Journal of Arts and Social Sciences

Numeracy Manipulating Skills as a Sustenance of National Development in North-central, Nigeria

Dr. JIMOH Mohammed Idris*,Onimisi Ekuh ABDULLAHI** Morenikeji Alex AKANMU***

*Department of Social Sciences Education, Faculty of Education, University of Ilorin, Ilorin, Nigeria
**Department of Social Sciences Education, Faculty of Education, University of Ilorin, Ilorin, Nigeria
***Department of Science Education, Faculty of Education, University of Ilorin, Ilorin, Nigeria.
alexakanmu@gmail.com

A R T I C L E   I N F O

A B S T R A C T

Education is an instrument used to empower an individual to become a useful member of society through the acquisition of basic knowledge, skills and values. It has been observed that many of the students that went through universal basic education of 9-years programme are unable to read and perform basic calculations. The study therefore, want to examine the extent to which this assertion can be upheld in North-central, Nigeria. A descriptive survey design was adopted. The population comprised all students of Universal Basic 1 to 9 while the target population consisted of 645, 177 upper basic students in North-central, Nigeria. Researchers-developed *numeracy manipulating test was constructed which contained thirty multiple-choice items. Scale content validity was computed and obtained 0.88 S-CVI. Kuder Richardson KR 20 was employed and obtained 0.81 reliability coefficient. Four research objectives were* conceived. *One research question was raised and answered using percentage. Three hypotheses were generated and tested using an independent t-test at 0.05 level of significance. One of the findings revealed that students possessed 41.61% numeracy skills. No significant difference existed based on gender. A significant difference existed based on school ownership and school location. It was concluded that the performance of students was weak and might inhibit national development. It was recommended that the governments at all levels should give more attention to the UBE programme being the foundation of other forms of education in Nigeria.*

Introduction

Education in the world and Nigeria in particular is declared as an instrument par excellent that every citizen requires having that could produce efficient and effective national development (Federal Republic of Nigeria, 2004). As such, whatever form or level of education put in place is expected to be of high standard in order to produce the required results of high-quality products (learners) and that will be able to contribute meaningfully to growth of the country in all ramifications (Modebelu & Igwebuike, 2013). The basic goal of education in Nigeria is to prepare an individual citizen for responsible and be able to function effectively and efficiently in any society he/she belongs to (Ahmadi &Lukman, 2015). It implies, therefore, that education is regarded as the instrument which

can empower an individual to be a useful member of society through the acquisition of certain basic skills, abilities, attitudes, self-reliance, self-supportive (Robert, Ma'aji, Kareem & Egbeta,2014). No single community or nation can attain the desired height of transformation except through quality education that will meet the required nation's manpower (Organization for Economic Co-operation and Development (OECD) (2012) and Universal Basic Education Commission, 2013).

To attain this highest transformation in quality education and the quality being sustained in countries in the world, the United Nations proposed 17 sustainable development goals in September 2015; that all nations must pull their resources towards achieving these sustainable goals. The organization went further, that countries of the world must ensure that by year 2030 all citizens in every country should enjoy non-negotiable peace and prosperity. Out of these goals, the fourth goal that is related to education has ten targets which encompasses different aspects in education. These seven targets are regarded as expected outcomes as highlighted: 1) Universal primary and secondary education; 2) Early childhood development and universal pre-primary education; 3) Equal success to technical/ vocational and higher education; 4) Relevant skills for decent work; 5) Gender equality and inclusion; 6) universal youth literacy and numeracy; and 7) Education for sustainable development and global citizenship. It could be noted that item 6 target is of paramount important in this study: It states that by year 2030, all youth and a substantial proportion of adults, both men and women are to achieve literacy and numeracy (UNESCO, 2018)

One of the strategies used to achieve national goals and to sustain the existing development was the reformation of primary and junior secondary education to nine years Universal Basic Education (UBE) uninterrupted to school going aged children to acquire basic knowledge, skills and attitudes (Uzomah, & Chinwe, 2010). Hence, to solidify these aforementioned millennium development goals and Education for All, educational programmes in Nigeria were restructured and reformed to 9 3 4, that is, nine years of basic education, three years of senior secondary school and four years of university education (Federal Republic of Nigeria, 2014). In the 1970s, numeracy was seen as a skill that was essential in life and by the turn of the twenty-first century, numeracy came to include the ability to reason. There is no doubt that the UBE educational programme is the foundation and fundamental upon which the rest Nigerian educational system is built (Awofala, 2012). Numeracy was no longer seen simply in the area of mathematics but continued to permeate through all areas of study and ino daily life (Miranda, 2018). However, The UBE is segmented into lower, middle and upper basic schools (Federal Republic of Nigeria, 2014).

The Universal Basic Education Programme was introduced in 1999 by the Federal Government of Nigeria as a reformed programme aimed at providing greater access to, and ensuring the quality of education (Miranda, 2018) education throughout the country (Awofala, 2012). One of the aims of UBE, therefore, according to section 2 subsection 11(e) page 4, UBE is to ensure the acquisition of the appropriate levels of literacy, numeracy, communicative and life skills, as well as the ethical, moral, security and civic values needed for the laying of a solid foundation for life-long learning that attracts national development (Federal Republic of Nigeria, 2014). The essence of the policy drive is to equip citizens with the necessary skills that could accelerate national development. In this study, the emphasis is on numeracy manipulating skills. By Numeracy Manipulating skill, we mean simple calculations that could make an individual student survive in everyday activities (The Education State, 2018). To ascertain the contributions of numeracy skills to national development, this, therefore, calls for the evaluation of numeracy skills in the UBE programme especially in the North-central, Nigeria.

Numeracy is one of the core subjects in the basic education curriculum and beyond as recognized by the Nigeria national policy on education (Federal Republic of Nigeria, 2004) and (Federal Republic of Nigeria, 2014). Numeracy refers to a body of knowledge and skills that are coined out of that aspect of mathematics that deals with numbers and their operations. There is a need on daily basis for humans to interact and manipulate figures. In the course of interaction, it gives room for recognition and understanding the dispositions and capacities to use the knowledge numeracy manipulative skills both within and out-of-school (Jayanthi, 2019). The knowledge of this discipline involves calculations, computations and daily problem-solving at basic level called consumer

mathematics. According to Bennison (2015), this body of knowledge deals with measurement and manipulation of data and hence, it plays a significant role in community and nation-building. This, therefore, warrants its inclusion in the school curriculum and hence, needed to be investigated.

Either consciously or unconsciously in everyday life, an individual engages in evaluation and it takes a different form. It is through this evaluation that one can discriminate between good and bad (Stavropoulou & Stroubouki, 2014). Keating (2011) defined evaluation as a process by which information about an entity is gathered to determine its worth and it involves making value judgements about the entity.

To justify the evaluation of this study, there are array of evaluation models that have been developed and could be used, among them are (i) Objective-Centered (Goal Attainment) Model credited to Raph Tyler of 1949; (ii) Countenance Model credited to Stake of 1967; (iii) Discrepancy Model credited to Provus of 1971; (iv) Content-Input-Process-Product (CIPP) Model credited to Stufflebeam of 1971 (v) Goal-Free Evaluation Model credited to Michael Screen of 1967 and 1972 (Jimoh, 2017).

Based on the focus of this study, the researchers intend to the objective-centred model propounded by Tyler, (1949). The model examines the degree of success of a given educational programme to identified educational objectives. The rationale of Tyler's model is to investigate the extent to which the educational objectives are achieved (Tyler, 1949).

Literature have shown that various studies have been conducted on numeracy both within and outside Nigeria. For instance, Education Sector Support Programme in Nigeria (2016) reported that there was an assessment of numeracy in 2003 and 2011 at primary classes 4 and 6, (ESSPIN, 2016) and findings are summarized as reported in Table 1.

Table 1: Numeracy Percentage Mean Scores 1996, 2003 and 2011

Indicators	Numeracy		
	1996	2003	2011
National mean score (%)	32.20	43.81	36.28
Mean score Girls (%)	31.89	33.74	37.00
Mean Score Boys (%)	32.42	33.52	36.98
Mean Score Urban (%)	35.00	34.33	38.29
Mean Score Rural (%)	30.33	35.21	36.28
Mean Score Public (%)	30.13	30.63	39.78
Mean Score Private (%)	43.08	43.12	36.25

Source: Education Sector Support Programme in Nigeria, (2016)

In the same development, the (Jimoh, 2017) researched on assessment of learning outcome among universal basic education students in north-central, Nigeria. He found that students' mean performance in numeracy was 41.61%. The finding also revealed no significant difference in numeracy tests between public (30.10%) and private (30.10%) schools. The report also revealed that students from urban schools had 35.00% better than students from rural schools (32.30%) with a margin of 2.70. The study concluded that students' performance in numeracy was weak.

According to the study conducted by Universal Basic Education Commission (2013) the achievement of pupils in numeracy in primary 4, 5, 6 and performance of students in mathematics at the Junior Secondary 1. The results revealed that the national mean performance was 51.63%, 50.36% and 52.94% in numeracy for primary 4, 5 and 6 respectively and 41.08% for Junior Secondary 1 students.

(Nigeria National Population Commission, RTI International, Nigeria Federal Ministry of Education & Nigeria Universal Basic Education Commission, 2011) reported Nigeria DHS EdData survey of 2010. The commission sampled children between the ages of 5 to 16 years and the national numeracy obtained was 58.00% and in North-central, Nigeria it was 25.00%. The finding of the study also showed a significant difference between male children (59.00%) and female children (56.00%). The commission also found a significant difference between students from urban schools (77.60%) and students from rural schools (49.50%).

In the same vein, (National Population Commission and Research Triangle Institute (RTI

International, 2016) reported the 2015 Nigeria education data survey (NEDS). The report revealed that national numeracy was 73.60% and the North-central, Nigeria numeracy was 53.60%. The commission reported further that no significant difference existed between male numeracy (74.60%) and female numeracy (72.50%) while in North-central, Nigeria the male numeracy was 54.70% and the female numeracy was 52.40%. The report also revealed the national numeracy of children from public schools (65.60%) and children from private schools (76.60%) with a marked difference. The national numeracy of students from urban schools was 75.40% and the students from rural were 39.60%

(National Population Commission and Research Triangle Institute (RTI International, 2016) researched on monitoring of learning achievement in Rivers State public schools. The outcome showed that the state numeracy of primary schools' pupils was 49.60% while the Junior Secondary School mathematics was 45.20%. The Rivers State Ministry of Education further reported that there was a significant difference between students from rural schools (42.80%) and students from urban schools (46.70%.).

Stanley & Otu-Eleri (2019) evaluated the learning outcomes of primary school pupils in Ebonyi state, Nigeria. They found that the general performance in numeracy was 35.8. The finding further showed the mean value for male students was 31.54 and the females had the value of 31.45 on their performance in the tests which implied no statistically significant difference in the score (performance).

The motivation for carrying out this study was derived from the position held by (Osagie & Ehiametalor, 2010) that despite major interventions in education by the government over the past few years, learning outcomes at both Primary and Secondary levels remain poor, with many unable to read or do basic calculations. It is on the premise that the researchers' wanted to ascertain the extent to which the position held by the Education Sector Support Programme in Nigeria (2011) could be true. This study, therefore, focused on the terminal class (basic 9) of the UBE programme where the successes and value judgment of the UBE programme and the learning outcomes could be predicted and ascertained.

The following research objectives are raised:
1. Find out the extent to which upper basic students acquired numeracy manipulating skills in laying a solid foundation for the sustenance of national development in North-central, Nigeria.
2. Examine differences in numeracy manipulating skills acquired by male and female upper basic school students in North-central, Nigeria
3. Find out differences in numeracy manipulating skills acquired by public and private upper basic school students in North-central, Nigeria.
4. Determine differences in numeracy manipulating skills acquired by rural and urban upper basic school students in North-central, Nigeria.

Based on these research objectives, one research question was raised:
1. What is the extent to which upper basic students acquired numeracy manipulating skills in laying a solid foundation for the sustenance of national development?

Based on these research objectives, the following research hypotheses are postulated as:
H_{O1}: There is no significant difference in the performance of students in numeracy manipulating skills between male and female in North-central Nigeria.
H_{O2}: There is no significant difference in the performance of students in numeracy manipulating skills from public and private in North-central Nigeria.
H_{O3}: There is no significant difference in the performance of students in numeracy manipulating skills from rural and urban in North-central Nigeria.

Research Methodology

This study adopted a descriptive survey research design using objective-centred model evaluation model. This research design is, therefore, considered suitable for this study because it

enabled the researchers to obtain valid and reliable information on the variable (numeracy manipulating skills) of upper basic students across gender, schools' types and school location in North-central, Nigeria. This allowed the researchers to determine and evaluate the extent to which the students of Universal Basic Education have performed in numeracy manipulating skills.

The population of this study comprised all students in public and private Universal Basic Education (Basic 1-9) in North-central, Nigeria. The target population consisted of 645,177 upper basic students [32]. In North-central, six states are recognized (Benue, Niger, Kogi, Kwara, Nassarawa and Plateau). In addition to these states, the Federal Capital Territory is also found making seven. A multi-stage sampling procedure was adopted. The first stage was the stratification of schools based on states. A simple random sampling technique was, used to sample three states. In the selection of the three states, names of the six states and FCT were written on pieces of paper, wrapped, put in a container and mixed thoroughly together. A student was asked to pick a paper one after the other without replacement until three papers were picked. Those papers picked were opened and the names found in them were Kogi, Niger and the Plateau States.

The next selection was Local Government Areas in the three sampled states. There are 21, 25 and 17 Local Government Areas in Kogi, Niger and Plateau state respectively. Twenty-five per cent (25%) representing 5, 6 and 4 Local Government Areas in Kogi, Niger and Plateau state were sampled respectively using a simple random sampling technique. In each of the Local Government Areas sampled, upper basic schools were stratified based on school ownership and school location. Thirteen (13%) per cent of the schools based on school ownership and school location were selected using a simple random sampling technique.

In each of the schools visited, upper basic 3 students were sampled. This was because they were in their final stage of the UBE programme, where the researchers believed that the effectiveness of the UBE of 9 years programme could be assessed and evaluated. Thereafter, a simple random sampling technique was employed to select 30 upper basic 3 students in any school visited, thus, in all, 1,650 students were sampled.

Unfortunately, in the course of data collation and entry, the researchers discovered that 39 scripts were not properly completed and were discarded. Therefore, 1,612 students' scripts were involved in the analysis which represented the sample size for this study. The mortality rate of discarded scripts was calculated and put at 2.30%.

The researcher's self-developed measuring tool named "Numeracy Manipulating Test" (NMT) was used for data collection. The NMT contained Thirty (30) items constructed based on the national upper basic mathematics curriculum. In the course of items construction, the researchers adopted a revised edition of Bloom taxonomy cognitive objectives of two-dimensions (Knowledge Process Skills and Cognitive Process Skills). The knowledge domain comprised four levels: Number and Numeration, Algebraic Processes, Geometry and Menstruation and Statistics and Probability as indicated in the national upper basic mathematics national curriculum. The cognitive process domain used three levels i.e., Remembering, Understanding and Applying (see table 2).

Table 2: Table of Specification for Numeracy Manipulating Items

Themes		Cognitive Process Skills			
		Remembering	Understanding	Applying	Total
		40%	40%	20%	100%
Cognitive Process Skills	Number & Numeration	4	4	2	10 (33.3%)
	Algebraic Processes	3	3	2	08 (26.7%)
	Geometry & Menstruation	2	2	1	05 (16.7(%)
	Statistics & Probability	3	3	1	07 (23.3%)
	Ground Total	12	12	06	30 (100.0%)
		40.00%	40.00%	20.05%	

Table 2 revealed that in number and numeration, 10 (33.3%) of the 30 test items were prepared across remembering, understanding and applying in the proportion of 40%, 40% and 20% respectively. In algebraic processes, 08 (26.7%) of the test items were drawn across remembering, understanding and applying in the same proportion of 40%, 40% and 20% respectively. In Geometry and menstruation, 05 (16.7%) of the test items were prepared under remembering, understanding and applying in the same proportion of 40%, 40% and 20% respectively while in statistics and probability had 5 (23.3%) of the test items were prepared under remembering, understanding and applying in the same proportion of 40%, 40% and 20% respectively. Each of the items had four options A, B, C, and D.

The first psychometric property of the measuring tool was Content Validity (CV). It showed whether or not the items sampled for inclusion in the instrument adequately represent the domain of content being measured by the measuring instrument. It concerned with the degree to which a sample of items, taken together, constitute an adequate operational definition of a construct using ratings of item relevance by the experts (Yusoff, 2019).

Three seasoned lecturers in mathematics education were involved in ascertaining that all items in the instrument addressed the defined curriculum contents and the research objectives. They were to show the relevance of items to the variable under investigation. Scale content validity (S-CVI) was computed through item-level content validity (I-CVI). The average of the I-CVI for all items was computed to form scale content validity (S-CVI) as computation is reported in table 3.

Table 3: Processes of Content Validation of 3 Experts and 30 Items

Items	Expert 1	Expert 2	Expert 3	Experts' Agreement	I-CVI
1	√	√	√	3	3/3 = 1.00
2	—	√	√	2	2/3 = 0.67
3	√	√	√	3	3/3 = 1.00
4	√	—	√	2	2/3 = 0.67
5	—	√	√	2	2/3 = 0.67
6	—	√	√	2	2/3 = 0.67
7	√	√	√	3	3/3 = 1.00
8	√	√	√	3	3/3 = 1.00
9	√	√	√	3	3/3 = 1.00
10	√	√	√	3	3/3 = 1.00
---	---	---	---	---	---
---	---	---	---	---	---
---	---	---	---	---	---
30	√	√	√	3	3/3 = 1.00
		S-CVI = = 0.88			

Thirteen items were retained, ten were revised and seven were eliminated and replaced, as suggested by the experts. Item Level Content Validity (I-CVI) and Scale Content Validity (S-CVI) were computed. Hence, Scale Content Validity Scale (S-CVI) was put at 0·88.

Another psychometric property considered in this study was the estimation of reliability. To carry out this, two steps were taken. The first step was the computation of item analysis which primarily focused on the item-level information. This was used to determine a test of desired quality that could yield very high reliability in NMT. The item analysis was carried out in two folds i.e., item difficulty and item discrimination using WinGen 3 Window software.

The second step was the computation of the reliability estimate using split-half. It was used to determine how many errors in a test score are due to poor test construction. The measuring tool was administered once on upper basic 3 students that were not part of the actual study after which the split-half reliability was applied to measure the internal consistency of the test items. Kuder Richardson KR 20 formula was used to determine their reliabilities and put at 0.81. The coefficient obtained implied that the instrument was good enough, they could be used to collect data in this study and any other similar studies.

In each state visited, research assistants were recruited. They were trained and involved in the administration of the measuring instrument. The research assistants were instructed to have zero tolerance to examination malpractice. This allowed the researchers to harvest the true picture of the students in terms of their proficiency in numeracy skills acquired. The test was administered to the students during breakfast. This was to avoid distortion of the school activities.

One research question was raised and answered using the mean percentage to describe the performance of students in numeracy manipulative skills. Three research hypotheses were postulated and tested using an independent t-test at a 0.05 level of significance.

Result and Discussion

This section deals with data analysis and interpretation of results to the research questions raised and the research hypotheses postulated for the study. The data were processed using IBM/SPSS 25.0 Window Version.

Research Question 1:

What is the extent to which upper basic students acquired numeracy manipulating skills in laying a solid foundation for the sustenance of national development?

To answer this research question, the responses of the students to the Numeracy Manipulating Test (NMT) were summed up, collated and entered into SPSS 25.0 window version. There were thirty items in the measuring tool. The scores obtained were transformed to the percentage for easy analysis and interpretation as reported in table 4.

Table 4: Students' Performance in Numeracy Manipulating Skills in the Upper Basic Schools in North-Central Nigeria

Level of Numeracy	Score Range	Frequency	Percentage (%)
Low	0–33	532	33.00
Average	34–66	838	51.89
High	67–100	242	15.11
Total	0–100	1,612	100.00
Mean Performance	41.61%		

Results in Table 4 revealed the performance of students in the numeracy manipulating skills tests administered. It shows that 532 (33.00%) had low-level performance, 838 (51.89%) performed averagely while the rest 242 (15.11%) performed high in the test. To buttress this, the percentage mean score of the test was computed and obtained 41.61%. This implied that the performance of upper basic school students in numeracy was below average.

The finding (41.61%) could be attributed to a series of factors. One of the factors could be students' level of exposure to improved learning instructional, the use of recommended mathematics textbooks and above all recruitment of qualified mathematics teachers using modern pedagogical teaching strategies. All the factors are grossly inadequate. This finding was an improvement of over 32.2% numeracy as reported by the (Jayanthi, 2019). The finding also followed (National Population Commission and Research Triangle Institute, 2016) that reported numeracy of 35.80%. The finding also followed the same sequence with the report of (River State Ministry of Education, 2013) that had a mean score of 33.64% in numeracy. The finding disagrees with the report that reported 32.20% in 1996 and 36.28% in 2011. The present finding (41.61%) is below the report of a study conducted by the (Universal Basic Education Commission, 2013) that revealed numeracy value in primary 4 (51.63%), primary 5 (50.36%) and primary 6 (52.94%) respectively. Similarly, the (Jimoh, 2017) reported Nigeria DHS EdData survey of 2010 and obtained the national numeracy of 58.00% and in the North-central, Nigeria it was 25.00%. In the same vein, the national numeracy value (73.60%) reported by the (Tyler, 1949) was higher than the present value (41.61%) and also higher than the numeracy value (53.60%) obtained in North-central, Nigeria. The disparity in findings could also be attributed to differences in measuring tools used by the researchers, they were not equivalent in terms of curriculum contents, items included in the test and class level at which the studies were carried with the previous studies.

H_{O1}: There is no significant difference in the performance of students in numeracy manipulating skills between males and females in North-central Nigeria.

Table 5: **Difference in the Performance of Students in Numeracy Manipulating Skills Between Male and   Female in North-central Nigeria**

Gender	No	Mean	Std. Dev.	Df	Cal. t-value	Tab. t-value	Sig.	Remarks
Male	818	47.30	2.59					
				1,610	0.349	0.675	0.31	NS
Female	794	48.53	1.98					

P > 0.05

Table 5 indicated the output of independent t-test analysis showing a difference in the performance of male and female of upper basic students obtained in numeracy manipulating skill in North-central Nigeria. The result in the table showed that the calculated level of significance (0.31) is greater than the p-value (0.05), hence, hypothesis one was not rejected. This implies that there was no significant difference in the mean scores of male and female upper basic students obtained in numeracy skills in North-central Nigeria. Looking at the mean difference, male students have 47.30% and female students are 48.53%.

The finding of no significant difference in males and females is not surprising because they were exposed to the same planned curriculum, received lessons in a similar academic environment, taught by similar teachers with similar pedagogy skills. The finding of this study is not different from the finding of a study conducted by the (Stavropoulou & Stroubouki, 2014). The numeracy values of boys and girls were very low and no significant difference existed between boys and girls in 1996 (31.89% and 32.42%), 2003 (33.74% and 33.52%) and 2011 (37.00% and 36.98%) respectively. The (OECD Equity & Quality in Education, 2012) also investigated numeracy level and reported that male students had a mean score of 32.40% and females had a mean performance of 31.90% with no marked significant difference between male and female students. The present finding was also in agreement with (River State Ministry of Education, 2013) who obtained a mean score of 33.48% for males and 33.84% for females with no marked significant difference between them. The finding also agrees with (National Population Commission & Research Triangle Institute, 2016) that showed the available mean values for male students were 31.54 and the females had the value of 31.45 which implied no statistically significant difference in the score (performance). This second finding was an improvement over the present finding with a marked significant difference. Nigeria National Population Commission, RTI International, Nigeria Federal Ministry of Education & Nigeria Universal Basic Education Commission (2011) obtained a mean score of 22.65% for males and 18.78% in numeracy, though, low but with a marked significant difference between male and female students' performance in the numeracy test. The (Tyler, 1949) presented a performance of 74.60% for males and 72.50% for female children higher than the present value but marked a significant difference in male and female performance.

HO2:   *There is no significant difference in the performance of students in numeracy manipulating skills from public and private in North-central Nigeria.*

Table 6: **Difference in the Performance of Students in Numeracy Manipulating Skills from Public and Private in North-central Nigeria**

Schools	NO	Mean	Std. Dev.	df	Cal. t-value	Tab. t-value	Sig.	Remarks
Public	904	35.27	2.79					
				1,610	5.79	0.675	0.00	S
Private	708	49.61	1.63					

P > 0.05

Table 6 showed the output of independent t-test analysis showing a difference in the performance in numeracy manipulating skills of upper basic students from public and private schools in North-central Nigeria. The result in the table revealed that the calculated level of significance (0.00) was less than the p-value (0.05), hence, hypothesis two is rejected. This implied that there was a significant difference in the performance of students in numeracy manipulating skills from public and

private upper basic schools in North-central Nigeria. To ascertain where the significant difference lied, mean scores of students from public and private schools were compared. The result showed that students from private schools with a mean score of 49.61% outperformed students from public schools (35.27%).

This finding is in favour of private schools over public students. The finding of this study is an improvement over the study conducted by the Stavropoulou & Stroubouki, 2014). The numeracy values reported on students from public and private schools were very low and no significant difference existed between students from public and private schools in 1996 (30.13% and 43.08%), 2003 (30.63% and 43.12 and 2011 (39.78% and 36.25%) respectively. All in the favour of students from private schools. Also, the finding of this study agrees with the (Tyler, 1949). The commission's report showed that children from public schools had 65.60% and children from private schools had 76.60% which marked a significant difference in favour of private school students. The present finding negates the finding of the (Stavropoulou, A. & Stroubouki, 2014). The ministry reported that students from public and private schools had the same numeracy score of 30.10% with marked no significant difference in the performance of these children. Factors that might inhibit quality education in public schools in North-central, Nigeria is attributable to inadequate qualified mathematics teachers, especially in public schools. In some of the schools visited, mathematics teachers were improvised using any available science teacher to teach mathematics. There are also inadequate educational materials such as students' textbooks. Lastly, teachers' salaries and allowances are not promptly paid, they are being toyed with.

H_{O3}: *There is no significant difference in the performance of students in numeracy manipulating skills from rural and urban in North-central Nigeria.*

Table 7: **Difference in the Performance of Students in Numeracy Manipulating Skills from Rural and Urban in North-Central Nigeria**

Schools	NO	Mean	Std. Dev.	Df	Cal. t-value	Tab. t-value	Sig.	Remarks
Rural	904	36.95	2.19					
				1,610	4.16	0.675	0.00	S
Urban	708	48.72	0.89					

P < 0.05

Table 7 showed the output of independent t-test analysis showing a difference in the performance in numeracy manipulating skills of upper basic students from rural and urban schools in North-central Nigeria. The result in the table revealed that the calculated level of significance (0.00) was less than the p-value (0.05), hence, hypothesis three is rejected. This implied that there was a significant difference in the performance of students in numeracy manipulating skills from rural and urban upper basic schools in North-central Nigeria. To ascertain where the significant difference lies, the mean scores of students from rural and urban schools were compared. The result showed that students from urban schools with a mean score of 48.72 outperformed students from rural schools (36.95).

This finding is in favour of students from urban schools. The finding of this study is an improvement over the study conducted by the (Stavropoulou & Stroubouki, 2014). The numeracy values reported on students from rural and urban schools were very low and however, a significant difference existed between students from rural and urban schools in 2003 (35.21% and 30.63% and in 2011 (36.28% and 39.78%) respectively. It is also an improvement over the report of the (Stavropoulou & Stroubouki, 2014) which revealed a mean numeracy value of 35.00% of students from urban and 32.30% from rural schools. The finding agrees with (River State Ministry of Education, 2013) report that found the mean value of 41.15% for urban students and 29.70 % for rural students with a marked difference in favour of urban school students. The (ESSPIN, 2016) monitored learning achievement in Rivers State. The ministry reported 42.80% numeracy from students in the rural schools while students from urban had 46.7% which was in favour of students from the urban school. The (Jimoh, 2017) reported the national numeracy rate for children that attended rural and urban schools. The report revealed that the numeracy rate for students in rural schools was 39.6% and

students from urban had 75.4% with a marked significant difference in favour of urban schools. Though, all the performances were low including the present finding. The field observation revealed that could be traced to the neglect of rural community schools in the provision of inadequate teaching and learning resources.

Conclusion

It could be concluded that the intended or expected learning outcome (numeracy skills) in North-central, Nigeria was generally low, weak and below average that could sustain existing national development. It was also low based on gender, school proprietorship and school location though with a marked significantly difference between school proprietorship and school location. This implied that the stated objectives UBE programme in Nigeria for lifelong learning education were yet to be accomplished that could sustain the Nigeria economy especially in the North-central, Nigeria. This may inhibit national development and especially in the North-central, Nigeria.

Recommendations

Given the importance of numeracy in day-to-day activities, the following recommendations are put forward:

1. The Nigerian governments (Federal, States and LGAs) should give priority to the UBE programme because it is the foundation upon which other levels of education are built.
2. The stakeholders in the education industry (Parents, Government, Philanthropists, Non-government organizations etc could join hands together in providing quality education at this level because it is the foundation of other levels.
3. The provision of quality education could be through the provision of the necessary infrastructural facilities that could enhance better students learning conditions.
4. Many students find numeracy (Mathematics) to be a difficult subject across schools (private, public, rural and urban), qualify mathematics teachers should be employ to handle the subject that would cater for individual differences in terms of students' gender and their ability.
5. Standardized instrument(s) in assessing educational progress and learning outcomes are needed so that comparability of learners' performance across gender, school types, school location, regions, and Local Government Areas could be guaranteed and may gear up their performance since it leads to competition.
6. Lastly, field observations revealed that most Mathematics teachers in the rural schools are not experts, they only studied science-related courses, as such proprietors of these schools should employ qualify teachers to handle the subject.

References

Ahmadi, A. A. & Lukman, A. A. (2015). Issues and Prospects of Effective Implementation of New Secondary School Curriculum in Nigeria. *Journal of Education and Practice*, Online), 6, (34), 29–39. Available: https://files.eric.ed.gov/fulltext/EJ1086103.pdf

Antonini, M., Delprat, M., Bell, N. B. and Jere, C. M. ((2015). Education for All 2000–2015: Review and Perspectives, Jahrgang,. 10 – 15. Available: https://www.researchgate.net/publication/280131738

Awofala, A. O. A. (2012). An analysis of the new 9- year basic education mathematics curriculum in Nigeria. *Acta Didactical Napocensia,* 5, (1), 17–28. Available: https://core.ac.uk/download/pdf/234698089.pdf

Bennison, A. (2015). Supporting teachers to embed numeracy across the curriculum: a sociocultural approach., *ZDM Mathematics Education*, 47, 561–573. Available: https://link.springer.com/article/10.1007/s11858-015-0706-3

Education Sector Support Programme in Nigeria (2011). *Transforming Basic Education in Kaduna.* Update, 1-4 (2011) Available: http://www.esspin.org

Education Sector Support Programme in Nigeria (2016). *Assignment Report: Reflections on why basic education learning outcomes are declining in Nigeria*. Education Sector Support Programme in Nigeria (ESSPIN). Available: https://www.esspin.org/reports/download/457-file-Reflections-on-why-basic-education-learning-outcomes-are-declining-in-Nigeria.pdf

Federal Republic of Nigeria, (2004). *National policy on education.* (4th Ed.). Yaba-Lagos: NERDC Press. Available: https://www.academia.edu/35126579/National_Policy_on_Education_pdf

Federal Republic of Nigeria (2014). *National policy on education.* (6th Ed.). Yaba-Lagos: NERDC Press.Available:https://education.gov.ng/wp-content/uploads/2020/06/NATIONAL-POLICY-ON-EDUCATION.pdf.

Galguera, M. P. ((2015)). Education for all 2015: Achievements and challenges. United Nations Educational Scientific and Cultural Organization. *Journal of Supranational Policies of Education*, 3, 328–330. Available: file:///C:/Users/MR%20JIMOH/Downloads/5654-Texto%20del%20art%C3%ADculo- 11930-1-10-20160722%20(1).pdf

Inko-Tariah, D. C. (2014). Assessment of Literacy and Numeracy Levels of Junior Secondary School Students in the Rivers State of Nigeria. *Journal of Education and Practice, 5*, (19), 150-155. Available:https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.994.8803&rep=rep1&type=pdf

Jayanthi, R. (2019). Mathematics in Society Development-A Study. *International Research Journal*, 3 (3), 59–63. Available: https://irejournals.com/formatedpaper/1701630.pdf

Jimoh M. I. (2017). *Assessment of learning outcome among universal basic education students in North-central, Nigeria.* A Ph.D thesis research report submitted to the Department of Social Sciences Education, Faculty of Education, University of Ilorin, Ilorin, Nigeria.

Keating S. B. (2011). Curriculum development and evaluation in Nursing. 2011. (2nd edition), New York: Springer Publishing Company

Miranda K. (2018). Numeracy. *Brock Education Journal*. 27(2), 58-62. Available: https://files.eric.ed.gov/fulltext/EJ1179949.pdf

Modebelu, M. N & Igwebuike, F. K. (2013). Nigerian Child Learning Styles: A Teaching Strategy for Achieving Effective Education in Nigeria. *Journal of Educational and Social Research,* 3 (6),9Available:https://www.researchgate.net/publication/271105573NigerianChildLearningStylesATeachingStrategyforAchievingEffectiveEducationinNigeria/link/5fc551db4585152e9be7f121/download

National Population Commission and Research Triangle Institute (2016). *Nigeria DHS E dData survey 2010: education data for decision-making*. 2016. Washington DC: United States Agency for International Development.

Nigeria National Population Commission, RTI International, Nigeria Federal Ministry of Education and Nigeria Universal Basic Education Commission (2011). 2010 Nigeria DHS EdData survey: education data for decision-making. Abuja: National Government Commission. Available: https://www.worldcat.org/title/nigeria-dhs-eddata-survey-2010-education-data-for-decision-making/oclc/812203226

Obun, A. F., Joseph, O. V. & Akan, E. M. (2018). A qualitative analysis of universal basic education policy implementation strategies in Nigeria: Effective management for goals realization. *International Journal of Research and Innovation in Social Science, Research and Scientific Innovation Society*. II, (IX), 48 -54. Available: www.rsisinternational.org.

Organization for Economic Co-operation and Development (OECD) ((2012). Equity and Quality in Education. Supporting Disadvantaged Students and Schools. OECD publishing. Available: https://www.oecd.org/education/school/50293148.pdf.

Ogbonnaya, E. A. (2020). Education as a key to national development in Nigeria. International *Journal of Research and Innovation in Social Science (IJRISS)* IV (VIII), 796–803. Available:https://www.rsisinternational.org/journals/ijriss/Digital-Library/volume-4-issue-8/796-803.pdf

Osagie, R. O. & Ehiametalor, E. T. (2010). Assessment of learning achievement of primary four pupils in Edo State. *American Journal of Scientific and Industrial Research,* 2010. *1(3)*, 651-

655. Available: https://www.scihub.org/AJSIR/PDF/2010/3/AJSIR-1-3-651-655.pdf.

River State Ministry of Education. (2013). *Monitoring learning achievement (MLA) in River State Public State: Rural-Urban Differences in Learning Outcome. Final Report.* Volume III. Port Harcourt: Arbitrage Consult Ltd. 1-58. Available: https://www.slideshare.net/BernardHunvounopwaBa/rural-urban-differences-in-learning-outcome

Robert O. Okwori, Ma'aji A.S, Kareem, W. B. & Egbeta, U. A. (2014). Drop out among Basic Technology Students in Nigerian Educational System: Causes, Effects and Remedies. 2014, J*ournal of Educational Policy and Entrepreneurial Research (JEPER) 1, (2), 204-210.* Available: https://www.iiste.org/Journals/index.php/JEPER/article/view/17033.

Stanley, I. I. & Otu-Eleri, E. N. (2017). Evaluation of learning outcomes of primary school pupils in Ebonyi state, Nigeria. *International Journal of Quantitative and Qualitative Research Methods*, l5, (5), 1-9. 2017. Available: https://www.eajournals.org/journals/international-journal-of-quantitative-and-qualitative-research-methods-ijqqrm/vol-5-issue-5-november-2017/evaluation-learning-outcomes-primary-school-pupils-ebonyi-state-nigeria/

Stavropoulou, A. & Stroubouki T. (2014). Evaluation of educational programmes–the contribution of history to modern evaluation thinking. 2014, *Health Science Journal.*8 (2), 193 – 204. Available: https://www.scirp.org/%28S%28lz5mqp453edsnp55rrgjct55%29%29/reference/referencespapers.aspx?referenceid=2619199

The Education State (2018). *Literacy and numeracy tips to help your child every day: A guide for parents of children aged 0-12*. Melbourne: The Department of Education and Training. Available:http://www.education.vic.gov.au/Documents/childhood/providers/edcare/veyldframework.pdf

Tyler, R. W. (1949). *Basic principles in curriculum and institution.* Chicago: University Press.

UNESCO. Education for All (2015). National EFA Reviews Guidelines. Draft. 2013. Available: http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Santiago/pdf/guidelinesnationalefa2015reviewsenglish19062013.pdf

UNESCO (2018). Meet the SDG 4 Data: Measuring Youth and Adult Literacy and Numeracy

By Silvia Montoya, Director of the UNESCO Institute for Statistics. Available at http://uis.unesco.org/en/blog/meet-sdg-4-data-measuring-youth-and-adult-literacy-and-numeracy

United Nations (No Date). Transforming Our World: The 2030 Agenda for Sustainable Development A/RES/70/1 Available: https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf

Universal Basic Education Commission (2013). 2011 National Assessment of Learning Achievements in Basic Education (NALABE)-Final Report. Education for all is the responsibility of all. Available: https://ubeconline.com/Pre/2011%20National%20Assessment%20of%20Learning%20Achievement%2

Universal Basic Education Commission (2019). *Pupils/students' enrolment*. Abuja: Department of Planning Research and Statistics.

Uzomah, P. N. & Chinwe, O. (2010). Impact of the implementation of the 9- years universal basic education programme in public primary and junior secondary schools in Imo State. *African Research Review*, *An International Multi-Disciplinary Journal, Ethiopia, 4 (3a), 109-118.* Available: www.afrrevjo.com

Yusoff, M. S. B. (2019). ABC of Content Validation and Content Validity Index Calculation. *Education in Medicine Journal*. 11(2): 49–54. https://www.researchgate.net/publication/334134963