be meaningful learning of mathematics.

Ideally, the Conventional technique of teaching Mathematics in primary schools unlike the commonly used Traditional method include many other sub-methods such as discussion, lecture, demonstration, field trips, expository, discovery, laboratory, problem solving, heuristic etc.

2.04 The Modern Method of Teaching Mathematics:, The modern method of teaching is fully systemized way of presenting lesson. It exist in different forms some of which include

I. Expository method of teaching Mathematics
II. Guided discovery method of teaching Mathematics
III. Laboratory method of teaching Mathematics
IV. Discussion method of teaching Mathematics

Naude et-al (2003), in their study described Conventional techniques in a form of prose thus:

> Sometimes he asked questions that called for chorus responses on the part of students. He also invited students to ask questions, a practice which seemed to be

very familiar and which students were very comfortable with as seen from the number of questions they posed. He used the expository approach to present the concepts. He went into a lot of detailed explanation to drive a concept home and he used many familiar examples in the process. He followed his presentation with class exercises, at the end of which, sometimes, there would be group discussions. For example, students were given an exercise to complete in ten minutes

In another vain, Naude et-al (2003) went further to explain other teaching styles as Small group work; a situation where assignment is given and pupils are allowed to discuss freely with a person sitting next to them. Demonstration style a situation where teacher uses for example the use of a dynamo to explain the concept of energy transformation

(i) Expository method of teaching Mathematics

Susan, Antoinette, and Gwendolyn (2004) maintained that there are two approaches to teaching:

Teaching for procedural knowledge which implies teaching definitions, symbols, and isolated skills in an expository manner without first focusing on building deep, connected meaning to support those concepts and

Teaching for conceptual understanding; this entails teaching by beginning with posing problems that require students to reason flexibly. Through the solution process, students make connections to what they already know, thus allowing them to extend their prior knowledge and transfer it to new situations

ii)Guided discovery method of teaching Mathematics

Guided discovery method of teaching is a strategy which normally lead a learner to the correct assertion by way of guessing and generalization. For example,

$3 \times 5 = 4^2 - 1^2$

$6 \times 8 = 7^2 - 1^2$

$5 \times 7 = 6^2 - 1^2$

Can we now generalize; $(n - 1) \times (n + 1) = n^2 - 1^2$

Also, $3 \times 7 = 5^2 - 2^2$; $4 \times 10 = 7^2 - 3^2$; $2 \times 14 = 8^2 – 6^2$

Therefore, in order to generalize the equations, we can conclude that it is the same as $(a – b)(a + b)= a^2 - b^2$

iii) Laboratory method of teaching Mathematics

This is the use of spacious room equipped with instructional materials, where students are taught on how to make practical models for solving theoretical concepts of the traditional teaching techniques.

2.06 The Concept of Teacher-led Professional and Mentoring Support in Mathematics.

- Teachers are eager to learn, staff development programs policy of the government is weak and teachers' associations NTI and NTRC are increasingly using traditional union to operate at a snail speed. The need for skills and activities to build the infrastructure for success in the classroom is at its greatest peak, hence teacher professionalism only hang on Teacher-led Professional and Mentoring Support development.
- Professional development centres can help to focus these activities and provide opportunities to set long-range goals and visions for the profession.
- Teacher-led professional development centers can provide the long term stability needed to allow the profession to flourish. The establishment of these important resources is not

for just a few teachers or a few schools. It is work that must extend to all to so many currently teaching and to their successors.

- Support for new teachers to ensure success during the first few years in the profession
- Opportunities to discuss standards and assessments for student learning
- The professional development center can be the organizing principle around which seemingly diverse pieces of work to transform teaching are carried out. Today, some of these pieces include (but are not limited to):

i. Development of innovations in practice
ii. Adoption of innovations in practice
iii. Curriculum development
iv. Leadership development
v. Peer assistance
vi. Deepening and renewing subject-specific knowledge
vii. Awareness and assistance with pursuing certification by the National Board for Professional Teaching Standards

Mathematics Education in Nigeria generally is in a pathetic situation. Most especially the Primary school Mathematics which is suppose to be a crucial matching ground for the country's technical labour force as well as a turning point for the determination of future carrier of our secondary school students (U B E 1999 guidelines). Researches as well as reports from chief Examiners of National Examination Council of Nigeria (the body in charge of Common Entrance Examination as well as Junior Secondary School Examination in Nigeria) and the out cry of stake holders in Mathematics Education in Nigeria have shown that the situation is really unpleasant.

In fact, the Federal Ministry of Education could not keep mute over the devastating condition of Education in the country, as it agreed that there is a great crisis in Nigerian Education (See appendix A).

His Excellency, former President Federal Republic of Nigeria, Chief Olusegun Obasanjo (2006) once highlighted the importance and problems associated with teaching and learning by saying that

> Education is for national development, oil and gas or solid minerals will not ensure Nigeria's development, rather the application of the benefit stream arising from resource exploitation in the development of human capital, Education is central to the accomplishment of the above.

Examples of countries that have succeeded with this approach include China, India, Japan, South Korea & Singapore.

Kolo et-al (2004) pointed out that the trends of students' performance particularly in Mathematics from 1998 to 2003 was alarmingly deplorable. It is therefore disheartening, that despite the effort put in by the federal government, the state government as well as non-governmental agents to ascertain quality and sustainable education in the country, the result yielded little or no significant success. Efforts placed on the introduction of Universal Basic Education (UBE), the establishment of Open University, the creation of new institutions of higher learning and the upsurge of private Nursery, Primary and Secondary schools in every null and corner of every state in the country are not helping matters. Also in spite of series of academic and intellectual researches carried out on problems, militating against performance in Mathematics, the situation remains uncontrollable. According to Esenkwe (2007) Education in Nigeria is degenerating into anarchy, she lamented that

> In essence, Nigeria is producing less and less of the leaders of tomorrow: the managers, the entrepreneurial class, the teachers, the doctors, the policy makers, the law enforcement officers, the professionals…Instead, the country is in danger of mass-producing half-baked graduates, miscreants, the disaffected and rejected, the misdirected, the unlearned, the angry, the wronged, agitated and hopeless.

All these are pointers to the fact that Nigeria does not just have an educational sector crisis; but have a national crisis that needs an urgent solution

In order to solve a relatively similar educational problem that affects Teaching Mathematics to Foundation Level Learners with Limited Language Proficiency,

Naude et-al (2003), employ the use of Teacher Professionalism. They maintained that Teacher Professionalism is an Innovative Programme for Teaching Mathematics to Foundation Level Learners with Limited Language Proficiency. They iterated that there is study of ways in which limited language proficiency affected learners' readiness for Mathematics instruction among disadvantaged preschoolers within a Griqua community in South Africa. In there study, they linked between limited language proficiency and nonreadiness for foundation level Mathematics due to limited thinking skills, which constitute limited cognitive academic language proficiency. The findings of the study revealed that developing Teacher Professionalism program for teaching mathematics to foundation level learners with limited language proficiency is the surest way to solving the persistent learning difficulties for foundation level pupils of Griqua community in South Africa.

In the same vain, Teacher-Led Professional and Mentoring Support for Teaching and Learning Mathematics In Zaria Local Government Primary Schools is a program prepared to solve the persistent learning difficulties faced by majority of Pupils in these regions and thereafter infer the outcome of the study on the general performance of pupils in Mathematics.

This researcher therefore, resolve to dismantle the stumbling block that has been the obstacle to effective teaching and proper understanding of the subject by means of this study. Steps along this path, is explicitly reviewing the techniques for teaching Mathematics, and as well discuss the theories of learning Mathematics.

In order for teachers of Mathematics to be expose to innovations and inventions in his or her profession, so as to awake students' interest and teachers' commitments as well as to improve better understanding of the subject, it is mandatory for the teacher to make contacts and exchange ideas with colleagues and experts in Mathematics. The surest and easiest way of acquiring this, would have been through conferences, seminars and workshops. But, only few teachers can afford to attend conferences, seminars and workshops, while the training received at the college of education as well as the university are grossly inadequate Adetula (1990).

Therefore, Teacher led Professional Support for teaching Mathematics is a local way of organizing cooperative, collaborative and interactive exchange of ideas. It involves the rubbing of minds on ideal lesson plans, effective use of instructional aids and other pedagogical issues among Mathematics teachers within a school setting as well as between Mathematics teachers from different schools in the local environment.

2.07 Learning Theories and Performance of Pupils in Mathematics

Learning, acquiring knowledge or developing the ability to perform new behaviors. It is common to think of learning as something that takes place in school, but much of human learning occurs outside the classroom, and people continue to learn throughout their lives.

Even before they enter school, young children learn to walk, to talk, and to use their hands to manipulate toys, food, and other objects. They use all of their senses to learn about the sights, sounds, tastes, and smells in their environments. They learn how to interact with their parents, siblings, friends, and other people important to their world. When they enter school, children learn basic academic subjects such as reading, writing, and mathematics. They also continue to learn a great deal outside the classroom. They learn which behaviors are likely to be rewarded and which are likely to be punished. They learn social skills for interacting with other children. After they finish school, people must learn to adapt to the many major changes that affect their lives, such as getting married, raising children, and finding and keeping a job.

Because learning continues throughout our lives and affects almost everything we do, the study of learning is important in many different fields. Teachers need to understand the best ways to educate children. Psychologists, social workers, criminologists, and other human-service workers need to understand how certain experiences change people's behaviors. Employers, politicians, and advertisers make use of the principles of learning to influence the behavior of workers, voters, and consumers.

Learning is closely related to memory, which is the storage of information in the brain. Psychologists who study memory are interested in how the brain stores knowledge, where this storage takes place, and how the brain later retrieves knowledge when we need it. In contrast, psychologists who study learning are more interested in behavior and how behavior changes as a result of a person's experiences.

Cooperative Learning Strategies

According to Slavin, Robert E (1988), research evidence shows that cooperative learning strategies are not equally effective, though most positively affect self-esteem, intergroup relations, and the ability to work with others. To produce achievement gains, these methods must include both a group goal and individual accountability.

There are many forms of learning, ranging from simple to complex. Simple forms of learning involve a single stimulus. A *stimulus* is anything perceptible to the senses, such as a sight, sound, smell, touch, or taste. In a form of learning known as classical conditioning, people learn to associate two stimuli that occur in sequence, such as lightning followed by thunder. In operant conditioning, people learn by forming an association between a behavior and its consequences (reward or punishment). People and animals can also learn by observation—that is, by watching others perform behaviors. More complex forms of learning include learning languages, concepts, and motor skills as depicted in the concept reasoning and concept understanding.

According to Bauwens and Hourcade (2001), cooperative learning refers to a direct form of collaboration in which a general educator and one or more support service providers voluntarily agree to work together in a co-active and coordinated fashion in the general education classroom. These educators who possess distinct and complementary sets of skills, combine roles and share

resources and responsibilities in a sustained effort while working towards the common goal of school success for all students.

2.08 Academic Achievement /Performance of Pupils in Mathematics

Inyang (1998) defined academic achievement as assessment of how much pupils have learnt or attained after learning period. Webster's Third New International Dictionary defined achievement as 'a result brought about by resolve persistence or endeavor.

On the other hand, Microsoft Encarta 2009 defined Performance to mean manner of functioning, that is, the manner in which somebody functions, operate or behave or accomplishing task or action

From the above definitions of academic achievement and performance, one can conclude that the definition simply stands for the level of success attained or accomplished by a learner as a result of the instructions/training he/she received from his teacher. While Marshall (1971), defined academic achievement/performance as the "extent to which a person has achieved something, acquired certain information or mastered certain skills, usually as a result of planned instruction or training".

On this note, the researcher made the following observations to ascertain on the treatment achievement and performance. Problems noticed during mathematics in-class interactions on fractions, mensuration and integers. Four questions were asked in order to reveal student's learning complexity (concept reasoning and concept understanding).

Question 1

Teacher: a) is $\frac{-1}{2}$ a proper fraction or improper fraction?

Pupil: Yes it a proper fraction because -1 is less than 2

Teacher: b) is $\frac{1}{-2}$ a proper fraction or improper fraction?

Pupil: No it an improper fraction because 1 is greater than -2

Remark: In what way can the pupil's be helped to overcome the misconception about negative fractions?

Question 2

Teacher: What is a circle?

Pupil: A circle is a round object

Teacher: Give one example of an object that can be called circle

Pupil: Ball

Remark: What kind of instructional materials will enhance better understanding of the difference between plane shapes and solid shapes

Question 3

Teacher: Simplify $\frac{1}{4} \times \frac{1}{5}$

Pupil: $\frac{1}{4} \times \frac{1}{5} = \frac{5}{20} \times \frac{4}{20} = \frac{20}{20}$

Remark: How can this student or his likes be helped to differentiate the operations in addition and multiplication of fractions

Question 4

Teacher: 52 - 28

Teacher: step 1 (unit value): borrow 1 from 5tens and add to

2unit = 12

Teacher: step 2 (unit value): subtract 8 from 12 = 4unit

Teacher: step 3 (tens value):subtract 2 from the remaining 4=2

Teacher: step 4: 5 2

-2 8

2 4

Pupil: Sir, when is the 1 borrowed going to be refunded

Remark: How will teacher resolve the problem of language barrier in this pupil?

Remarks to Responses given by the teachers in the Mathematics in-Class Problems

Some of the teachers who participated in the study have difficulty in identifying the problem with some of the questions, however, the use of ideal lesson plan and professional instructional materials , such as charts on plane and solid figures (see diagrams and charts below) that will facilitate better and faster understanding of the concept being taught in the class were iterated with the teachers. Lesson plans and instructional material produced by some of the participating Teachers adopted for used in Teacher-led Professional Support and Mentoring Program are displayed in appendix B below.

Chart 2.1

Professional Instructional Charts on plane figures

(adopted from Microsoft Encarter)

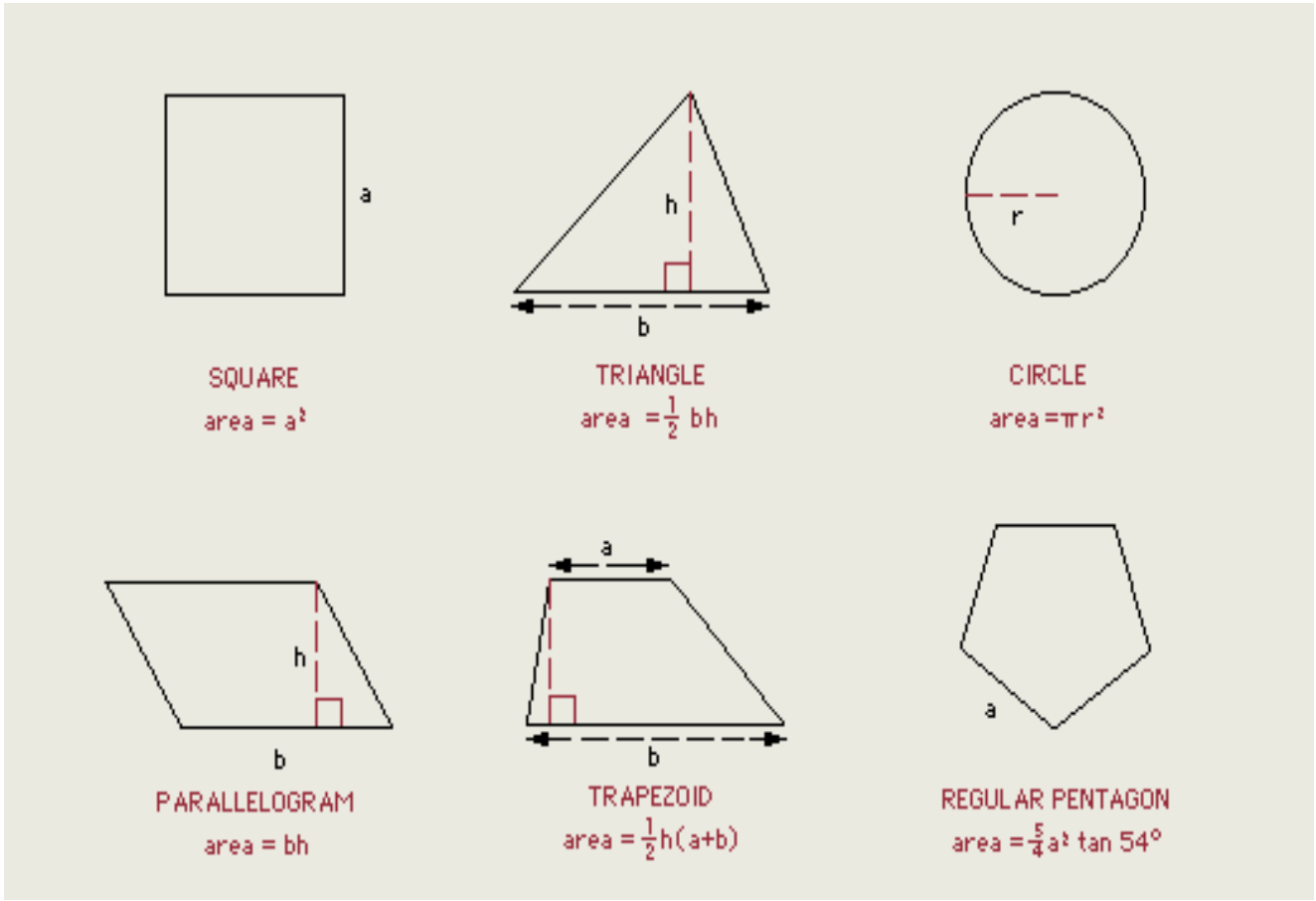


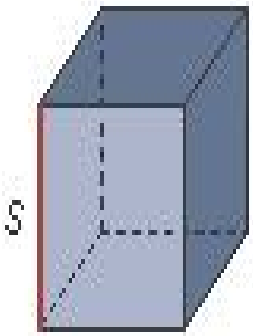
Chart 2.2

Professional Instructional Charts on solid figures

(adopted from Microsoft Encarter)

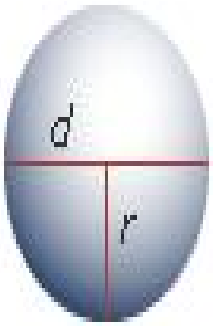
V = volume
h = height
B = area of base
d = diameter
r = radius
s = side

Cube



$$V = s^3$$

Sphere

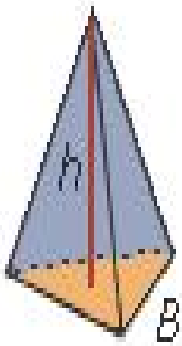


$$V = \frac{1}{6}\pi d^3$$

or

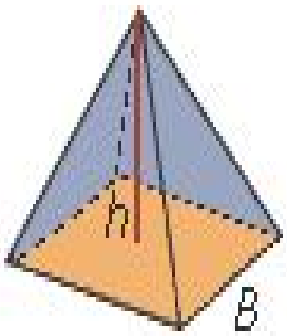
$$V = \frac{4}{3}\pi r^3$$

Tetrahedron



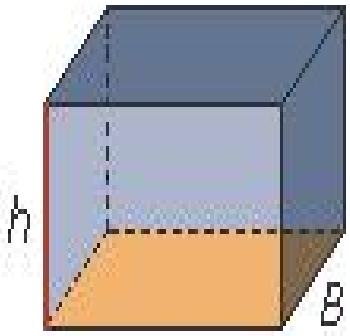
$$V = \frac{1}{3}Bh$$

Pyramid



$$V = \frac{1}{3}Bh$$

Parallelepiped



$$V = Bh$$

2.09 Teachers Qualification Bases for Mathematics Content Knowledge and Pedagogical Content Knowledge.

The general low performance of pupils in Mathematics in Nigerian primary schools could

be traced to the crop of teachers who are of different subject specializations and as a result of this, ill-prepared to impart adequate knowledge of Mathematics to their pupils. The poor methods of teaching some topics in Mathematics have made pupils to perceive such topics to be difficult. Salman (2005) confirmed from her research work that pupils dislike certain topics in Mathematics because of the belief that they are difficult, while the teachers also dislike teaching certain topics because of the belief that they are difficult to teach.

A teacher of mathematics at different levels of Nigerian schooling system ideally is supposed to possess at least the following minimum qualification as expressed by Jahun (2007), Clement and Nnenna (2010)

1. National Certificate of Education obtained from the colleges of Education with Mathematics being one of the major field to teach in primary school.
2. Bachelor of Education. (B.Ed.), or Bachelor of Science Education (B.Sc. Ed.) in Mathematics to teach in Junior Secondary Schools
3. Bachelor of Education. (B.Ed.), or Bachelor of Science Education (B.Sc. Ed.) in Mathematics and Postgraduate diploma in Education. (P.G.D.E). in Mathematics Education For those that do not have background knowledge in Education to teach in Senior Secondary Schools
4. Master of Education. (M.Ed.) in Mathematics Education and Philosophy of Education (Ph.D) in Mathematics Education to teach in tertiary institution

However, as rightly said by Adetula (1990) that to some extent, the training received at the college of education as well as the university are grossly inadequate. Therefore, the concern for this study hinges on the Mathematics Content Knowledge as well as the Pedagogical Content Knowledge of Mathematics teachers which are embedded in Teacher-led Professional and mentoring Support.

According to Barber, Heal and Martyn (2002), the mathematics subject matter knowledge otherwise referred to as mathematics content knowledge of primary school teachers has in recent years become a high profile issue in the UK and beyond. They iterated that there is statistical evidence (e.g. Rowland, Martyn, Barber and Heal, 2001) that secure knowledge of mathematics topics - including and extending beyond those encountered in the primary curriculum - is associated with more competent mathematics teaching in the case of pre-service ('trainee') primary teachers. Likewise, weak subject knowledge is associated with less competent teaching of the subject.

In order to make the teaching of Mathematics more relevant to the immediate needs of the learners, the societies, and the nation at large, considering the level of Mathematics Content Knowledge and Pedagogical Content Knowledge, it is imperative to improve the quality of

Nigerian primary school teachers through direct involvement in Teacher-led Professional and Mentoring Support

2.10 Gender Difference and Performance of Pupils in Mathematics

A survey carried out by Maduabum and Odili (2007) on male and female students' Performance in mathematics, in senior secondary certificate further mathematics in Nigeria, shows that male out beat female student within the 7 years trend of the survey. The result of Maduabum and Odili is not surprising, looking at the performance of male and female pupils' in Mathematics right from the primary school level which is the grass root of learning in Nigeria as contain in this study. Also, studies have shown that there is great disparity between the Mathematics Performance of boys and girls at all levels of education, Abubakar (2010).

It is glaring that most of the greatest Mathematicians cited in history of Mathematics are men, this is a pointer to the facts that men are known for challenging and tedious tasks. In line with the present research, Stevenson et al (2000) also compared the performances in a number of areas of mathematics

by grade l and grade 5 boys and girls in Beijing and Chicago. Their results showed that in Chicago boys outperformed girls in all areas but although Beijing girls in grade I were faster than the boys, in other areas the magnitude and direction of sex differences was equivalent to the Chicago group. The Beijing group of students however were superior to the Chicago group in all areas tested. Would the present study come up with any contrary result or have a similar outcome? The analysis in chapter four will clear the doubt.

Researchers generally agreed that men are higher achievers in mathematics than women. It's obvious that most of the world greatest mathematicians cited in History of Mathematics are men. Furthermore, most f the researcher's past/present students who excel in mathematics are males. In the paragraphs below the researcher discussed different research findings on gender and mathematics achievement both at home and abroad.

The first work to be cited was conducted by Begley (1998). Which indicates that there is only a very little gap in mathematic achievement between boys and girls at elementary level. However, the gap increases around the age of thirteen and continues to expand through the high schools and college age.

Similarly, Holden (1998) discusses a two – year study of mathematically talented children. The study shows that there is a stable difference in males and females mathematical performance.

Erin Leahey and Guang Guo (2001), in their study reported that very little gap between the performances of boys and girls at the elementary level. But they reported that boys tend to progress much more quickly as they become older than their females counterparts. And they concluded that gender gap in mathematic achievement performance.

Clark and Gorski (2002), conducted a study on the decline of females in the technology field. When survey fourth and twelfth grade students, fewer females than their females than males answered yes to the question, “I like mathematics” and “I am good at mathematics” at twelfth grade level. Fourth graders of both gender voted similarly, while the number of twelfth grade girls with confidence in mathematics decreased drastically. This shows that girls have below level of confidence in mathematics at higher level.

Korau (1990) conducted a research for the purpose of verifying weather gender gap exists at primary school mathematics. The sample used consisted of 772 primary three pupils. Out of those 504 boys and 268 girls selected from 20 primary schools in Zaria local government. His findings show no significant difference between the performance of boys and girls in elementary school mathematics.

Therefore, one can conclude from all the evidences provided above that gender differences in mathematics achievement if exist, is very negligible at primary school level; but it grows with age, i.e. there is a very wide gap at higher level of mathematics. The writer of this thesis will like to find out if this gap exists between boys and girls in terms of mastery of mathematics facts.

2.11 Effects of School Location on the Performance of Pupils in Mathematics

Performance comparisons of rural, suburban, and urban students were made separately for the four geographic regions of the United States by Fan and Chen (1998). Classifications of rural, suburban, and urban schools, and of geographic regions, were based on the 1980 Census classification of the schools from which the students were sampled Korau (1990). The results showed that students from rural schools performed as well as, if not better than, their peers in metropolitan schools in math, science, reading, and social studies.

In the same vein, Swanson and Brown (2001) maintained that rural areas lagged behind urban and suburban schools in academic achievement despite many odds and unpleasant environment in urban areas. They went further by saying that

> urban students are often faced with many extraneous factors such as crime-infested neighborhoods with violence on the streets, leaking roofs, sewage problem and other problems outside the classroom that affects students learning and motivation which invariably and unequivocally has effect on their achievement.

Another study has shown that pupils in the urban centres have well-equipped schools, with rich infrastructures and facilities as well as extra-moral training outside the school. These according to Oriaifor

(1986) as quoted by Joubert (2010), have contributed positively in enhancing their Mathematics achievement level.

Therefore, it is the objective of this study to verify whether there is or no significant difference between Mathematics achievement of pupils in Zaria LGA whose teacher were exposed to teacher-led professional and mentoring support program of the study.

2.12 Implication of Literature Review on the Present Study

On Conceptual Overview of Mathematics, there have been many attempts to reconceptualize the process of teaching mathematics that sees teachers as mere transmitters of knowledge without minding the ability of the teachers' performance in commensurate to the pupils' achievement. The present study emphasized the concretizations of the teaching of Mathematics at the foundation level (Primary Schools) in which the objectives for teaching mathematics concepts are well spelt out so as to make Mathematics pupils' friendly and enhance better achievement in the subject.

It may refer to an actual place where people convene to study and collaborate. It may also have a virtual existence, both in terms of electronic delivery of learning opportunities and the facilitation, support, or brokering of services to enable all teachers to participate. While a virtual component will enhance the professional development center's value and reach,

research shows that the existence of a bricks and mortar home where teachers can convene for learning is greatly desired by almost all teachers (*Member Professional Development Survey*, National Education Association, 1999).

The pages that follow outline a process that state and local teacher associations and their partners can undertake to:

Create a vision for teachers' professional development

Identify the partners who will help to realize the vision

Develop a plan to make the professional development center a reality

Work effectively in partnership for an extended period of time

Reach all teachers

Get results

The greatest challenges to designing professional development centers for the new millennium are finding ways to reach every teacher and embedding the center's work in every school building. To accomplish these goals, new models for professional development centers will have to be established and significant resources dedicated to their design and sustained support. In order to realize a new vision of teaching, the profession must convene the partners and resource providers necessary to provide such development

The review of literature for this study also indicates that so many teaching techniques and learning theories have been advocated as remedies to the persistent teaching and learning difficulties in Mathematics. The literature highlighted the gap between performance of male and female pupils and impact of school location on their performance as well as the difference in performance among the different education zone.

Although present study is partially in agreement with the majority of the findings on the effective ways of improving pupils' achievement in Mathematics, it is however, not in support of the cosmetic treatment that provides solutions to the erring problems at its peripheral level as some of the findings proves to be. The present study Effects of Teacher-Led Professional and Mentoring Support on Pupils' Performance in Mathematics in Zaria Local Government is thus an attempt to provide an in-depth solution to the nagging problems in teaching and learning Mathematics.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter described the design, method and procedure employed in the conduct of this research (Effect of Teacher-led professional and Mentoring Support on Primary School Pupils' Performance in Mathematics in Zaria Local Government). The population, sample and sampling techniques, data gathering techniques, administration and analysis, reliability and validity as well as pilot study were discussed in this chapter.

3.2 Research Design

In an attempt to answer the research questions and to provide solutions to the research hypotheses formulated, the research method used in this study was quasi-experimental method. The choice of this method is dictated by the nature and scope of the research problem being investigated, that is, an investigation technique that combined both administrative program and academic support. Also, since the research is expected to cover several thousand numbers of respondents, it invariably becomes convenient to use the scientific method or approach (Sambo, 2005).

Definitions of scientific method as contained in Microsoft Encarta (2009) use such concepts as objectivity of approach to and acceptability of the results of scientific study. Objectivity indicated the attempt to observe things as they are, without falsifying observations to accord with some preconceived world view. Acceptability is judged in terms of the degree to which observations and experimentations can be reproduced Microsoft Encarta (2009). Scientific method also involves the interplay of inductive reasoning (reasoning from specific observations and experiments to more general hypotheses and theories) and deductive reasoning (reasoning from theories to account for specific experimental results).

Also considering the nature of variables and attributes in the study however, the research design used is quasi-experimental with two group randomized pretest and posttest design (Nworgu, 1991).

The respondents were made up of the teachers who served as the facilitators and the pupils who took the stand of the recipients. The pupils were randomly assign into three groups namely the control groups (C), the experimental group 1 (TLPMS-MCK) and the experimental group 2 (TLPMS-PCK). All the groups were given pretest in order to establish the homogeneity in terms of level of understanding among the pupils. The teachers of the experimental groups were then exposed to the treatment of the study (Teacher-led professional and mentoring support (TLPMS), a collaborative and interactive exchange of pedagogical ideas between the researcher and the teachers). The teachers were categorized according to their qualification as Mathematics Content Knowledge Teachers and Pedagogical Content Knowledge Teachers and their pupils were tagged experimental group 1 (TLPMS-MCK) and experimental group 2 (TLPMS-PCK) respectively.

After the treatment, all the pupils in all the groups were given a posttest to ascertain the effect of the treatments. The research design therefore was Pre-test Post-test design. Symbolically it is represented by chart below

R----------→O11----------→----------→O12

R----------→O21----------→X----------→O22

R----------→O31----------→X----------→O32

Where

R = random assignments into groups

O_{11} = control group pretest observation

X = treatment /three months weekly interactive session with the teachers and mentoring

O_{12} = control group posttest observation

O_{21} = TLPS-MCK experimental group pretest observation

O_{22} = TLPS-MCK experimental group posttest observation

O_{31} = TLPS-PCK experimental group pretest observation

O_{32} = TLPS-PCK experimental group posttest observation

In a quasi- *experiment,* the psychologist or researcher manipulated one factor in a situation—keeping other aspects of the situation constant—and then observes the effect of the manipulation on behaviour/performance. The people whose behaviour was being observed were the *subjects* of the experiment. The factor that an experimenter varied (the effect of the teacher-led professional support on school location, and gender for this study) were the *independent variables,* and the behaviour /performance being measured (the effect on pupils' performance based on MCK and PCK) were called the *dependent variables.* This could still be illustrated with example of a test of the hypothesis that frustration triggers aggression, frustration would be the independent variable, and aggression the dependent variable.

3.3 The Population

The total population of public primary school pupils in Zaria Local Government Authority was sixty seven thousand, one hundred and thirty seven (67137) all from 114 schools (see detail in appendix C). The split down of the population into classes and gender was given in table 3.1 below

Table 3.1 Population of Public Primary Schools Pupils in Zaria LGA

Classes	Gender		Total
	Boys	Girls	
Primary 1	7796(12%)	5999(9%)	13795(21%)
Primary 2	6585(10%)	5761(8%)	12346(18%)
Primary 3	6166(9%)	5388(8%)	11554(17%)
Primary 4	5463(8%)	5551(8%)	11014(16%)
Primary 5	5437(8%)	4501(7%)	9938(15%)
Primary 6	4589(7%)	3901(6%)	8490(13%)
Total	36036(54%)	31101(46%)	67137(100%)

Source: Zaria Educational Zone Statistics 2009

However, the target population for the study comprises of twenty nine thousand four hundred and forty two (29442) pupils of class 4, 5 and 6 in the six Educational District within the Local Government Area. The preference for these classes was based on the fact that the medium of communication in these classes was English Language and this was the language used for the research instrument.

3.4 Sample and Sampling Procedure

In order to limit bias chances, and in order to have a reasonable sample size for a quasi-experimental study of this nature, two techniques of sampling were employed. First, a random sampling technique, followed by systematic sampling technique. Nworgu (1994) noted that samples resulting from these techniques were said to be unbiased and therefore, representative of the population. It was on this note that the present researcher used random sampling technique to arrive at a sample size of 17640 pupils from thirty (30) Schools comprising ninety (90) classes. The schools were randomly selected from all the 144 Schools in the six Educational District (five Schools from each district). All the schools in each

Educational District were numbered serially from 1 to 114. (serial numbers shown by the left side of schools as shown in table 3.2 below)

Table 3.2 Sampled Schools and Pupils Enrolment in Classes 4, 5 and 6

DISTRICTS	SCHOOLS	PUPILS ENROLMENT CLASS 4-6							
		Class 4		Class 5		Class 6		Total	
		M	F	M	F	M	F	M	F
KAURA	1. Nuhu Bayero46	175	120	136	116	117	88	428	324
	2. Shehu Idris Model58	164	149	161	164	121	155	446	468
	3. Sarki Jaafaru57	185	179	161	164	121	155	467	498
	4.Lt.Col.M.M.Jumare40	104	83	76	58	107	75	287	216
	5. Nuhu B.Makaranta45	106	109	83	82	81	68	270	259
T/WADA	6.Baba Ahmed18	219	204	190	195	120	139	529	538
	7.Abdrahman.Mora03	102	108	78	74	70	73	250	255
	8. Bello Aliyu20	86	73	94	63	82	63	262	199
	9. Abubakar Imam06	163	164	142	153	153	165	458	482
	10. Ahmed Gyellesu09	83	96	96	74	88	80	267	250
PADA	11. Sarki Sambo53	160	147	188	183	150	186	498	516
	12.Ahmadu Fatika 08	85	100	120	116	65	70	270	286
	13. A/Karim 02	80	55	86	59	56	79	224	193
	14. J.B.Sambo34	79	90	105	109	88	96	272	295
	15. Turaki Ali 63	75	77	108	69	94	77	277	223
RAFIN ALBASA	16. A.Maccido05	139	118	156	129	132	114	427	361
	17. Wasiri Lawal 65	211	158	152	164	203	120	566	442

	18. Limam Kwaire39	280	135	220	120	226	106	726	361
	19. Dahiru Kanti22	250	66	215	78	39	156	504	300
	20. Aliyu Liman K.76	19	12	7	18	8	16	34	46
ANGWAN DANKATI	21. Adamu B.Dikko07	191	156	138	133	121	124	450	413
	22. Bashir Abubakar19	167	16	89	60	96	66	352	142
	23.Daniel Gowon25	50	50	53	47	39	25	142	122
	24.Gwarg Police Brck90	64	40	42	27	36	21	142	88
	25.Madauchi Bagudu41	61	53	53	28	35	34	149	115
DAMBO	26. Umar Isah64	45	50	62	42	51	41	158	133
	27. S. Nabara52	116	120	110	125	127	114	353	359
	28. A. Fascom12	26	8	25	6	21	2	72	16
	29.Tudun Kusa Nom62.	45	50	62	42	51	41	158	133
	30. B. Nomadic81	35	22	54	35	21	4	110	61
TOTAL		3565	2808	3262	2733	2719	2553	9546	8094

Source: Zaria LGA Educational Zone Statistics (2009)

The sample size was further reduced systematically to 5850 Pupils still from the thirty (30) schools but 30 classes, the samples for the study involve systematical selection of class 4 in school 1, class 5 in school 2 and class 6 in school 3 sequentially to the last school as shown in table 3.3 below.

Table 3.3 Sampling of Schools and Pupils in Classes 4, 5 and 6

DISTRICTS	**SCHOOLS**	PUPILS ENROLMENT CLASS 4-6			
		Class 4	Class 5	Class 6	Total

		M	F	M	F	M	F	M	F
KAURA	1. Nuhu Bayero46	175	120					175	120
	2. Shehu Idris Model58			161	164			161	164
	3. Sarki Jaafaru57					121	155	121	155
	4.Lt.Col.M.M.Jumare40	104	83					104	83
	5. Nuhu B.Makaranta45			83	82			83	82
T/WADA	6.Baba Ahmed18					120	139	120	139
	7.Abdrahman.Mora03	102	108					102	108
	8. Bello Aliyu20			94	63			94	63
	9. Abubakar Imam06					153	165	153	165
	10. Ahmed Gyellesu09	83	96					83	96
PADA	11. Sarki Sambo53			188	183			188	183
	12.Ahmadu Fatika 08					65	70	65	70
	13. A/Karim 02	80	55					80	55
	14. J.B.Sambo34			105	109			105	109
	15. Turaki Ali 63					94	77	94	77
RAFIN ALBASA	16. A.Maccido05	139	118					139	118
	17. Wasiri Lawal 65			152	164			152	164
	18. Limam Kwaire39					226	106	226	106
	19. Dahiru Kanti22	250	66					250	66
	20. Aliyu Liman K.76			7	18			7	18
ANGWAN DANKATI	21. Adamu B.Dikko07					121	124	121	124
	22. Bashir Abubakar19	167	16					167	16
	23.Daniel Gowon25			53	47			53	47
	24.Gwarg Police Brck90					36	21	36	21

	25.Madauchi Bagudu41	61	53					61	53
DAMBO	26. Umar Isah64			62	42			62	42
	27. S. Nabara52					127	114	127	114
	28. A. Fascom12	26	8					26	8
	29.Tudun Kusa Nom62.			62	42			62	42
	30. B. Nomadic81					21	4	21	4
TOTAL		1187	723	967	914	1084	975	3238	2612

Source: Deduced from table 3.2 above

The split down of the sample into classes and gender is given in table 3.4 below

Table 3.4 Sample of Public Primary Schools Pupils in Zaria Educational Zone

Classes	Gender		Total
	Boys	Girls	
Primary 4	1187	723	1910
Primary 5	967	914	1881
Primary 6	1084	975	2059
Total	3238 (55%)	2612(45%)	5850

Source: Deduced from table 3.3 above

Finally, another systematic sampling techniques was used in selecting the one thousand five hundred and eighty five (1585) pupils who served as respondents for the study. The samples were classified as Control Group with four hundred and twenty seven (427) pupils, Experimental Group I (TLPMS-MCK) with four hundred and eighty one (481) pupils and Experimental Group II (TLPMS-PCK) with six hundred and seventy seven (677) pupils. All the three groups were given pre–test and post-test assessment.

Table 3.5 Samples of Experimental and Control Groups (Pupils in Classes 4, 5 and 6)

DISTRICTS		**SCHOOLS**	PUPILS ENROLMENT CLASS 4-6							
			Class 4		Class 5		Class 6		Total	
			M	F	M	F	M	F	M	F
Experimental GroupI	KAURA	Lt.Col.M.M.JumareShehu Idris Model	104	83					104	83
					83	82			83	82
	DAMBO	Tudun Kusa Nom			62	42			62	42
		B. Nomadic					21	4	21	4
TOTAL									270	211
Experimental GroupII	RAFIN ALBASA	Dahiru Kanti	250	66					250	66
		Aliyu Liman K.			7	18			7	18
	T/WADA	Bello Aliyu			94	63			94	63
		Ahmed Gyellesu	83	96					83	96
TOTAL									434	243
Control Group	PADA	Ahmadu Fatika	65	70					65	70
		A/Karim			80	55			80	55
	ANGWAN DANKATI	Daniel Gowon			53	47			53	47
		Gwargwaje Police					36	21	36	21
TOTAL									234	193

Out of the total sample, girls accounted for 41 per cent of enrolment figures, with boys constituting 59 per cent.

Baba Ahmed L.E.A Primary School Tudun-Wada that seemly falls within the centre of the zones was used as the research centre where all the Teachers in the experimental groups converge for exposure to the treatment on weekly bases (Saturdays 9.30AM – 11.30 AM) for three months.

3.5. Instrumentation/Treatment Procedure

An introductory letter for postgraduate research from Department of Education Ahmadu Bello University Zaria (Appendix E), was taken to the Administrative Secretary of Zaria Zonal Education office., After one week deliberation, the secretary ordered the principal executive officer (P.E.O Statistics) to link up the researcher with the teachers and pupils of the sampled schools (Table 3.2).

Baba Ahmed Primary School Tudun Wada was made to be the research centre where the researcher and the participants (Mathematics Teachers) converged on all Saturdays (10AM – 12PM) for a period of three months () the sampled school for the treatment. Mondays through to Fridays intermittently the researcher and his assistants follow up the weekly deliberations with the teachers in their schools.

Out of the six Education Districts, Schools in four of the Districts were made to be Experimental group while the other two were regarded as control group. During the first weekly (Saturday) interactive session, all the Teachers were instructed to prepare 50 items objective questions for their various classes and submit to the researcher under the camouflage that the research ends there so as to avoid interference between the Experimental group and the Control group.

By the second weekly (Saturday) interactive session, the Teachers of the Experimental groups were re-invited and asked to provide their curriculum vitae and credentials (on the directive of the P.E.O in the LGA secretariat). The teachers' qualification and years of experience were analysed to determine their Mathematics Content Knowledge and Pedagogical Content Knowledge respectively.

The 2007 edition of 9-Year Basic Education Curriculum in Mathematics for Primaries 4-6 produced by Nigerian Educational Research and Development Council (Appendix D) was adopted as the duide for the treatment for the study. Two sets of three instruments (test-re-test) was used in this study. A pre-test and post-test for pupils in class 4, 5 and 6 was used by the researcher from harmonized set of questions produced by selected sampled Teachers for the study. Teachers for the three classes were asked to produce 50 items objective questions from where the researcher harmonized and came up with set of

three questions for the three classes as pre-test. The same questions were later reshuffled and re-administered as post-test see appendices B.

3.6 Administration/Scoring of Instrument

At the beginning of the schools' second term (a week after resumption) a pretest questions (Appendix B) consisting of 50 objective items were administered to all the pupils of the 6 sampled schools with support of the classroom teachers and research assistants employed by the researcher while the researcher moves round to inspect.

At the end of the period, the same set of questions were reshuffled and re-administered as post-test (Appendix C) to all the pupils of the 6 sampled schools. still with the support of the classroom teachers and research assistants employed by the researcher while the researcher moves round to inspect the conduct of the examination. The scripts were marked over hundred on the basis of two marks for each item and a mark for an altered correct answer.

3.7 Reliability and Validity of the Instrument

In order to establish the reliability of the scores that was generated from the use of the instrument and determine the validity estimate of the instrument, a pilot study was conducted in Samaru and, Giwa town all of Kaduna state. Four schools were used as trial schools.

Two Schools in Samaru were made to be the Experimental schools, while two Schools from Giwa were made to be the Control schools. The choice of the two Schools in Samaru as the Experimental schools was born out of the facts that the School teachers were earlier subjected to a similar study Olaofe et-al (2008).

Experts from Mathematics Department and Education Department of Ahmadu Bello University Zaria, were served with the instruments for their comment on the content and face validity of the instrument. Their remarks was satisfactory.

Also the results of the two test were subjected to a parallel test reliability estimate and the outcome shows a remarkable reliability estimate of 0.82

3.8 Method of Data Analysis

The data collected from this study were analyzed using two statistical tools viz descriptive and inferential statistics. The descriptive aspect was used to display data generated in terms of frequency distribution, mean, standard deviation and percentage. The inferential aspect was used in analyzing the hypotheses using t-test for null hypotheses 1, 2, 3, 4 and 5; while Analysis of Variance for null hypotheses 6 and 7.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

In this chapter, data are presented, results of research questions highlighted and hypotheses formulated are outlined and the findings thereafter are discussed with respect to post-test given to pupils in classes 4, 5 and 6 of the sampled Schools in Zaria Educational Zone.

4.2 Results

The purpose of this section is to provide empirical evidences for drawing conclusions on the research questions and the null hypotheses raised during the course of study. Analyses and interpretation of the findings for the study were carried out based on the post-tests administered on the control group and the two experimental groups and the conclusions drawn according to the decision rule at 0.05 level of significant.

One thousand five hundred and eighty five (1585) pupils were given pre–test and post-test assessment, among which four hundred and twenty seven (427) are classified as control group NTLPS, four hundred and eighty one (481) pupils are in the Experimental Group I (MCK only) while Experimental Group II (PCK only) have six hundred and seventy seven (677) pupils as shown in table 4.01 below.

TABLE 4.01 Samples of Schools/Pupils in Experimental and Control Groups

DISTRICTS		**SCHOOLS**	PUPILS ENROLMENT CLASS 4-6							
			Class 4		Class 5		Class 6		Total	
			M	F	M	F	M	F	M	F
Experimental GroupI	KAURA	Nuhu Bayero	104	83	-	-	-	-	104	83
		Shehu Idris Model			83	82			83	82
	DAMBO	Tudun Kusa Nom	-	-	62	42	-	-	62	42
		B. Nomadic	-	-	-	-	21	4	21	4
TOTAL			104	83	145	124	21	4	270	211
Experimental GroupII	RAFIN ALBASA	Dahiru Kanti	250	66	-	-	-	-	250	66
		Aliyu Liman K.	-	-	7	18	-	-	7	18
	T/WADA	Bello Aliyu	-	-	94	63	-	-	94	63
		Ahmed Gyellesu	83	96	-	-	-	-	83	96
TOTAL			333	162	101	81	-	-	434	243
Control Group	PADA	Ahmadu Fatika	65	70	-	-	-	-	65	70
		A/Karim	-	-	80	55	-	-	80	55
	ANGWAN DANKATI	Daniel Gowon	-	-	53	47	-	-	53	47
		Gwargwaje Police	-	-	-	-	36	21	36	21
TOTAL			63	70	133	102	36	21	234	193

Mathematics Teachers in Nuhu Bayero LEA and Shehu Idris Model LEA School of Kaura Education District as well as Mathematics Teachers in Tudun Kusa Nomadic LEA and B. Nomadic LEA School of Dambo Education District, possessed Mathematics Content Knowledge. Mathematics Teachers in Dahiru Kanti LEA Schools and Aliyu Liman K. LEA School of Rafin Albasa Education District as well as Mathematics Teachers in Bello Aliyu LEA School and Mathematics Teachers in Ahmed Gyellesu LEA School of Tudun Wada Education District, possessed Pedagogical Content Knowledge.

Table 4.02 below shows samples of school and Pupils' Enrolment in Urban and Rural Areas under study covers only pupils in the experimental groups. The total enrolment of Pupils in Urban area is 688 while the enrolment in rural area is 470

TABLE 4.02 Distribution of Pupils in Experimental Groups by Location

DISTRICTS		SCHOOLS	PUPILS ENROLMENT CLASS 4-6							
			Class 4		Class 5		Class 6		Total	
			M	F	M	F	M	F	M	F
Urban Area	KAURA	Nuhu Bayero	104	83					104	83
		Shehu Idris Model			83	82			83	82
	T/WADA	Bello Aliyu			94	63			94	63
		Ahmed Gyellesu	83	96					83	96
Urban Total									364	324
Rural Area	DAMBO	T/ Kusa Nomadic			62	42			62	42
		B. Nomadic					21	4	21	4
	RAFIN ALBASA	Dahiru Kanti	250	66					250	66
		Aliyu Liman K.			7	18			7	18
Rural Total									340	130

The distribution of the respondents by location shows that 470 pupils are from Tudun Kusa Nomadic LEA School and B. Nomadic LEA Schools of Dambo Education District; Dahiru Kanti and Aliyu Liman K. LEA Schools of Rafin Albasa all in Rural setting. While 688 are from Nuhu Bayero and Shehu Idris Model LEA Schools of Kaura Education District; Bello Aliyu and Ahmed Gyellesu LEA Schools of Tudun Wada Education District are in Urban area

4.3 Answers to Research Questions:

In order to establish the existence or otherwise of homogeneity among all the pupils engaged and to provide answers to the research questions raised in the study, descriptive analyses was used in computing the results as shown in the tables corresponding to each question below

Table 4.03 Descriptive Statistics for difference between pre-test of control and experimental (MCK and PCK) **groups**

Groups	N	Mean	Std Deviation
Control	427	45.27	15.36
Experimental(MCK and PCK)	1158	42.44	13.70

Summary of the computation in table 4.03 above showed that there was no much difference between the mean score of the control group and the combined experimental groups, the mean score and standard deviation for control group was 45.27 and 15.36 respectively while the combined experimental group being respectively 42.44 and 13.70. The mean and standard deviation indices shown in table 4.03 above are indication that there was homogeneity in level of mathematical performances among all the pupils before the treatment.

Research Question 1

What is the difference between the mathematics performance of Pupils whose Teachers were exposed to the treatment of Teacher-Led Professional and Mentoring Support for Teaching and Learning Mathematics and those whose teachers are not exposed to the treatment?

Table 4.04 Descriptive Statistics in post-test mathematics performance between control and experimental (MCK and PCK) **groups**

Groups	N	Mean	Std Deviation
Control	427	47.58	15.36

Experimental(MCK and PCK)	1158	82.30	9.57

The post-test analysis on research question 1 was to determine the effect of the treatment on the experimental groups. The result as contained in table 4.4 shown above, had a slight difference in mean and standard deviation scores of 47.58 and 15.36 respectively for control group when compared with the scores in the pre-test. However, there was a wide difference in the statistics for the experimental groups during the pre-test and the post-test, could have been as a result of the treatment to be affirm by the test of hypothesis 1.

Research Question 2

What are the differences between the Mathematics performance of boys and girls whose teacher were exposed to Teacher-Led Professional and Mentoring Support program

Table 4.05 Descriptive Statistics for difference in post-test mathematics performance between male and female (in combined MCK and PCK)

Groups	N	Mean	Std Deviation
Boys	704	73.00	14.36
Girls	454	71.72	13.94

Table 4.05a gives a breakdown of the mathematics performance between male and female pupils whose teachers had an exposure to Teacher-Led Professional Support and Mentoring program. From the table there is a close difference in the performance of the two groups (male and female pupils) with an overall average scores of the two groups being 73.00 and 71.72 for male and female respectively. Even though,

there exist slight difference between male and female pupils' performance in mathematics, the variation in their scores looks insignificant with standard deviation 14.36 and 13.94 respectively for male and female. However, whether the differences were significant or not, a probe into the null hypothesis Ho_2 has cleared the doubt as can be seen in table 4.5b below.

Research Question 3

What are the differences between the Mathematics performance of Pupils in the Control Group and Pupils in the Experimental Group in the Post-test of Teacher-Led Professional Support and Mentoring program

Table 4.06 Descriptive Statistics for difference in post-test mathematics performance between Control Group and Experimental Group 1 (MCK only)

Groups	N	Mean	Std Deviation
Control	427	47.58	15.36
Experimental 1(MCK only)	481	72.50	12.70

Table 4.06 shows that the mean performance in the post-test for 427 pupils in the control group and their standard deviation stood at 47.58% and 15.36 respectively. The 481pupils in the experimental group1 had a mean performance in the post-test as 82.30% and the standard deviation was 9.57. The difference in performance between Control Group and Experimental Group 1 in the study as shown in table 4.6a above did not strongly point out any glaring distinction. However, the significance of this difference was more pronounced in the analysis of null hypothesis Ho_3.

Research Question 4

What are the differences between the Mathematics performance of Pupils in the Control Group and Pupils in the Experimental Group 2 in the Post-test of Teacher-Led Professional and Mentoring Support Program

Table 4.07 Descriptive Statistics for difference in post-test mathematics performance between Control Group and Experimental Group 2 (PCK only)

Groups	N	Mean	Std Deviation
Control	427	47.58	15.36
Experimental 2 (PCK only)	677	60.12	7.27

There were 427 pupils in the control group and their mean performance in the post-test and standard deviation stood at 47.58% and 15.36 respectively. The pupils in the experimental group2 were all 677, the mean performance also in the post-test was 60.12% and the standard deviation was 7.27. The difference in performance between Control Group and Experimental Group 2 in the study as shown in table 4.7 above is somehow glaring, but the significance of this difference was more determined through hypothesis Ho_4.

Research Question 5

What are the differences between the Mathematics performance of Pupils in the Experimental Group 1 and Pupils in the Experimental Group 2 in the Post-test of Teacher-Led Professional Support and Mentoring program

Table 4.08

Descriptive Statistics for difference in post-test mathematics performance between Experimental Group 1 (MCK only) **and Experimental Group 2** (PCK only)

Groups	N	Mean	Std Deviation
Experimental 1(MCK only)	481	72.50	12.70
Experimental 2 (PCK only)	677	60.12	7.27

Table 4.08a shows at a glance the difference that existed between the two groups of experimental group1and experimental group2. with the former having a total of 481 pupils and their mean performance in the post-test as well as standard deviation been 82.30% and 9.57 respectively and pupils in the later were all 677, their mean performance also in the post-test was 60.12% and the standard deviation was 7.27. However, the extent of the significance of this difference was established in hypothesis Ho_5.

Research Question 6

What are the differences in the Mathematics performance of Pupils in the four Educational Districts in the Post-test of Teacher-Led Professional and Mentoring Support program

Table 4.09

Descriptive Statistics for difference in post-test mathematics performance among Experimental Groups (combined MCK and PCK) **in the four educational districts**

Educational Districts	N	Mean	Std Deviation
Kaura	352	87.62	9.26
Dambo	129	76.98	7.24
Rafin Albasa	341	58.42	6.36
T/Wada	336	61.82	7.48

Table 4.09 provided answer for the research question 6 above. It is amazing that Dambo Educational District where the nomadic schools are located recorded second to the highest mean score of 76.98% with a standard deviation of 7.24, Kaura Educational District came first with mean score of 87.62% and standard deviation of 9.26. T/Wada, the business centre of the local Government Area had a mean score of 61.82 and standard deviation of 7.48, while Rafin Albasa, which is a remote rural settlement, recorded the least mean score of 58.42 and standard deviation of 6.36. However, whether the differences in the mean scores were of significant value led the researcher to further subject the data to an 'f' test as null hypothesis six.

4.4 Test of Hypotheses

Null Hypothesis Ho_1: There is no significant difference in the mean performance of pupils whose Teachers were exposed to Teacher -Led Professional and Mentoring Support and those whose Teachers were not exposed to Teacher-Led Professional and Mentoring Support

Table 4.10

t-test statistics for difference in post-test mathematics performance between control and experimental (MCK and PCK) **groups**

Groups	N	Mean	Std Deviation	Df	t-test	p-value	decision
Control	427	47.58	15.36	1583	-30.95	0.000	Reject $H0_1$
Experimental	1158	82.30	9.57				

The computation of the t-test statistics for hypothesis1 is summarized in table 4.10 above. The table provided the result of t-test in respect of Ho_1, as mean score for the control group and the combined experimental group been respectively 47.58 and 82.30, the standard deviation for the two groups stood at 15.36 and 9.57 respectively. The degree of freedom (df), t-test and the p-value at the alpha level 0.05 were obtained to be 1583, -30.95 and 0.000 respectively. Therefore, going by the decision rule, $H0_1$ was rejected. The implication here is that there exist significant difference between the control group and experimental group.

Null Hypothesis Ho_2 There is no significant difference in the mean mathematics performance of male pupils and female pupils whose teachers were exposed to Teacher-Led Professional Support and Mentoring

Table 4.11

t-test statistics for difference in post-test mathematics performance between male and female (in combined MCK and PCK)

Groups	N	Mean	Std Deviation	Df	t-test	p-value	Decision
Boys	704	73.00	14.36				

Girls	454	71.72	13.94	1156	1.35	0.176	Retain $H0_2$

The degree of freedom was 1156 and the computed t-test as well as p-value stood at 1.35 and 0.176 respectively. Going by the decision rule, $H0_2$ was Retained. The implication here is that there was no significant difference between the performance boys and girls in the study.

Null Hypothesis Ho_3 There is no significant difference in the Mathematics performance of Pupils in the Control Group and Pupils in the Experimental Group in the Post-test of Teacher-Led Professional Support and Mentoring program

Table 4.12

t-test statistics for difference in post-test mathematics performance between Control Group and Experimental Group 1 (MCK only)

Groups	N	Mean	Std Deviation	df	t-test	p-value	Decision
Control	427	47.58	15.36	906	-40.30	0.000	Reject $H0_3$
Experimental 1(MCK only)	481	72.50	12.70				

The degree of freedom was 906 and the computed t-test as well as p-value stood at

-40.3 and 0.000 respectively. Going by the decision rule, $H0_3$ was Rejected. The implication here is that there was significant difference between the performance of pupils in the control group and those in the experimental group1 in the study. That is the possession of Mathematics Content Knowledge in conjunction with Teacher-led professional and Mentoring Support played significant role in influencing mathematics performance of pupils under study.

Null Hypothesis Ho_4 There is no significant difference in the Mathematics performance of Pupils in the Control Group and Pupils in the Experimental Group2 in the Post-test of Teacher-Led Professional Support and Mentoring program

Table 4.13 t-test statistics for difference in post-test mathematics performance between Control Group and Experimental Group 2 (PCK only)

Groups	N	Mean	Std Deviation	df	t-test	p-value	Decision
Control	427	47.58	15.36	1102	-14.00	0.000	Reject $H0_4$
Experimental 2(PCK only)	677	60.12	7.27				

The computation of t-test statistics for difference in post-test between control and experimental group is summarized in table 4.13 in respect of hypothesis 4 (Ho_4). The degree of freedom stood at 1102 for the two groups, the computed t-test at 0.05 alpha-value and the probability value were respectively -14.00 and 0.000.

Going by the decision rule that when p-value falls less than alpha-value, the hypothesis under question is rejected. Therefore, hypothesis 4 (Ho_4) is rejected which implies that there exist significant difference between the performance of pupils whose teachers possessed Pedagogical content knowledge and those whose teachers were not exposed to the treatment of teacher-led professional and mentoring support program.

Null Hypothesis Ho_5 There is no significant difference in the Mathematics performance of Pupils in the Experimental Group 1 and Pupils in the Experimental Group 2 in the Post-test of Teacher-Led Professional Support and Mentoring program

Table 4.14 t-test statistics for difference in post-test mathematics performance between Experimental Group1(MCK only) **and Experimental Group 2** (PCK only)

Groups	N	Mean	Std Deviation	Df	t-test	p-value	Decision
Experimental1 (MCK only)	481	72.50	12.70	1156	38.34	0.000	Reject $H0_1$
Experimental2 (PCK only)	677	60.12	7.27				

Table 4.14 provides the result of t-test in respect of hypothesis 5 (Ho_5). The degree of freedom stood at 1156 for the two groups, the computed t-test at 0.05 alpha-vale and the probability value were respectively 38.34 and 0.000.

Going by the decision rule that when p-value falls less than alpha-value hypothesis under question is rejected. Therefore, the hypothesis 5 (Ho_5) is rejected which implies that there exist significant difference between the performance of pupils whose teachers possessed Mathematics content knowledge and those whose teachers possessed pedagogical content knowledge in conjunction with teacher-led professional and mentoring support program.

Null Hypothesis Ho_6 There is no significant difference in the mean Mathematics performance of pupils from the four Educational Districts within Zaria Local Government Area after the post-test of Teacher-Led Professional and Mentoring Support for Teaching and Learning Mathematics.

TABLE 4.15 Analysis of Variance for Mathematics Performance of Pupils in the four Educational District

Source	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	11027.788	3	3675.929	20.074	.000
Within Groups	211319.100	1154	183.119		
Total	222346.888	1157			

Table 4.15 shows the test of significant difference among the performance of pupils in Mathematics in the four educational districts. At the alpha level of 0.05 and with the degree of freedom (df) 3, 1154 and 1157 for between group, within group and residual respectively, the f-test stood at 20.074 and the probability value been 0.000. Therefore, going by the decision rule, the null hypothesis is rejected which implies that there exist significant difference in the mean Mathematics performance of pupils from the four Educational Districts.

With the result from hypothesis 6 above, it becomes necessary to verify where the difference lies. Hence there is need to re-subject the data on educational districts to a post hoc analysis, in which case the researcher decided to use Tukey HSD test and Scheffe for the avoidance of doubt.

TABLE 4.16 Post Hoc Analysis for Difference in

Mathematics Performance of Pupils in the four Educational District

Educational Districts	Mean Difference	Sig.	95% Confidence Interval	
			Lower Bound	Upper Bound

Scheffe	KAURA	DAMBO	10.64	.487	-1.7259	6.0725
		RAFIN ALBASA	29.20*	.000	4.7082	10.4654
		T/WADA	25.80	.458	-1.2251	4.5538
	DAMBO	KAURA	-10.64	.487	-6.0725	1.7259
		RAFIN ALBASA	18.56*	.002	1.4975	9.3295
		T/WADA	15.16	.988	-4.4329	3.4151
	RAFIN ALBASA	KAURA	-29.20*	.000	-10.4654	-4.7082
		DAMBO	-18.56*	.002	-9.3295	-1.4975
		T/WADA	-3.40*	.000	-8.8346	-3.0103
	T/WADA	KAURA	-25.80	.458	-4.5538	1.2251
		DAMBO	15.16	.988	-3.4151	4.4329
		RAFIN ALBASA	3.40*	.000	3.0103	8.8346

However, the researcher decided to use both Tukey HSD test and Scheffe's test as the post hoc analysis as displayed in table 4.10. These are used to determined point of significant among the groups. The results indicated that there was significant difference between the Mathematics performance of pupils from Kaura and Rafin Albasa, Dambo and Rafin Albasa as well as Rafin Albasa and Tudun wada Educational Districts.

Also, the table shows no significant difference between the Mathematics performance of pupils from Kaura and Tudunwada, Dambo and Tudunwada as well as Rafin Albasa and Tudun wada Educational Districts.

4.4 Discussion of The Result:

From the data analysed in this chapter, it was revealed that there exist significant difference between the control group and experimental group. Which implies that, the performance of pupils whose teachers were exposed to the treatment of Teacher-led professional and mentoring support on the Mathematics Performance of Public Primary School Pupils in Zaria Local Government Area was better than the performance of pupils whose teachers were not exposed to the treatment.

The study revealed that there was no significant difference between the performance of boys and girls. Also there was significant difference between the performance of pupils in the control group and those in the experimental group1 that is there exist significant difference between the performance of pupils whose teachers possessed Pedagogical content knowledge and those whose teachers were not exposed to the treatment of teacher-led professional and mentoring support program.

The study also unfold the fact that there was significant difference between the performance of pupils in the control group and those in the experimental group2. That is to say, there exist significant difference between the performance of pupils whose teachers possessed Mathematics content knowledge and those whose teachers were not exposed to the treatment of teacher-led professional and mentoring support program.

Furthermore, the study revealed that there was significant difference between the performance of pupils in the experimental group1 and those in the experimental group2. There also existed significant difference in the mean Mathematics performance of pupils from the four Educational Districts as analysed in hypothesis 6.

Many implications could be drawn from these findings. For instance the teachers who possessed pedagogical and mathematics content knowledge and had exposure to the training of teacher-led

professional and mentoring support impacted better knowledge of Mathematics to their pupils, Barber, Heal and Martyn (2002),

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS`

5.1 Introduction

This chapter gives summary of the study. Based on the research findings, conclusion were drawn and recommendation was made. The study looked into the effects of Teacher-Led Professional and Mentoring Support on the Mathematics performance of Pupils in Public Primary Schools in Zaria Local Government Area. Special emphasis was placed on the two basic component features of the study, Mathematics Content Knowledge and Pedagogical Content Knowledge in which the features served dual purposes in the study. Both Mathematics Content Knowledge and Pedagogical Content Knowledge were separately compared to determine the impact of teachers' preparedness on their pupils performance. The two features were also combined to form bases on which other analyses were drawn.

Based on the data gathered from all the post-test, six research questions and corresponding six null hypotheses were formulated for the study, the research questions were answered and the six hypotheses were tested at a significant level of 0.05. Null hypotheses 1, 2, 3, 4 and 5 were tested using t-test statistics while hypothesis 6 was tested using analysis of variance (ANOVA) and post hoc analysis, Scheffe test was used to determine point of difference after anlysing hypothesis six. The summary of the major findings is given in section 5.2 below.

5.2 Summary of Findings

After analyzing the data, the following were the major findings:

(a) The performance of pupils whose teachers were exposed to the treatment of Teacher-led Professional and Mentoring support out beat the performance of pupils

whose teachers are not exposed to the treatment of Teacher-led Professional and Mentoring support

(b) In like manner, there was no significant difference between the performance boys and girls whose teachers got the treatment of Teacher-led Professional and Mentoring support

(c) The performance of pupils whose teachers possessed Mathematics content knowledge differs significantly from the performance of pupils whose teachers were not exposed to the treatment of teacher-led professional and mentoring support

(d) Also the performance of pupils whose teachers possessed Pedagogical content knowledge differs significantly from the performance of pupils whose teachers were not exposed to the treatment of teacher-led professional and mentoring support

(e) Performance of pupils whose teachers possessed Mathematics content knowledge was higher than the performance of pupils whose teachers possessed pedagogical content knowledge

(f) Regional influence also played significant role in the mean Mathematics performance of pupils from the four Educational Districts.

5.3 Conclusion

Based on the findings of the study, the following conclusion could be drawn.

The performance of pupils hinges on their teachers exposure to interactive training or developmental program. As evident from the findings, pupils whose teachers were exposed to the treatment of teacher-led professional and mentoring support had an average score of 72.4367 as against the average score of 47.5753 for pupils whose teachers did not get exposure for the training. Also contrary to the

general believe that Mathematics is a masculine subject, the study here unfolded that boys and girls performed equally.

However, it was noticed that knowledge of subject matter played prominent role in mathematics performance of pupils than the methodology for teaching the subject.

Finally, influence of school location and environment had significant impact on pupils' performance in mathematics as could be seen from the result of the study.

5.4 Recommendations

Based on the findings made in this study, the following recommendations are advanced

1. The ministry of education should introduce periodic developmental programs like teacher-led professional and mentoring support/program that will enhance Collaborative, Interactive and Cooperative Teaching strategies for teachers of mathematics from the same school and from different schools. This will univocally address the persistent teaching and learning difficulty faced in primary school Mathematics,
2. Since teachers of primary schools within the scope of the study are made to teach all core subjects, curriculum designers and headmasters need to be guided to incorporate inter-school and intral-school collaborative teaching in Mathematics scheme of work.

3 The study is recommending that a period should be created for interactive session in the form of mathematical games or quize among the pupils and their teacher so as to develop interest of pupils in Mathematics and make the teachers have professional sense of belongingness in teaching the subject.

4 Text book publishers are also advised to localize the content of their books (avoid the use of foreign examples) since some of the mathematics teachers in primary schools do not posses subject content knowledge and pedagogical content knowledge.

5 The researcher is also recommending that fellow researchers can exploit this study for further researches on the topic in other level as well as higher level, and in other subjects.

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APPENDIX A

FEDERAL GOVERNMENT OUTCRY OF CRISIS IN EDUCATION

FEDERAL MINISTRY OF EDUCATION

WE CAN!

CR!SIS

The State of the Nigerian Education System

A Presentation by the
Federal Ministry of Education

February 2007

APPENDIX B

PRIMARY MATHEMATICS ACHIEVEMENT TEST

SECTION A: PRIMARY FOUR - SIX MATHEMATICS PRE - TEST

INSTRUCTIONS: ATTEMPT ALL QUESTIONS (tick √ the correct answer)

TIME ALLOWED **1Hour 30minutes**

(EACH QUESTION CARRIES 2 MARKS)

Q1. Which of the following is a prime number?

(A) 4 (B) 5 (c) 6 (D) 8 (E) 9

Q2. What is the square root of 16?

(A) 16 (B) 8 (C) 7 (D) 6 (E) 4

Q3. Add together 0.60, 7, 21, 18 and 3

(A) 0.3178 (B) 3.178 (C) 31.78 (D) 317.8
(E) 3178

Q4. The factors of 24 are

(A) 2, 3, 5, 6, 8, 12, 24

(B) 2, 3, 4, 6, 12, 20

(C) 3, 4, 6, 8, 12, 15, 24

(D) 2, 4, 5, 6, 8, 9, 24

(E) 2, 3, 4, 6, 8, 12, 24

Q5. The highest common factor of 12, 30, 42 and 72 is

(A) 12 (B) 6 (C) 4 (D) 3 (E) 2

Q6. The least common multiple of 50, 15 and 6 is

(A) 150 (B) 300 (C) 450 (D) 600
(E) 4500

Q7. Multiply 0.0803 by 1000

(A) 803003 (B) 80303 (C) 803 (D) 80.3 (E) 8.03

Q8. A woman bought 200 oranges and sold 40% of them on the market day. How many oranges would she have left?

(A) 20 oranges (B) 50 oranges (C) 120 oranges

(D) 160 oranges (E) 240 oranges

Q9. A man's average speed is 36km/h. How far will he travel in 35 mins?

(A) 36 km (B) 35 km (C) 21 km (D) 18km (E) 7 km

Q10. Two boys aged 6 yrs and 9 yrs shared ₦ 300 in the ratio of their ages. How much did the older boy received?

(A) ₦ 250 (B) ₦ 200 (C) ₦ 180 (D) ₦ 120

(E) ₦ 100

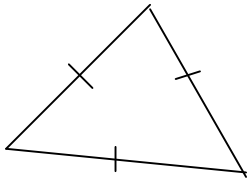
Q11 Simplify 81 + 27– 48 ÷ 4

(A) 98 (B) 96 (C) 44 (D) 42 (E) 15

Q12 The formular L x B x H is used in finding _ _ _ _ of some cuboids

(A) angle (B) area (C) number (D) perimeter (E) volume

Q13 The figure below is



(A) Equilateral triangle (B) Isosceles triangle

(C) Obtuse triangle (D) Right-angled triangle

(E) Scalene triangle

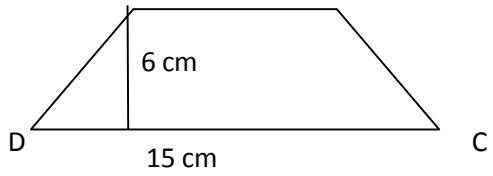
Q14 Simplify $2\frac{1}{3} \div 1\frac{1}{4} + 3\frac{1}{3}$

(A) $11\frac{1}{2}$ (B) $8\frac{2}{5}$ (C) $6\frac{5}{12}$ (D) $5\frac{1}{5}$ (E) $\frac{3}{19}$

Q15

A 10cm B

100



Find the area of the trapezium ABCD above

(A) 31cm^2 (B) 75 cm^2 (C) 105 cm^2 (D) 210 cm^2

(E) 150 cm^2

Q16 What is the place value of 7 in the number 345.79?

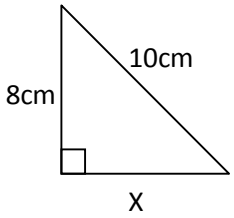
(A) 7 hundred (B) 7 tens (C) 7 units (D) 7 tenths

(E) 7 hundredth

Q17 10 minutes past 8 should be written as

(A) 1:08 (B) 1:80 (C) 8:10 (D) 10:8 (E) 81:0

Q18 Calculate the value of X in the figure below



(A) 164 (B) 36 (C) $\sqrt{164}$ (D) $\sqrt{80}$

(E) 6

Q19 If r = 4, s = 3 and t = 2. Find the value of $\frac{3r+s-t}{2}$

(A) 2 (B) 4 (C) $6\frac{1}{2}$ (D) $8\frac{1}{2}$ (E) 13

Q20 Express in figure the roman numeral MCDIX

(A) 1609 (B) 1490 (C) 1409 (D) 1299 (E) 1099

Q21 Find the principal which yield simple interest of ₦55.50 for $1\frac{1}{2}$ yrs

at the rate of 2%

(A) ₦2775.50 (B) ₦1905.50 (C) ₦1850.00

(D) ₦1794.50 (E) ₦1665.00

Q22 The average of the following numbers 12, 40, x, 60 and 20 is 36 find x

(A) 14 (B) 28 (c) 48 (D) 52 (E) 68

Q23 The length of a rectangle is three times its breadth. If the perimeter is 56 cm, find the length of the rectangle

(A) 7cm (B) 14cm (C) 20cm (D) 21cm (E) 28cm

Q24 A line that divided a circle into two equal parts is called

(A) arc (B) diameter (C) perimeter

(D) radius (E) semi-circle

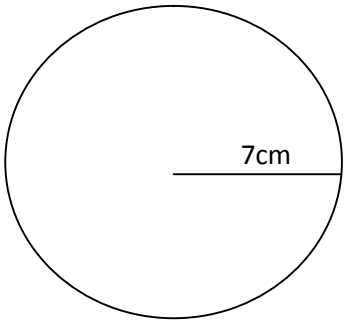
Q25 In what time will ₦640 yield ₦64 interest at the rate of 5% P.A

(A) 4yrs (B) 3yrs (C) 2yrs (D) 1yr 6months (E) 1yrs

Q26 Change $3\frac{1}{2}$ days into hours

(A) 42hrs (B) 72hrs (C) $72\frac{1}{2}$ hrs (D) 84hrs (E) 148hrs

Q27 Find the circumference of the circle below (take $\pi = \frac{22}{7}$)



(A) 24cm (B) 32cm (C) 36cm (D) 40cm (E) 44cm

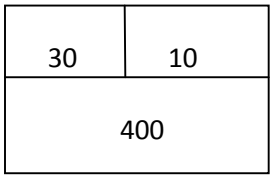
Q28 What is the capacity of a kerosene tank measuring 6m by 5m by 4m

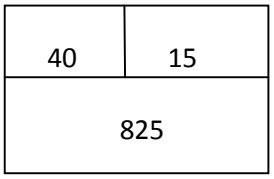
(A) 120000litres (B) 12000litres (C) 1200litres (D) 120litres (E) 12litres

Q29 A rope is 200meters long. If 35% of the total length is cut off calculate the length of the remaining part of the rope.

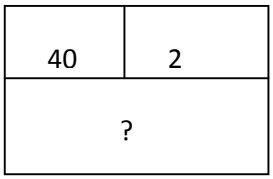
(A) 65m (B) 70m (C) 100m (D) 130m (E) 165m

Use the sample below to answer questions 30 – 33



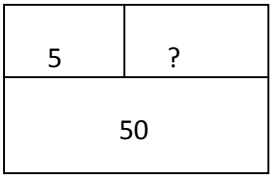


Q30



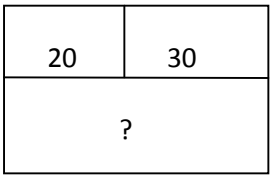
(A) 64 (B) 68 (C) 74 (D) 84 (E) 92

Q31



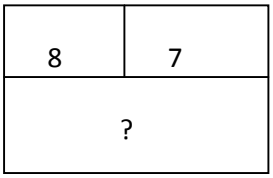
(A) 3 (B) 5 (C) 13 (D) 19 (E) 25

Q32



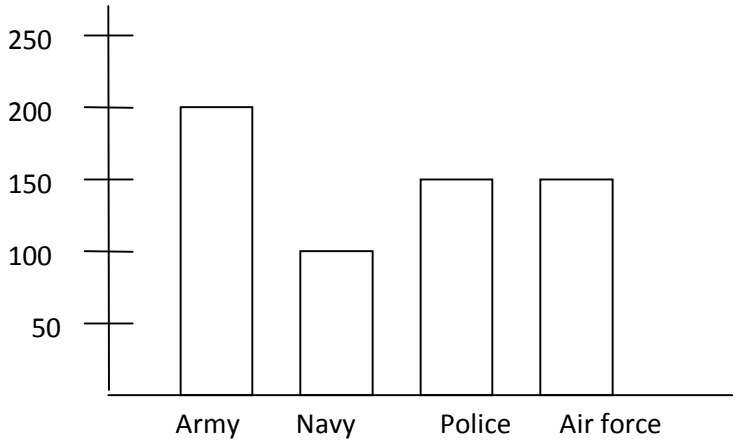
(A) 1500 (B) 1000 (C) 850 (D) 720 (E) 144

Q33



(A) 95 (B) 100 (C) 105 (D) 110 (E) 115

Use the below bar chart to answer questions 34 - 36



Q34 How many men are there in the Army more than in the Police?

(A) 200 (B) 100 (C) 50 (D) 40 (E) 20

Q35 What is the total population of men in the Army, Air force and Navy altogether.

(A) 450 (B) 420 (C) 400 (D) 220 (E) 200

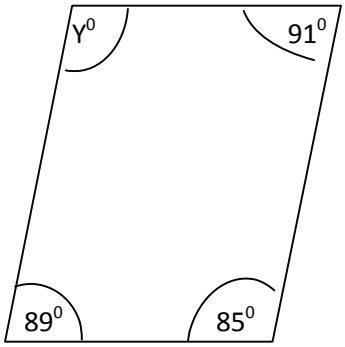
Q36 From the above bar chart, which of the forces is most populated?

(A) Air-force (B) Army (C) Police (D) Navy (E) None

Q37 $\frac{42}{T} = \frac{21}{2}$. What is the value of T^2

(A) 84 (B) 21 (C) 16 (D) 8 (E) 4

Q38 Calculate the size of the marked angle with letter y in the diagram below



. (A) 254^0 (B) 175^0 (C) 105^0 (D) 95^0
(E) 85^0

If the word PLEASANT is represented by the number 56781843 use this to answer the questions 39 - 41.

Q39 What number is represented by the word STATE ?

(A) 38371 (B) 83713 (C) 13837 (D) 37138 (E) 71383

Q40 What word does number 5867 represent?
(A) PATE (B) PLAT (C) SALE (D) LANE (E) PALE

Q41 What number is represented by the word SLEEP ?

(A) 16775 (B) 15667 (C) 14567 (E) 15467 (E) 13414

Q42 IF x + 35=350, what is the value of X ?

(A) 385 (B) 315 (C) 300 (D) 150 (E) 100

Q43 The weight of a dog is $6\frac{3}{4}$ kg. If it starts loosing weight by 125g every week, after how many weeks will be down to $5\frac{1}{2}$ kg?

(A) 6 (B) 8 (C) 10 (D) 12 (E) 14

Q44 Express 31010 in word.

(A) Thirty thousand and ten

(B) Thirty one thousand one hundred and ten

(C) Thirty one thousand and ten

(D) Three hundred ten thousand and ten

(E) Three thousand one hundred and ten

Q45 Simplify $\frac{0.1}{0.001}$

(A) 1 (B) 10 (c) 70 (D) 100 (E) 10000

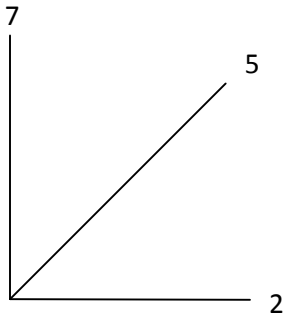
Q46 The scale of a map is 1cm to 15km. What is the distance on land if the length from point P to point Q on the map is 20cm?

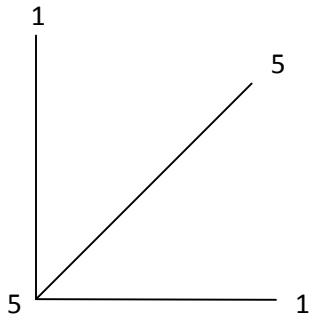
(A) 100km (B) 150km (C) 250km (D) 300km (E) 350km

Q47 Calculate the sum of the mean and mode of the set of scores; 2, 1, 1, 4, 2, 2

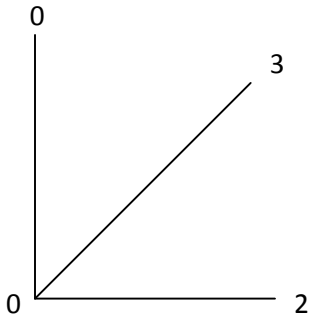
(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

Use the samples below to solve questions 48 – 50

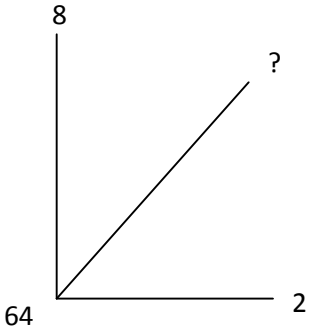




70

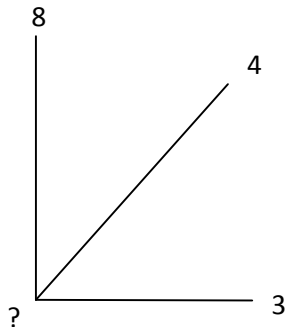


Q48



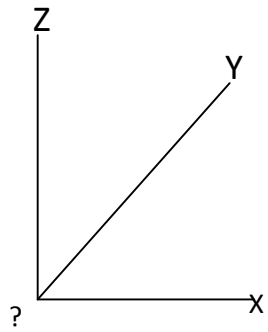
(A) 4 (B) 6 (C) 7 (D) 8 (E) none of the above

Q49



(A) 32 (B) 96 (C) 81 (D) 91 (E) 100

Q50



(A) X^2YZ (B) XY^2Z (C) XYZ (D) XYZ^2 (E) 3XYZ

APPENDIX C

SECTION B: PRIMARY FOUR -SIX MATHEMATICS POST-TEST

NAME OF SCHOOL_____

INSTRUCTIONS: ATTEMPT ALL QUESTIONS

(EACH QUESTION CARRIES 2 MARKS)

TIME ALLOWED 45 MINUTES

Q1 If a packet of biscuit cost ₦120:50kobo, find the cost of 4 packets

(A) ₦400 (B) ₦420 (C) ₦432 (D) ₦482 (E) ₦540

Q2 The figure below is a magic square, copy and complete the

table

(A) 7cm (B) 14cm (C) 35cm (D) 42cm (E) 49cm

Q3. Approximate 0.001528 to 3 significant figures.

(A) 0.00001 (B) 0.00200 (C) 0.00150

(D) 0.00153 (E) 0.00152

Q4. If 2 coins are thrown at once, what is the probability

Of getting 2heads or 2 tails?

(A) ¼ (B) ½ (C) $^{3}/_{4}$ (D)1 (E) 2

Q5. Change $79_{ten}$to binary number.

(A) 1111001 (B) 1011111 (C) 1001111

(D) 1000111 (E) 1000111

Q6. What is the value of 20–35+8-18?

(A) -25 (B) -10 (C) -5 (D) +19 (E) + 29

Q7. Write 1999 in roman numeral.

(A) MCMXCIX (B) MCMCIX (C) CMXCIX

(D) MXCIX (E) MCMXCI

Q8. Estimate the number of square tiles of size 12cm

Needed to cover a rectangular floor 8m by 6m

(Give your answer to the nearest whole number).

(A) 4000 (B) 3300 (C) 3333 (D) 2340 (E) 2000

Q9. Factorize Y^2+2Y-15.

(A) (Y+3)(Y+5) (B) (Y-3)(Y+5) (C) (Y-3)(Y-5)

(D) (Y+3)(Y-5) (E) (Y+2)(Y-15)

Q10. Examine the number pattern,1,4,9,16.what is the next

Number?

(A) 20 (B) 25 (C) 30 (D) 36 (E) 49

Q11. Solve for x in 5x < 8-3x.

(A) x>4 (B) x>1 (C) x >0 (D) x<1 (E) x<4

Q12. An edge of a plane figure is define as the

(A) Point where two places meet.

(B) Point where two faces join.

(C) Line where two faces join.

(D) Position where two faces meet.

(E) Area where two faces join.

Q13. Simplify p-15p-5p-2p+25p.

(A) -47p (B) -4p (C) +3p (D) +4p (E) +47p

Q14 Which of the following numbers is NOT a perfect square.

(A) 25 (B) 36 (C) 49 (D) 56 (E) 64

Q15 A boy bought a book for ₦ x . He sold it for N60.

What was his profit?

(A) ₦ (60 + x) (B) ₦ (60 - x) (C) ₦ (x + 60)

(D) ₦ (x - 60) (E) ₦ 60x

Q16. Which of these angles is reflex angle?

(A) 35^0 (B) 80^0 (C) 95^0 (D) 105^0 (E) 230^0

Q17. An envelope costs ₦q and a pen costs 14 kobo

More than an envelope. Find the cost of an envelope

and a pen in kobo.

(A) (100q + 14) kobo (B) (100q + 14q) kobo (C) (200q + 14) kobo

(D) (200 + 14q) kobo (E) (200 - 14q) kobo

Q18. Express $\sqrt{\frac{144}{49}}$ in decimal form correct to two places

of Decimal.

(A)1.71 (B) 2.71 (C) 3.71 (D) 7.71 (E) 12.71

Q19. 15 is divided by the sum of 2 and n. If the result

Is 3, what is the value of n?

(A) $^1/_3$ (B) 3 (C) $4^1/_2$ (D) 6 (E) 9

Q20. Find the supplement of angle 108^0.

(A) 72^0 (B) 60^0 (C) 52^0 (D) 28^0 (E) 18^0

Q21. Factorize $2x^2$ -3x + 2x -3.

(A) (2x + 3) (x + 1) (B) (2x - 3) (x + 1) (C) (2x - 3) (x -1)

(D) (x - 3) (x + 1) (E) (x - 3) (x - 1)

Q22, When a bottle is $^5/_8$ full, the content is 6.25 ml.What will be the content when full?

(A) 1.25ml (B) 3.75ml (C) 5.00ml (D) 10.00ml (E) 12.25ml

Q23. If (b-2) is a factor of $5b^2 – 10b + 3b – 6$, what is The other factor?

(A) (5b + 3) (B) (5b - 3) (C) (3b + 5) (D) (3b - 5) (E) (3 – 5b)

Q24. If the area of a given square is $625cm^2$, find the Perimeter of the square.

(A) 40cm (B) 50cm (C) 80cm (D) 100cm (E) 135cm

Use the following table of values for Y=2x + 1 to Answer question 25 to 27.

x	0	1	2	3	4
Y	A	3	B	7	C

Q25 Obtain the value of $a^2 - b^2$.

(A) +36 (B) +28 (C) +10 (D) -36 (E) -24

Q26. Factorize and Evaluate: $\sqrt{b^2 + 4b + 4}$.

(A) 49 (B) 39 (C) 29 (D) 17 (E) 7

Q27. Simplify $\frac{(a+c)^2}{b^2}$

(A) 2 (B) 4 (C) 5 (D) 20 (E) 25

Q28. Approximate 2954 to two significant figures.

(A) 29 (B) 2000 (C) 2900 (D) 2950 (E) 3000

Q29. Find the L.C.M of 9,12 and 15.

(A) 100 (B) 108 (C) 120 (D) 180 (E) 200

Q30. If the sum of a seat of scores is 225 and these scores are 30 in number. Find their ean. (A) 9.5 (B) 8.5 (C) 7.5 (D) 6.5 (E) 5.5

Q31 Make I the subject of the formula. If $W = I^2 R$.

(A) $\left(\frac{W}{R}\right)^2$ (B) $\pm\frac{W}{R}$ (C) $\pm\frac{W}{\sqrt{R}}$ (D) $\pm\sqrt{\frac{W}{R}}$ (E) $\pm\frac{\sqrt{W}}{R}$

Q32. What is the median of the set of scores given as

9,6,5,8,10,4,1,4,5,8?

(A) 6 (B) 5.5 (C) 5 (D) 4 (E) 1

Q33. If $T \alpha \frac{1}{S}$ and T=2 when S = 60. Find T when S =90.

(A) (B) $\frac{3}{2}$ (C) $\frac{3}{4}$ (D) $\frac{2}{3}$ (E) $\frac{1}{2}$

Q34. A sister is older than her brother by 3 years.5 years ago, the sum of their ages is 23. How old is the sister now?

(A) 8 years (B) 13years (C) 15years (D) 18years (E) 21years

Q35. P varies inversely as the square of Q. Represent the Information above in a variation equation if K is use as a constant.

(A) $P = KQ^2$ (B) $Q = \frac{K}{\sqrt{P}}$ (C) $P = \frac{K}{Q^2}$ (D) $Q = \frac{K}{P^2}$ (E) $p = \frac{K}{\sqrt{Q}}$

Q36. Aisha thinks of a number, and adds 5 to it. If she divides the sum by 4 and the final answer is 3. What number does she think of

(A) 3 (B) 4 (C) 5 (D) 6 (E) 7

Q37. The range of value of x from which the inequality {0 ≤ x < 8} is true, is

(A) {0, 1, 2, 3, 4, 5, 6, 7, 8}

(B) {0, 1, 2, 3, 4, 5, 6, 7}

(C) {1, 2, 3, 4, 5, 6, 7}

(D) {0, 1, 2, 3, 4, 5, 6}

(E) {1, 2, 3, 4, 5, 6, 7, 8}

Q38. Which of these angle CANNOT be conveniently Constructed with a pair of compasses and ruler?

(A) 130^0 (B) 75^0 (C) 45^0 (D) 30^0 (E) 15^0

Q39 Solve the equation: $\frac{2d+7}{6}+\frac{d-5}{3}=0$

(A) $\frac{23}{12}$ (B) $\frac{4}{3}$ (C) 1 (D) $\frac{3}{4}$ (E) $\frac{12}{23}$

Q40. Simplify $\frac{5}{x+y}+\frac{3}{2x.}$.

(A) $\frac{13y+3x}{(x+y)(2x)}$ (B) $\frac{13x+3y}{(y+x)(2x)}$ (C) $\frac{13x+y}{x(x+y)}$ (D) $\frac{13y+x}{x(x+y)}$ (E) $\frac{13x+y}{x+y}$

Q41. Expand 3a(2b+c).

(A) 6ac + 3ab (B) 3ac + 6ab (C) 6bc + 3ac (D) 6ab + 3ac (E) 3ab + 6ac

Q42. If $\frac{1}{F}=\frac{1}{U}+\frac{1}{V}$, find F when U = 3, and V = 5.

(A) $^{8}/_{15}$ (B) $^{3}/_{5}$ (C) $^{15}/_{8}$ (D) 2 (E) 8

Q43. Factorize the expression pqr + pq.

(A) 2P(qr + 1) (B) p(qr + p) (C) pq (r + 3) (D) 2q(pr + 1) (E) 2(pr + q)

Q44. A bag contain 2red, 4green, 3black balls. If a ball is pick at random, what is the probability that is a green

Ball.?

(A) $^{2}/_{9}$ (B) $^{3}/_{9}$ (C) $^{4}/_{9}$ (D) $^{1}/_{2}$ (E) 1

Q45. Simplify (6x - 5y) + (3y + 4x).

(A) 6x – 2y (B) 7x – 2y (C) 8x – 2y (D) 9x – 2y (E) 10x – 2y

Q46. The value of the ratio between the circumference of a Circle and its diameter is

(A)$5^{2}/_{3}$ (B) $4^{1}/_{3}$ (C) $3^{1}/_{2}$ (D) $2^{2/}{}_{5}$ (E) $1^{5}/_{7}$

Q47. Solve the inequality $3x + 16 \leq 0$.

(A)$x \leq -8$ (B) $x \leq -2y$ (C) $x \leq 2$ (D) $x \leq 8$ (E) $x \leq 28$

Q48. A certain cuboid measures 8cm by 6cm by 4cm. how many 4cm by 4cm by 4cm cubes would this cuboid Contain?

(A) 10 (B) 8 (C) 6 (D) 5 (E) 3

Q49. What is the value of y in $9 = 16y - 21$?

(A) $1^{1}/_{2}$ (B) $2^{1}/_{2}$ (C) $3^{1}/_{2}$ (D) $4^{1}/_{2}$(E) $5^{1}/_{2}$

Q50. Simplify $\frac{3q+2}{4}+\frac{2a}{3}$.

(A) $\frac{23a}{12}$ (B) $\frac{17a+6}{12}$ (C) $\frac{17+6a}{12}$ (D) $\frac{15a+8}{12}$ (E) $\frac{14a+9}{12}$

APPENDIX D

THE INSTRUMENT: TEACHER-LED PROFESSIONAL AND MENTORING SUPPORT **(TREATMENT)**

SECTION A: TEACHER-LED PROFESSIONAL AND MENTORING SUPPORT LESSON PLAN FOR TEACHING FRACTION

Class	: PRIMARY 4.
Time	: 30 Minutes.
Subject Area	: Mathematics
Topic	: Fraction
Instructional Material	: Fraction charts, Orange, Cardboard paper of different shapes
Behavioural Objects	: By the end of the lesson, pupils should be able to differentiate between proper and improper fraction, convert improper fractions to mixed numbers and vice versa
Previous Knowledge	: the pupils have been thought division in whole number without remainder
Introduction	:
Presentation Step I:	teacher show division of whole with or without the remainder is best express as a fraction in form of $^{a}/_{b}$, e.g. $^{1}/_{2}$, $^{3}/_{5}$, $^{3}/_{1}$.
Step ii:	teacher explain two types of fraction: proper fraction and improper fraction. Teacher also explain that whole number and fraction join together forms mixed number.

Step iii: Teacher explain proper fraction, such as $^{2}/_{3}$, $^{1}/_{4}$, $^{7}/_{8}$ and so on. Here teacher show that number on top is numerator and number below is denominator. In proper fraction numerator is smaller than the denominator, e.g. $^{5}/_{6}$, $^{1}/_{8}$, $^{10}/_{13}$, $^{92}/_{100,}$ and so on.

Step iv: teacher show how to simplify proper fraction e.g. $^{2}/_{4} = {}^{1}/_{2}$, $^{7}/_{21} = {}^{1}/_{3}$, $^{5}/_{10} = {}^{1}/_{2}$, $^{6}/_{9} = {}^{2}/_{3}$.

Step v: teacher explain improper fraction as when denominator is smaller than numerator or when numerator is bigger than denominator, e.g. $^{3}/_{2}$, $^{5}/_{1}$, $^{7}/_{4}$, $^{8}/_{6}$ and so on.

Step vi: teacher explain how to convert improper fraction to mixed number, e.g. $^{3}/_{2} = 1^{1}/_{2}$, $^{7}/_{4} = 1^{3}/_{4}$, $^{8}/_{6} = 1^{2}/_{6} = 1^{1}/_{3}$

Evaluation: 1. The teacher evaluates the lesson by asking the pupils to simplify the fraction below. $^{5}/_{8}$, $^{2}/_{4}$, $^{3}/_{6}$ and $^{12}/_{30}$

2. Teacher ask his pupils to draw a shape to illustrate the fraction $^{5}/_{8}$, $^{2}/_{4}$, $^{3}/_{6}$ and $^{12}/_{30.}$

Conclusion : Teacher marks the work and give the correction in th Class.

TEACHER-LED PROFESSIONAL AND MENTORING SUPPORT LESSON PLAN FOR TEACHING FRACTION AND DECIMAL IN CLASS 5

Class	: PRIMARY 5.
Time	: 30 Minutes.
Subject Area	: Mathematics
Topic	:Fraction and decimal
Instructional Material	:Fraction charts, Orange, Cardboard paper of different shapes
Behavioural Objects	:By the end of the lesson, pupils should be able to differentiate between proper and improper fraction, convert improper fractions to mixed numbers and vice versa
Previous Knowledge	: Pupils were taught how to count whole numbers, solve quantitative aptitude problems in whole numbers up to millions and appreciate problems related to place value in whole number.
Introduction	:

Presentation Step I:

Step ii:

Step iii:

Step iv: the teacher encourages the students to go through the calculations.

Evaluation : The teacher evaluates the lesson by asking the students to solve the problems below.

1.

Conclusion :.

THE INSTRUMENT: TEACHER-LED PROFESSIONAL AND MENTORING SUPPORT **(TREATMENT)**

SECTION B: PARTICIPANTS (TEACHERS) LESSON PLAN

Candidate's Number ..... Page No.....

Question No.....
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Baraka Mwaka

DATE - 14/11/09

Class - 2

Time - 8.30 - 9.30

Subject - Mathematics

Topic Addition of tens and units

Duration - 1 hour.

Age - 7 - 8

B/objectives - By the end of the lesson, pupils should be able to Identify Tens and units.

P/knowledge - Pupils have learn how to count the number.

Introduction - Teacher introduces the lesson by asking the pupils question based on P/knowledge e.g. Class ~~monitor~~ who can count the numbers from 1-20 Anina count the numbers from 26 - 40

Presentation - Teacher present the lesson by the following steps

Step I - Teacher write on the black board e.g.

① T U

1 0

+ 0 0

1 0

② T U

1 1

+ 2 1

3 2

Step II - Teacher gives more example to the pupils e.g.

T U

+ 1 1

2 1

T U

+ 2 1

3 2

Step IV - Teacher permit some pupils to come out and write the answer on the black board. e.g.

T	U		T	U
+ 3	2	⊗	4	3
2	3		2	3
5	5		6	6

Evaluation - Teacher evaluates the lesson by giving them class activities based on the topic e.g.

T	U		T	U
3	2	⊗	9	4
4	5		5	1
7	7		7	5

Conclusion - Teacher concludes the lesson by goes round marks their exercise book for marking.

Question No.....
Write on both sides of the paper

T/TE = 6 Years.

DATE = 14-11-2019

SUBJECT Mathematics

TOPIC — Least Common Multiples

TIME = 8:00 - 8:35

CLASS — Primary 6

AVERGE - 10 +

SEX — Mixed

NUMBER OF PUPILS — 45

INSTRUCTIONAL MATERIALS — Boundle of Sticks, text books and Mathematical Set.

B/O Objectives: By the end of this lesson, The pupils should be able to:

(1) Explain what L.C.M is?

(2) Find the L.C.M of two or more numbers

P/K KNOWLEDGE — pupils have been taught on factors of Numbers.

INRODUCTION — Teacher Introduces the lesson by review the previous lesson to pupils.

Write down the factors of the following numbers (1) 12. (2) 4 (3) 24.

(1) $12 = 3 \times 4$

(2) $4 = 2 \times 2$

(3) $24 = 8 \times 3$

Question No.....
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PRESENTATION – Teacher present the lesson by the following steps:

STEP 1 = Teacher should guide the pupils on the lesson.

STEP 2 = Teacher should give some examples to pupils.

(1) Find the L.C.M of 3 and 4

Multiples of 3 = 3, 6, 9, [12], 15, 18, 21, [24], 27, 30 ---

Multiples of 4 = 4, 8, [12], 16, 20, [24], 28, 32 ---

Common Numbers = 12, 24

The L.C.M of 3 and 4 = 12

(2) Find the L.C.M of 5 and 7

Multiples of 5 = 5, 10, 15, 20, 25, 30, [35], 40, 45, [50]

Multiples of 7 = 7, 14, 21, 28, [35], 43, [50], 57, ---

Common Numbers = 35, 50

L.C.M 5&7 = 35

STEP 3 – Teacher Solve the examples with pupils participation.

EVALUATION – Teacher evaluates the lesson by asking the pupils to:

(1) Find the L.C.M of 4 and 5.

CONCLUSION – Teacher Concludes the lesson by going round the class and see how the pupils do their work.

Question No.....
Write on both sides of the paper

School	MBAGUDU L.G.E.A
NAME	NURADDEEN A. ABUBAKAR
TEACHER TEACHIN Experience:	4 years
Date	14-11-09
class	prim 4
subject	Mathematics
TOPIC	place value
S/TOPIC	same as above
Time	8:00 – 8:35
Duration	35 minuts
sex	mixed
AGE	10 years and above
Nº of pupils	45
T/materials	Textbooks counters, Abacus
B/Objective	By the end of the lesson pupils should be able to identify the place value of a given numbers.
Previous knowledge	pupils have an idea on counting and roman numbers
Introduction	The Teacher Introduces the lesson by asking pupils questions base on the previous knowledge e.g count from 20–60 and also teacher write some number and ask pupils to mention their names

P. T. O

Write on both sides of the paper

Presentation The Teacher present the lessons by ~~writing some numbers on the black board e.g 2 3 4 5 6 7 the following steps.~~

step I The Teacher starts by writing some number on the black board e.g 234,567

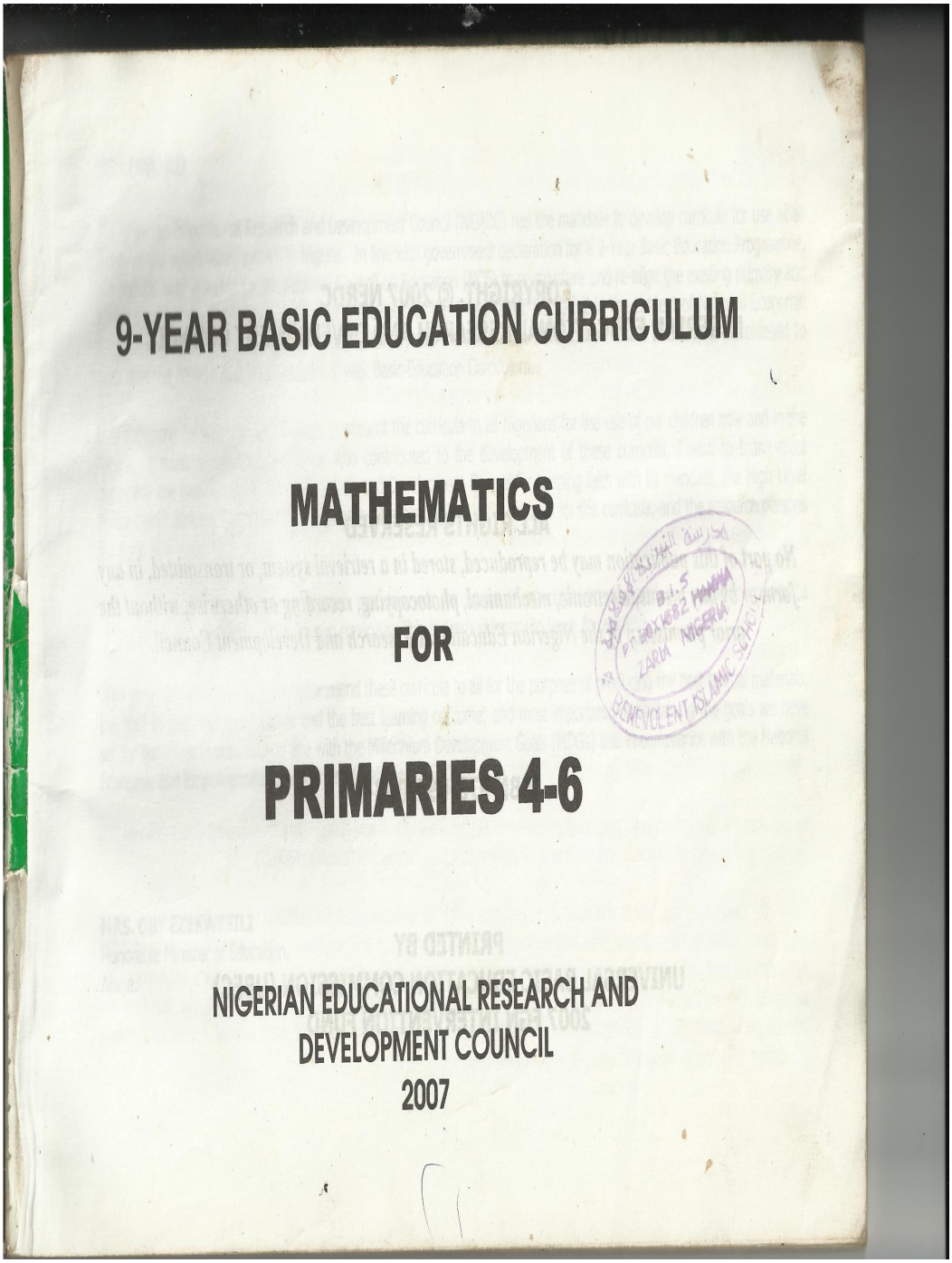
step ii The Teacher should go further by identifying the place value of each number to the pupils e.g

HTh	Th	Th	H	T	U
2	3	4	5	6	7

step iii The Teacher should go further by writing the numbers in words e.g Two Hundred and Thirty four thousand Five Hundred and sixty seven.

Evaluation The Teacher evaluate the lessons by asking pupils questions base on what they have been taught

Conclusion The Teacher conclud the lessons by telling pupils to copy what is on the black board and also given them assignment.



9-YEAR BASIC EDUCATION CURRICULUM

MATHEMATICS

FOR

PRIMARIES 4-6

NIGERIAN EDUCATIONAL RESEARCH AND
DEVELOPMENT COUNCIL
2007

BENEVOLENT ISLAMIC SCHOOL
ZARIA NIGERIA

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