Assessment of Primary School Teachers' Mastery Number Base System in the Universal Basic Education (UBE) Mathematics Curriculum

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Abstract: **The study examined primary school teachers' mastery of number base system in Universal Basic Education (UBE) mathematics curriculum in Delta Central Senatorial District. The purpose of the study was to determine the extent to which primary school teachers have mastery of number base system in the studied area. Four research questions were raised alongside four null hypotheses which were tested at 0.05 level of significance to guide the study. The research design used was descriptive research design. The population of the study consist of 4969 teachers in public primary schools with a sample size of 357 teachers. The research instrument was mathematics question used to determine the extent to which primary school teachers have the mastery of the concept (number base system). The validity of the instrument was established with the use of table of specification. The reliability was established using test-retest method for establishing the stability of the question which yields an alpha reliability coefficient of 0.85. The hypotheses were tested by using independent t-test statistics at 0.05 level of significance. The study revealed that male, urban, experienced and university qualification of primary school teachers have a slight difference in their mean when compared to female, rural, less experienced and NCE qualifications of primary school teachers' mastery of number base system in Universal Basic Education Mathematics Curriculum. The researcher recommended that: Teachers training institutions in the country should give adequate training to both male and female primary school teachers' mastery of number base systems in mathematics, Primary school teachers in the federation should be guided by the curriculum planners on how to implement the new mathematics curriculum.**

Keywords**: assessment, mastery, number base system, universal basic education, curriculum.**

I. INTRODUCTION

Nigerian leaders, knowing and understanding that education is not only an investment in human capital but also a prerequisite and correlating factor for economic development, have made concerted efforts to make basic education available to all individual seeking to acquire better education in their country (Adetula, Adesina, Owolabi & Ojeka, 2017). Many significant events occurred in Nigeria that set the ground for the introduction of Universal Basic Education (U.B.E). On the international stage, the United Nations General Assembly adopted a statement of human rights in 1948, which included the right to education (at least basic education), which was viewed as a universal right. The right to basic education was incorporated into the United Nations (UN) declaration of child rights in 1959, and being a member, Nigeria adopted it into her constitution (Human Rights Law, 2015).

In 1968, a worldwide conference was held in Paris on the theme of the global education problem. The prior pronouncements were backed up by this conference. The Jomtien World Conference on Education for All (WCEFA), held in 1990, was another international conference that fully supported Nigeria's desire for basic education (United Nations Educational, Scientific, and Cultural Organization (1993). There was also the E-9 conference for nine nations that had the highest illiteracy rate in the world, at which Nigeria was in attendance in Delhi in 1991. At this conference, the E-9 countries began to initiate ways of improving their literacy level. Also, the Organization of African Unity (O.A.U) conference of 1992, tagged "Ouagadougou 92", the O.A.U decade of education in Africa (1997), as well as the Durban (1998) conference of commitment to Education for All (E.F.A), gave a boost to U.B.E in Nigeria (United Nations Educational, Scientific, and Cultural Organization, 1993).

Assessment refers to the methods used in determining the extent to which students are achieving the intended learning outcomes for a particular course or programme (Nitko & Brookhart, 2007). Assessment is an integral part of teaching and learning and involves the process of gathering, interpreting, and recoding information related to students' progress in learning and the effectiveness of the teaching strategies. It aims to bring about improvement for both the teacher who is assessing and the students who are being assessed. Popham (2008) noted that assessment enables teachers to gather information about the students' progress as well as the extent to which the methods of instruction used are helping the students to achieve the intended learning outcomes. Through assessment, teachers can explore better ways of supporting students' learning and regulate their teaching strategies. It helps the students to know the areas where they need to work hard so as to attain the desirable learning outcomes (Odili & Asuru, 2010). Assessment is used to improve both teaching and learning and is crucial in ensuring the quality of education offered. If appropriate decisions and measures are taken based on the information revealed through assessment, it contributes to enhancing the

quality of education. Assessment is seen as an essential tool for engaging students in learning as well as for sustaining their commitment and effort to study (Linn & Gronlund, 2000). Students tend to concentrate and pay keen attention to their studies if they know that at the end of a topic they will be assessed. Their commitment tends to correlate highly with the stakes associated with the decisions to be made based on the assessment they undertake. Assessment plays an important role in motivating students' learning and the formation of good study habits. The role of teachers in ensuring that assessment leads to effective teaching and learning cannot be overemphasized. Teachers are expected to play a dual role of facilitating students' learning and implementing classroom assessment in a manner that will enhance meaningful learning outcomes.

As a result of the above conferences, many countries have made progress in delivering basic education to their populations. On a national level, Nigeria's desire for basic education stretches back to the colonial era, when Nigerian elites and freedom fighters began to question the quality of education offered by the colonial administration in the country. These fights resulted in the western area introducing free education in 1955, which was quickly followed by the eastern region adopting it in 1957(Abubakar, 2014). Universal Primary Education (U.P.E.) was established at the national level by the Federal Government in 1976, and it is currently offered throughout the country. Furthermore, the 1999 Nigerian constitution, section 18, subsections 1 and 3 under education, states that the government shall strive to eliminate illiteracy and, to that end, shall provide free and compulsory primary education, free secondary education, free university education, and free adult literacy programmes as and when practicable (Nwauzi & George-Ibikiri, 2018).

This implies that U.B.E came out of a desire to implement the constitutional provisions of Nigeria. These antecedents, discussed above on both national and international scenes, paved the way for the launching of the present universal basic education programme in Nigeria on September 30th, 1999. Universal Basic Education, as used in the Nigerian context, implies a free and compulsory 9 years of basic education for every Nigerian child, made up of 6 years of free primary education and 3 years of free junior secondary school (Universal Basic Education Commission, 2009).

U.B.E in Nigeria is designed to cater for all children of school age (6–11 years), the nomadic population, migrant people in physically isolated settlements, urban slums, adult illiterates, school drop-outs, as well as people that may be considered learners with special needs (Aboyi 2004). It is a programme which Ocheta and Olele (2009) say is a mandatory education policy for Nigerian children irrespective of such bottlenecks and handicaps associated with location, occupation, religion, race, and gender. This means that social, cultural, economic, and religious and location factors should not be a hindrance to accessibility to basic education for the Nigerian child. This clearly shows that UBE is an attempt at eradicating illiteracy on Nigerian soil; an attempt at achieving education for all (EFA); a step towards the realization of millennium development goals (MDGs); and an attempt at putting every Nigerian child on the threshold of reaping the dividends of national and global technological breakthrough. Accessibility, equity, and quality basic education, according to Adeniran (1999), are essential challenges that the UBE should address. The new National Mathematics curriculum is for the Universal Basic Education Programme (UBEP), beginning with Basic 1 to 9. In this new curriculum, the levels of education (Primary 1 to 6 and Junior Secondary 1 to 3) have been infused into basic 1–9 education. Pupils are expected to continue their education from basic one to basic nine without interruption. In this new mathematics curriculum, some mathematics topics were dropped while news such as binary number system and computer applications were added. There are shifts in topics from one class to the other (upwards and downwards) where necessary. The thematic approach was also adopted in electing the content and learning experiences in the curriculum. The revised curriculum includes the following themes: Number and Numeration, Basic Operations, Algebraic Process, Geometry and Mensuration, and Everyday Statistics.

The revised nine-year National Mathematics Curriculum for Basic Education in Nigeria is focused on giving children the opportunity to: acquire mathematical literacy necessary to function in an information age; Cultivate the understanding and application of mathematical skills and concepts required to thrive in today's rapidly changing technological world. Within their study of mathematics, they develop the essential elements of problem solving, communication, reasoning, and connection. Understand the major ideas of mathematics, bearing in mind that the world has changed and is still changing since the first National Mathematics Curriculum was developed in 1977 (NERDC, 2006).

Within the past three decades, the Primary School Mathematics Curriculum (PSMC) of Nigeria has been the subject of frequent criticism. Ohuche and Obioma (1983) discovered that primary school teachers perceived themselves as competent in number, numeration, and basic operations but inadequate in measurement, geometry, and statistics when they assessed their level of readiness to teach the content of the primary mathematics curriculum. The issue of poor curriculum delivery continues to draw and receive the attention of curriculum planners and developers. Lack of adequate mastery of primary school mathematics content has often been described as a determinant factor in the PSMC implementation. This scenario may be traced to the fact that most primary school teachers appear to be ill-prepared to cope with the teaching of primary mathematics content. In fact, a survey of the qualifications and exposure of Grade Two teachers by Lassa (2009) shows that most of this cadre of teachers are poorly trained. Yet, after over three decades, a recent survey shows that the situation has gone worse (Ezeilo and Obioma, 1991; Obioma, 2007).

Obioma (2007) claimed that more than 60% primary school teachers are either ill-prepared or under prepared to cope with the PSMC. Even in American system it is posited that without a profound understanding of fundamental Mathematics, it is impossible to be a competent Mathematics teacher in Kindergarten (K-G). Wu (1999) argues that it is a fact of human nature that teachers who are uncomfortable with the Mathematics they teach are not the ones to push hard for excellence in the Mathematical performance of their pupils- especially the pupils in K-G who do not usually make any effort to learn if they are not pushed hard.

A teaching qualification or teacher qualification is one of a number of academic and professional degrees that enables a person to become a registered teacher in primary or secondary and even tertiary institution. These teaching qualifications may include TC II, NCE B.Ed./BA/B.Sc., PGD, M.Ed. Another important variable on teachers' quality is the teacher's experience. There is a general saying that experience is the best teacher, and the teacher with a wealth of teaching experience could be said to have become a better teacher. Successful teaching and learning can be attained if such teachers combine their experience with their professional training. By school location therefore it means urban-rural school settings and this classification has influence on educational development. Educational opportunities vary from one location to another. While some places are known to have enough schools with facilities and teachers, others do not. The sex of the teacher is an important variable to consider in this study. Sex refers to the widely shared expectations and norms within a society about appropriate male and female behaviours, characteristics and roles. Sex has continued to be an issue of concern to educators and researchers because sex as impact on number base system in our educational system.

In view of the work presented to examiners, the consensus of opinion was that majority of those taking the (arithmetic) test were illiterates in the simple arts of numbers. They believe that they could pass through chance. One wondered whether some had even seen the inside of a classroom (WAEC, 1973), frequently, lack of mastery of content is exhibited by teachers during classroom instruction. Recalling Harbor-Peters and Ogoamaka (1991) experience with a student teacher who asked primary five pupils to carry out the following operation: ½ ÷ $^{3}/_{4}$. The student teacher objected to the following solution: ½ ÷ ¾ = ½ × $^{4}/_{3}$ = $^{2}/_{3}$. Instead, he solved it thus: ½ ÷ ¾ = $^{2}/_{1}$ × ¾ = $^{6}/_{4}$ = $^{3}/_{2}$ =$1^{1}/_{2}$.

During an intervention exercise with the 3rd Cluster in- Service UBE Teacher Professional Support Services of FGN/World Bank Primary Education Project (PEPII) in 2005 in Obio-Akpor Local Government Area of Rivers State, a primary 3 teacher asked one of the investigators of the study to explain a question in her pupils question paper, centrally set, for an end of year examination. The question was: Write this number in expanded form: 549 = ___, ____, and ___. If the teacher had mastery of content, she should have observed a structural error in the question. Correcting the question as 549 = ___ + ____ + ____ wound have been of help to the pupils. The two examples show how teachers with different mastery of some basic Mathematics topics mangle their answers or explanations to innocuous questions that naturally arise in a classroom. From the above observation therefore, it is obvious that the primary school teachers exhibited lack of knowledge of concepts in Mathematics. Is this assertion true of most primary school teachers today? If yes, which category of teachers, (the less experienced or more experienced) would show greater lack of mastery of content? It becomes necessary therefore to verify the state of the art through a mastery test on the Primary School Mathematics content.

Nurudeen (2007) stated that all sciences have their roots in Mathematics and described mathematics as the gate way to human endeavour. Many mathematicians viewed mathematics in various ways based on its activities and importance. Usman (2002) stated that mathematics arose from the peoples‟ need in organized society. It is also one of the most powerful and acceptable tool, which the intelligence of man has made for its own use over the centuries. According to Obodo (2000), mathematicians viewed mathematics as a universal language that uses carefully defined terms and concise symbolic representations to add precision to communication. This shows that mathematics has different dimension and in the context of this study, one such dimension is number bases system. Azuka (2009) defines number bases as systems of counting or grouping of numbers (e.g. 12 = 1ten + 2units = 10 + 2). Mathematics in the context of this study is the study of number bases, their structures, symbolic representation and operation. Mathematics is an important subject that is indispensable to the development of any nation. It has been regarded as the bedrock of scientific and technological development. Okafor (2001) stated that no nation can develop scientifically or technologically without exposing her citizens to good foundation in school mathematics. It is very useful in everyday activity. In essence, the subject is one of the compulsory subjects in both primary and post primary schools in the country.

Just as pupils find it very hard to understand the lessons, teachers equally find difficulties in teaching many topics such as squares of numbers, profit and loss percent, ratio; population issues and number bases (Amazigo, 2000). This has created challenges for parents, pupils, teachers and educationists. According to Kurumeh and Imoko (2008), Common Entrance Examination and primary school mathematics Olympia reveal so much about the pupils lack of foundation in mathematics. This mathematics foundation which is very weak in primary level is carried forward to junior secondary and is culminated in senior secondary school. This situation, according to Usman, (2003), could be as a result of shortage of human resources in mathematics education. This has resulted in the co- opting of unprofessional mathematics teachers to teach mathematics, making it difficult to have effective implementation of mathematics curriculum (programme of study). The curricula

are the subjects that are included in the course of study in a school. Badmus (2002) defined curriculum as the set of experiences planned to influence learners towards the goals of an organization. Organization here refers to school. Azuka (2009) stated that curriculum of a school consists of all experiences that a learner encounters under the direction of school. The curriculum of any educational system is planned and developed according to the needs of the society. The author further said that just as the society is dynamic, the curriculum is also dynamic. Hence, curriculum is usually changed from time to time of all levels of education; primary education is the foundation on which the rest of education is built upon. The Federal Republic of Nigeria (FRN, 2004) affirmed that problem at this level would definitely affect the educational system. Hence, the importance of primary school teachers is necessary. Joachim (2005) said that teachers are highly intelligent people with an ability to impart knowledge and understanding to their pupils.

Salman (2005) stressed that the achievement of a solid foundation for pupils in mathematics learning had strong implication for the quality of primary school teachers. Primary school teachers especially teachers of mathematics will be masters in the contents of number base system. A good primary school teacher is the one that has mastery skill in the teaching of number base contents. Hornby (2001) defines mastery as having great knowledge about a particular thing. Mastery according to Hornby (2006) involves having complete knowledge or understanding of a particular thing. In other words, it involves thorough awareness of something. Mastery in the context of this study identifies primary school teachers as having thorough knowledge and understanding of number bases. This involves understanding its operations and the strategies to be employed which would lead to a lasting learning on the part of the pupils. Teachers' mastery of number base system also implies having knowledge about number base, it embraces understanding challenges associated with experience especially among the rural and urban areas.

Statement of the Problem

It has often been alleged that primary school mathematics teachers do not have mastery of primary school mathematics content. There is considerable concern expressed by public outcries that suggest that some primary school teachers are usually not capable of demonstrating content mastery of this subject. What level of mastery of arithmetic content would one have expected of primary school teachers who WAEC referred to as illiterates in the simple arts of numbers?

Parents, the government, and the general public have been disturbed by the mass failure of pupils in mathematics. Primary school teachers are trained in colleges of education (C.O.E.) and universities. These teachers are trained to have a good knowledge of mathematics in the number base system during the course of training. They are also expected to effectively teach the students mathematics, particularly the number base system. Having been trained effectively and efficiently during their training in colleges and universities, they have been prepared or trained to achieve certain objectives in mathematics, such as providing the child with necessary basic skills in numeracy like the Number Base System. All these are to solve the problem of pupils' poor achievement in mathematics. In spite of the efforts made by training and retraining the primary school mathematics teachers, the problem of pupils' poor performance in mathematics has persisted. Pupils' achievement in mathematics is poor due to a lack of knowledge of the number base.

Parents and guardians complain bitterly about their children's poor calculations at home and their poor performance in school mathematics. Most pupils in primary schools find it difficult to do simple basic operations such as addition of numbers, subtraction, multiplication, and division, and number base system in mathematics. This has resulted in pupils' poor performance in mathematics. In an attempt to solve this problem, a number base system has been included in the primary school mathematics curriculum. The teachers of UBE also appear to be dissatisfied with their remuneration and conditions of service, in addition to the poor or inadequate provision of teaching and learning facilities like laboratory equipment, books, and so on. The morale of teachers also appears to remain low, indicating poor motivation, while the curriculum of UBE also appears not to be implemented fully in UBE schools. It is against this background that this research is out to assess primary school teachers' mastery of the number base system in the universal basic education mathematics curriculum. The problem of this study is to determine the extent to which primary school teachers have mastered the Number Base System in the Universal Basic Education (UBE) mathematics curriculum. Another issue of academic concern for this study, posed as a question, is: Are there any differences as regards to teachers' experiences, sex, school location, and qualification of teachers in primary school teachers' mastery of the number base system in the UBE mathematics curriculum?

Research Questions

The following research Questions were raised to guide the study:

1. What is the mean difference between male and female primary school teachers' mastery of number base system in universal basic education mathematics curriculum?
2. What is the mean difference between urban and rural primary school teachers' mastery of number base system in universal basic education mathematics curriculum?
3. What is the mean difference between experienced and less experienced primary school teacher's mastery of number base system in universal basic education mathematics curriculum?
4. What is the mean difference between University and NCE qualifications of primary school teachers'

mastery of number base system in universal basic education mathematics curriculum?

Hypotheses

The following null hypothesis were formulated to guide the study

1. There is no significant difference between male and female primary school teachers' mastery of number base system in universal basic education mathematics curriculum.
2. There is no significant difference between urban and rural primary school teachers' mastery of number base system in universal basic education mathematics curriculum.
3. There is no significant difference between experienced and less experienced primary school teachers' mastery of number base system in universal basic education mathematics curriculum.
4. There is no significant difference between University and NCE qualifications of primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

Purpose of the Study

The main purpose of the study is to assess primary school teachers' mastery of number base system in universal basic education mathematics curriculum in Delta State. Specifically, the study will:

i. examine the mean difference between male and female primary school teachers' mastery of number base system.
ii. identify the mean difference between urban and rural primary school teachers' mastery of number base system.
iii. identify the mean difference between experienced and less experienced primary school teachers' mastery of number base system.
iv. determine the mean difference between University and NCE qualifications of primary school teachers' mastery of number base system.

Significance of the Study

The study might be of significance benefit to the pupils, teachers, curriculum planners, the government and the society in general. The study will be of significant benefit to the pupils because it will help them to code items in punch card, represent the food they eat and names of states by using binary numbers.

The study might also be of significant benefit to teachers because it will help them effectively in inculcating the knowledge to their pupils for better academic performance in mathematics into tertiary institutions. The study might be of benefit to the curriculum planners because it will enable them to evaluate and review the mathematics curriculum. The study might be of significant benefit to the Government by organizing programme for primary school teachers in mathematics and equip them with strategies that will improve teaching – learning of number base system in mathematics.

Scope and Delimitation of the Study

The study assessed primary school teachers' mastery of number base system in universal basic education mathematics curriculum in Delta Central Senatorial District of Delta State. The study covered Number Base System such as ; Conversion of base ten numbers to base two, conversion of base two to base ten, addition and subtraction of base two numbers, multiplication of base two numbers.

The study was limited to primary five and six teachers in Delta State. The choice of classes is based on the fact that teachers in these two classes are fully involved in teaching the topic and the topic also falls within primary five and six mathematics curriculum.

II. RESEARCH METHOD AND PROCEDURE

Research Design

The design for this study was a descriptive survey research design that made use of mathematics questions on number base under the following topics: Conversion of base ten numbers to base two, conversion of base two to base ten, addition of base two numbers, subtraction of base two numbers and multiplication of base two numbers. The design described the attributes of primary school teachers' mastery of number base system in Universal Basic Education (UBE) mathematics curriculum. The design is to find out and describe events as they are without any manipulation of what will cause the events or what will be observed.

Population of the Study

The population of the study was four thousand nine hundred and sixty-nine (4969) teachers in public primary schools. This is made up of 1292 male and 3677 female teachers in Delta Central Senatorial District of Delta State.

Sample and Sampling Techniques

The sample of this study was 357 teachers in primary 5 and primary 6 in Delta Central Senatorial District of Delta State by means of purposive sample techniques. The table for determining needed size S of a randomly chosen sample from a given finite population of N case such that the sample proportion P was within + 0.05 of the population proportion P with a 95 percent lived of confidence.

Research Instrument

The instrument used in this study was mathematics questions titled Assessment of Primary School Teachers Mastery of Number Base System in Universal Basic Education Mathematics Curriculum. The instrument was made up of two sections. Section A contains the bio-data information of the respondents such as sex, years of experience, location of schools and qualifications of teachers.

Section B, consists of 15 objective mathematics questions under the following subheadings; Conversion of base ten numbers to base two, conversion of base two to base ten, addition of base two numbers, subtraction of base two numbers and multiplication of base two numbers.

Validity of the Instrument

Assessment of Primary School Teachers Mastery of Number Base System in Universal Basic Education Mathematics Curriculum adapted from Primary School Leaving Certificate Examination question paper administered to pupils that registered for the examination in 2017 and 2018. The psychometric properties of the items must have been carried out by examination unit of the ministry of Education Delta state before administration to the pupils that registered for the examination in that year. However, for the purpose of this study, the content validity was carried out by the use of the test blueprint or table of specification (see Table 1). The content of each concept was derived from the UBE scheme of work for Primary V and Six in Delta State

Table 1: Table of Specification of Mathematics Achievement Test

S/N.	Content	Knowledge (20%)	Comprehension (20%)	Application (40%)	Analysis (20%)	Total (100)
1.	Conversion of base ten numbers to base two	1(1)	-	2(2, 3)	-	3
2.	conversion of base two to base ten		1(4)	2(5,6)		3
3.	addition and subtraction of base two numbers	2(7, 8,9)	2(10,11)	1(12)	1(13)	6
4.	multiplication of base two numbers.	-	-	1(13)	2(14, 15)	3
	Total	3	3	6	3	15

Reliability of the instrument

The reliability of the instrument was established by using test-retest method. The questions were administered to thirty (30) teachers in primary 5 and 6 in Ukwani Local Government Area of Delta State who were not part of the study area. After a period of two weeks of administration, the same set of questions were re-administered to the same teachers in primary 5 and 6 and the resulting test scores were correlated. The test-retest method was used in establishing the stability of the questions. The Pearson Product Moment Correlation Coefficient (r) was used to correlate the responses obtained from the two separate administrations of question. This yielded a reliability coefficient of 0.85. (see appendix)

Method of Data Collection

The researcher and one research assistant visited the schools used and administered the instrument to the teachers in primary 5 and 6 who teach mathematics. The researcher and her assistant ensured that the teachers, who were used as respondents, responded to the instrument independently. The complete copies of the instrument were collected immediately on the spot by the researcher and the research assistant. The test was dichotomously scored (i.e. 1 for correct answer and 0 for wrong answer)

Method of Data Analysis

Mean and standard deviation was used to answer the research questions. t-test statistics was used to test the stated hypotheses at 0.05 level of significance.

III. PRESENTATION OF RESULTS AND DISCUSSION

This section analysed data collected for the study, based on the hypothesis.

Research Question 1

What is the mean difference between male and female primary school teachers' mastery of number base system in universal basic education mathematics curriculum?

Table 2: Mean and Standard Deviation of Male and Female Primary School Teachers' Mastery of Number Base System in Universal Basic Education Mathematics Curriculum.

Variables	N	Mean	Std. Deviation	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Male teachers	151	11.78	2.00	.16	-.23475	.61320
Female teachers	206	11.59	2.01			

Table 2, showed that male teachers in primary school has a mean of 11.78 and standard deviation of 2.00 and female teachers in primary school has a mean of 11.59 and standard deviation of 2.01. The mastery score of male teachers in primary school are little higher by 0.16. This implies that there was a mean difference between the two variables as

showed in the table along with the 95% confidence interval of the difference showing the lower bound of -.23475 and upper bound of .61320

Research question 2

What is the mean difference between urban and rural primary school teachers' mastery of number base system in universal basic education mathematics curriculum?

Table 3: Mean and Standard Deviation of Urban and Rural Primary School Teachers' Mastery of Number Base System in Universal Basic Education Mathematics Curriculum.

Variables	N	Mean	Std. Deviation	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Urban teachers	218	12.07	1.80	1.03	.61386	1.44659
Rural teachers	139	11.04	2.16			

Table 3 showed a mean of 12.07 and standard deviation of 1.80 for urban primary school teachers and a mean of 11.04 and standard deviation of 2.16. The mean difference between urban and rural primary school teachers was 1.03 with the 95% confidence interval of the difference showing the lower bound of .61386 and upper bound of 1.44659. This revealed that urban primary school teachers mastered number base system in universal basic education mathematics curriculum than their rural counterparts.

Research question 3

What is the mean difference between experienced and less experienced primary school teachers' mastery of number base system in universal basic education mathematics curriculum?

Table 4: Mean and Standard Deviation of Experienced and Less Experienced Primary School Teachers' Mastery of Number Based System in Universal Basic Education Mathematics Curriculum.

Variables	N	Mean	Std. Deviation	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Experience teachers	166	12.49	1.53	1.56	1.14723	1.92449
Less experience teachers	191	10.96	2.11			

Table 4 indicated a mean of 12.49 and standard deviation of 1.53 for experienced primary school teachers and a mean of 10.96 and standard deviation of 2.11 for less experienced teachers. The mean difference was 1.56 between the two variables with the 95% confidence interval of the difference showing the lower bound of 1.14723 and upper bound of 1.92449. This indicated that experienced primary school teachers mastered number base system in universal basic education mathematics curriculum than the less experienced primary school teachers.

Research question 4

What is the mean difference between university and NCE qualifications of primary school teachers' mastery of number base system in universal basic education mathematics curriculum?

Table 5: Mean and Standard Deviation of University and NCE Qualifications of Primary School Teachers' Mastery of Number Base System in Universal Basic Education Mathematics Curriculum.

Variables	N	Mean	Std. Deviation	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
University qualification	122	11.69	2.18	.03	-.41739	.46678
NCE qualification	235	11.66	1.92			

The result in Table 5 revealed that the university qualifications in primary schools has a mean of 11.69 and standards deviation of 2.18 and the NCE qualifications in primary school has a mean of 11.66 and standard deviation 1.92. The mean difference between university qualifications and NCE qualifications was .03 with the 95% confidence interval of the difference indicating the lower bound of -.41739 and upper bound of .46678. This indicated that a little difference existed between university qualifications and NCE

qualifications in the mastery of number base system in universal basic education mathematics curriculum.

Hypothesis 1

There is no significant difference between male and female primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

Table 6: Independent t-test analysis of Male and Female Primary School Teachers' Mastery of Number Base System in Universal Basic Education Mathematics Curriculum.

Variables	N	Mean	Std. Deviation	df	t-cal	Sig. (2-tailed)
Male teachers	151	11.78	2.00	355	.878	.381
Female teachers	206	11.59	2.01			

Table 6, indicated the t-calculated value of .878 and a p-value of .381 Testing the null hypothesis at an alpha level of 0.05, the p-value of .381 was greater than the alpha level of 0.05. Hence, the null hypothesis which states that 'there is no significant difference between male and female primary school teachers' mastery of number base system in universal basic education mathematics curriculum" was accepted.

Hypothesis 2

There is no significant difference between urban and rural primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

Table 7: Independent t-test analysis of Urban and Rural Primary School Teachers' Mastery of Number Base System in Universal Basic Education Mathematics Curriculum.

Variables	N	Mean	Std. Deviation	df	t-cal	Sig. (2-tailed)
Urban teachers	218	12.07	1.80	355	4.866	.000
Rural teachers	139	11.04	2.16			

Table 7 indicated the t-calculated value of 4.866 and a p-value of .000. Testing the null hypothesis at an alpha level of 0.05. The p-value of 0.000, was less than the alpha level of 0.05. Hence the null hypothesis which stated that there is no significant difference between urban and rural primary school teachers' mastery of number base system in universal basic education mathematics curriculum was rejected. This implies that there was significant difference between urban and rural primary school teachers' mastery of number base system in universal basic education.

Hypothesis 3

There is no significant difference between experienced and less experienced primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

Table 8: Independent samples t-test analysis of experienced and less experienced primary school teachers' mastery of number base system in universal basic education mathematics curriculum

Variables	N	Mean	Std. Deviation	df	t-cal	Sig. (2-tailed)
Experience teachers	166	12.49	1.53	355	7.772	.000
Less experience teachers	191	10.96	2.11			

Table 8, revealed the t-calculated value of 7.772 and a p-value of 0.000. Testing the hypothesis at an alpha level of 0.05, the p-value of 0.000 was less than the alpha level of 0.05. Hence, the null hypothesis was rejected. This indicated that there was significant difference between experienced and less experienced primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

Hypothesis 4

There is no significant difference between university and NCE qualifications of primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

Table 9: Independent samples t-test analysis of university and NCE qualifications of primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

Variables	N	Mean	Std. Deviation	df	t-cal	Sig. (2-tailed)
University qualification	122	11.69	2.18	355	.110	.913
NCE qualification	235	11.66	1.92			

Table 9, showed the t-calculated value of .110 and a p-value of .913. Testing the null hypothesis at an alpha level of 0.05, the p-value of .913 was greater than the alpha level of 0.05. Therefore, the null hypothesis was accepted. This revealed that there was no significant difference between university and NCE qualifications of primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

IV. DISCUSSION OF RESULTS

The findings of the results were discussed under the following subheadings:

Male and Female Primary School Teachers Mastery of Number Base System

The result in hypothesis 1, showed that there was no significant difference between male and female primary school teachers mastery of number base system in universal basic education mathematics curriculum. Though the mean of male teachers is slightly higher than that of their female counterpart, the difference was not significant. This result could be due to the fact that male and female teachers in the study area are being given the same level of training from time to time by their local educational authority. Hence, it is not surprising to find from this study that teachers of either sex do not differ in terms of primary mastery of number base system in the universal basic education mathematics curriculum. The finding was in line with Ohuche and Obioma (1983) in assessing the level of readiness of primary school teachers to teach the content of the primary mathematics curriculum found that teachers perceived themselves as competent in number, numeration and basic operations. This finding also supports the views of Popham (2008) who noted that assessment enables the teachers to gather information about the students' progress as well as the extent to which methods of instruction used are helping the students, to achieve the intended learning outcomes. The finding was at variance with the study of Harbor-Peters and Ogoamaka (1991) who conducted a study on survey of primary school teachers' mastery of primary school mathematics content, found that primary school teachers have no adequate mastery of primary school mathematics content.

Urban and Rural Primary School Teachers' Mastery of Number Base System

The finding in hypothesis 2 indicated that there was a significant difference between urban and rural teachers' mastery of number base system in universal basic education mathematics curriculum. The study indicated that urban teachers have better mastery of number base system in universal basic education mathematics curriculum than their rural counterpart. This could be due to the fact that urban teachers have access to better instructional facilities compared to their rural counterpart. This finding supports the study of Abidogun (2006) who stated that rural areas have greater challenges concerning educational development than urban areas and many teachers therefore reject posting into the rural areas while those that do treat their presence in such area as part time assignment. This was also in line with Edho (2009) who noted that some of the constraints that affect the success rate of universal basic education programme in the rural communities is teachers' inadequacy and the unwillingness to be posted to rural communities, which affect teachers' distribution and their diligence to duty between urban and rural teaches towards their effective implementation of the curriculum.

Experienced and Less Experienced Primary School Teachers Mastery of Number Base System

The finding in hypothesis 3 revealed that there was a significant difference between experienced and less experienced primary school teachers' mastery of number base system in universal basic education mathematics curriculum. This showed that experienced teachers' showed better level of mastery of number base system in universal basic education mathematics curriculum compared to those in rural area. This is not surprising because the more the number of years a teacher spent in teaching a particle subject the more the level of mastery of the subject. The finding supports the views of Ntino (2002) and Davis (2005) who observed that experienced teachers operate from a deeper and more sophisticated knowledge base than less experience teachers. That is the years of teaching have given the teachers extensive repertoires of effective explanation, demonstrations, illustrations, examples, diagrams and anecdotes for the myriad of concepts and principles that they teach and the understanding and skills that they help their students acquire. The finding was also in agreement with Darling – Hammond (2000) who maintains that many studies have established that inexperienced teachers

are typically less effective than experienced teachers. The finding was at variance with the studies of Harbor-Peters and Ogoamaka (1991) who conducted a study on survey of primary school teachers' mastery of primary school mathematics content found that increase in experience have no significant difference on primary school teachers' mastery of primary school mathematics content.

University and NCE Qualifications of Primary School Teachers' mastery of Number Base System

The finding in hypothesis 4 showed that there was no significant difference between university and NCE qualifications of primary school teachers mastery of number base system in universal basic education mathematics curriculum. Though demonstrated high level of mastery of number base, there was a slight difference in favour of university teachers. The finding supports the view of Ball , Hill and Rowan, (2005) who results in a studies of teachers' mathematical knowledge and students' achievement are mixed, found that the evidence does suggest that teachers knowledge of mathematics content despite the qualifications is a contributor to instructional quality and students achievement. The finding was also in agreement with Ball et al., (2008) on teachers' mathematical knowledge such as teacher certification or courses taken does not related the specific mathematical knowledge and instructional skills needed for effective teaching especially at the elementary and middle school level.

Summary of the Study

The study assessed primary school teachers' mastery of number base system in universal basic education mathematics curriculum. The study also assessed sex, location, experienced and less experienced and qualification of primary school teachers. Four research questions were raised and four null hypotheses were formulated to guide the study. The study was a descriptive survey research design that make used of mathematics questions on number base on the following topics" conversion of base ten numbers to base two, conversion of base two to base ten, addition of base two numbers, subtraction of base two numbers and multiplication of base two numbers.

The population of the study consists of 4969 teachers in public primary schools. Purposive sampling techniques were used to select 357 teachers in primary 5 and 6 in Delta Central Senatorial District of Delta State. This is to obtain the opinions of the respondents on the primary school teachers' mastery of number base system in universal basic education mathematics curriculum. The questions were validated at its face by expert judgment of a mathematic lecturer and lecturers in Measurement and Evaluation in Delta State University, Abraka. The reliability coefficient of the mathematics question was obtained by using test-retest method for estimating the stability of the question which yields an alpha reliability coefficient of 0.85. the research questions were answered using mean and standard deviation, while the hypotheses were analyzed by using independent t-test statistics at 0.05 level of significance.

V. FINDINGS

The following finding were obtained in the study:

1. There was no significant difference between male and female primary school teachers' mastery of number base system in universal basic education mathematics curriculum.
2. There was a significant difference between urban and rural primary school teachers' mastery of number base system in universal basic education mathematics curriculum.
3. There was a significant difference between experienced and less experienced primary school teachers' mastery of number base system in universal basic education mathematics curriculum.
4. There was no significant difference between university and NCE qualifications of primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

VI. CONCLUSION

In line with the findings, the following conclusions were drawn. The study indicated that male, urban experienced and university qualifications of primary school teachers had a slight difference in their mean when compared to female, rural, less experienced and NCE qualifications of primary school teachers' mastery of number base system in universal basic education mathematics curriculum.

VII. RECOMMENDATIONS

Based on the findings, the following recommendations were made;

1. More in-service training on number base should be given to teachers irrespective of sex to further increased their level of mastery of number base in universal basic education mathematics curriculum.
2. More training should be given to rural teachers to increase their mastery of number base system in universal basic education mathematics curriculum.
3. Less experienced primary school teachers should attend seminar, conference and workshops and learning of number base system in mathematics to increase their level of mastery of number base system in universal basic education mathematics curriculum.
4. Teachers with university and NCE qualification should given equal opportunity to attend seminar, conference and workshops and learning of number base system in mathematics to increase their level of mastery of number base system in universal basic education mathematics curriculum.

Contribution to Knowledge

This study has contributed to knowledge in the following ways:

i. The study has established that the teaching of number base in primary school by teachers would improve pupils' interest in mathematics.
ii. The study has affirmed that sex and qualifications of primary school teachers do not affect mastery of number base system in UBE mathematics curriculum.
iii. The study established that location, experienced and less experienced primary school teachers influence mastery of number base system in UBE mathematics curriculum.

Suggestions for Further Study

There is need for further research in the following areas:

1. Assessment of primary school teachers' mastery of number base system in universal basic education mathematics curriculum in Edo state.
2. Assessment of primary school teachers' competency in the teaching of word problems in mathematics in Delta State.
3. Effect of the use of number base game on senor secondary school students' academic achievement in mathematics in Delta Central Senatorial District of Delta State.
4. Assessment of primary school teachers' perception on the effective implementation of mathematics curriculum in universal basic education programme in Delta State.
5. Assessment of Gender, Qualifications and experience of secondary school teachers' mastery of number base system in students' academic achievement in mathematics in Delta State.

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