
BASIC ALGEBRAIC CONCEPTS IN MATHEMATICS CURRICULUM PERCEIVED DIFFICULT TO LEARN BY SENIOR SECONDARY ONE (SS1) STUDENTS

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ABSTRACT

The study was carried out to identify basic algebraic concepts in mathematics curriculum perceived difficult to learn by senior secondary school students particularly SS1 students in Kuje Area Council of Federal Capital Territory, Abuja, Nigeria. The sample size for the study comprised of two hundred (200) senior secondary one (SS1) students made of males and female students from five selected secondary schools using simple random sampling techniques. The instrument used for the data collection was a 33-item questionnaire on Basic algebraic concepts in mathematics curriculum perceived difficult (QBACMCPD) perceived difficult by students. The BACMCPD was validated and the reliability established using the test-retest method. The study was guided by three research questions and one stated null hypothesis. Research questions were answered by frequency counts and simple percentage, while the stated null hypothesis was tested at 0.05 level of significance using t-test statistics. The results revealed that among the 33 basic concepts, thirteen concepts (interval notations, translations involving inequalities, union and intersection of sets, opposite and absolute value, exponential expressions, order of operations, solving linear equations, clearing fractions and decimals, conditional equations, contradictions and identities, inequalities of the form $a < x < b$ etc.) were perceived difficult to learn by students and reasons given for perceiving algebraic concepts difficult includes: inadequate of instructional materials, teachers' method of teaching adopted and so on. Similarly, there was no significant difference in the number of basic algebraic concepts perceived difficult to learn by male and female students. Based on the findings of the study, it was recommended amongst others that workshops seminars should be organized to train mathematics teachers on the effective and efficient strategies that should be adopted for the teaching of the identified difficult algebraic concepts.

KEYWORDS: Basic algebraic concepts, t-test, Senior secondary students, Concepts perceived difficult

INTRODUCTION

Mathematics is one of the compulsory subjects offered at both primary and secondary school education system in Nigeria, Federal Government of Nigeria (FGN, 2014).. Its role and importance to education and the world at large makes it to be regarded as the basis of science and technological development. According to Okafor (2005), no country can develop scientifically and technologically without proper foundation in mathematics.

Mathematics is a language in which scientific ideas are expressed; it is the means by which other sciences including Physics, Chemistry, Biology, and disciplines like Engineering, Geology are understood. Mathematics enables the various sciences to draw the implications of their observational and experimental findings. Mathematics has become so valuable that there is nothing in all human endeavors that does not apply mathematics skills or knowledge. Therefore, scientific knowledge is impossible without a sound knowledge of mathematics. Equally; those who are grounded in mathematics are able to contribute meaningfully to scientific and technological development.

Despite the crucial roles played by algebra in the development of science and mathematics, Kurumeh (2006) reported that students achieved poorly in public examinations in mathematics. For instance, in Nigeria, in the years 2008, 2009, 2010 and 2011 the percentage pass with credit and above in mathematics were 23.0%, 31.0%, 24.94% and 38.98% respectively (Kurumeh & Imoko 2008; Moseri 2010; Iyi 2011). Azuka and

Dike (2013) also observed that candidates recorded mass failure in 2013 WASSCE examination. To be precise, Dike indicated that only 29% made a 5 credit grade in their subjects, including English and Mathematics, that candidate who sat for the 2013 West African Senior School Certificate Examination (WASSCE) recorded mass failure as only 86,612 candidates, out of the 308,217 candidates that participated in the examinations obtained five credits (including English and Mathematics)

Algebra refers to the operation of transferring a quantity from one side of an equation to another. or the process of subtracting similar quantities from both sides of an equation. Algebra is seen as an aspect of mathematics which deals with the representation of alphabets to represent numbers. Algebra plays important roles in primary and secondary mathematics curricular in Nigeria and the World at large. For instance, most employers expect their employees to be able to do the fundamentals of algebra. If you want to do any advanced training you will have to be able to be fluent in the concept of letters and symbols used to represent quantities.

When doing any form of science, whether just a project or a lifetime career choice, you will have to be able to do and understand how to use and apply algebra. Formulas are a part of our lives. Whether we drive a car and need to calculate the distance, or need to work out the volume in a milk container, algebraic formulas are used every day without you even realizing it. When it comes to analyzing anything, whether the cost, price or profit of a business you will need to be able to do algebra. Margins need to be set and calculations need to be made to do strategic planning and analyzing is the way to do it. The important of algebra as a branch of mathematics curriculum can never be over -emphasized.

STATEMENT OF THE PROBLEM

Several researches have shown that difficulty in teaching and learning of mathematics especially algebra has resulted in mass failure in examinations (NMC, 2009). Findings have shown that some factors are identified to make the learning of algebraic concepts in mathematics difficult which include: teachers' methods of instruction, geometric language, visualizing abilities (Noraini, 2006 and Aysen, 2012). Other factors include: gender or sex differences, inadequate instructional materials, gender differences, poor logical reasoning skill, time shortage, inadequate school curriculum and lack of proof by students (Mason, 2002; Uduosoro, 2011 and NERDC, 2012).

All these are alleged to have a negative impact on the learning of algebra. Learning of mathematics particularly in algebra is believed to be determined by gender differences. It has caused a lot of controversies for the fact that researchers such as Adebule (2004) opined that gender has no specific effect on the learning of mathematics while Udousoro (2011) was of the opinion that mathematics is male gender friendly. Abiam and Odok (2006) found no significant relationship between gender and achievement in number and numeration, algebraic processes and statistics. The researchers, however, found the existence of a weak significant relationship in geometry and trigonometry.

WAEC Chief Examiners' Report (2007-2011) revealed that candidates had weaknesses in exponential expressions, scientific notations, literal equations, conditional equations, contradictions as well as identities and many others. All these make students perform mournfully in the examinations; this poor achievement of students in mathematics especially in algebra has been a thing of worry to mathematics educators, parents, stakeholders, and governments of Nigeria and the World. Meanwhile, none of the literature reviewed in this study addressed particularly algebraic concepts in Mathematics perceived difficult to learn by Secondary School students.

To this backdrop, the present study identified algebraic concepts in mathematics perceived difficult to learn by secondary school students in Kuje Area Council of Federal Capital Territory, Abuja, Nigeria.

OBJECTIVES OF THE STUDY

The objective of this study was to identify basic algebraic concepts in mathematics perceived difficult to learn by secondary school students in Kuje Area Council of Federal Capital Territory of Abuja, Nigeria. The specific objectives are to:

- 1) Identify the basic algebraic concepts perceived difficult to learn by secondary school students
- 2) Analyze the possible causes of the perceived difficulty of algebraic concepts by secondary school students
- 3) Find out the difference in the number of basic algebraic concepts perceived difficult by male and female students?

RESEARCH QUESTIONS

These research questions are hereby posed for investigation:

- 1) What are the possible basic algebraic concepts perceived difficult to learn by secondary school students in Kuje Area Council of Federal Capital Territory, Abuja, Nigeria?
- 2) What are the possible causes of the perceived difficulty of algebraic concepts by senior secondary school students?
- 3) Is there any difference in the number of basic algebraic concepts perceived difficult by male and female students?

RESEARCH HYPOTHESIS

In accordance to research questions stated to guide the study, the following null hypothesis was formulated and tested at 0.05 level of significance.

HO₁: There is no significant difference in the number of basic algebraic concepts perceived difficult by male and female students.

LITERATURE REVIEW

Nigerian Educational Research and Development Council (2012) observed that difficult concepts in mathematics referred to any concept that posed challenges/ tasks to teachers and learners. Empirical studies on perceived difficult concepts in mathematics have been addressed by some researchers. Salman (2005) carried out a study on difficulty levels of topics in the primary school mathematics curriculum. Azuka, Jekayinfa, Durojaye and Okwoza (2013) researched on difficulty levels of topics in the new senior secondary school mathematics curriculum. Also, Adegun (2013) investigated students and teachers' view of difficult areas in mathematics syllabus. In the same vein, Uduosoro (2011) conducted a study on students' perceived and actual learning difficulties in secondary school mathematics. Abdul-Raheem (2012) carried out a study on ratings of the difficulty levels of senior school mathematics topics by teachers and students.

Sule and Musa (2018) researched on cognitive learning style and gender on students' achievement in branches of mathematics curriculum and found that male students achieved more than their female counterpart students in algebra while further analysis also indicated a significant difference in the mean achievement score of male and female students in algebra.

Several studies have been conducted to determine perceived difficult algebraic concepts in mathematics. Gunawarda (2011) found among others that the abstract structure of algebraic expressions posed many problems to students such as understanding or manipulating them according to accepted rules, procedures, or algorithms. Inadequate understanding of the uses of the equal sign and its properties when it is used in an equation was a major problem that hindered solving equations correctly. The main difficulty in word problems was translating them from natural language to algebraic language. Students used guessing or trial and error methods extensively in solving word problems.

Ebiendele and Adedunjo (2013) found that students do not have interest in Algebra and the usefulness of Algebraic notations are not known to them because they were not introduced to Algebraic topics with

notations symbols early enough in schools. Also, due to the inadequate modes/strategies in handling notations symbols by the teacher's at the classrooms also resulted in significant differences between the performance of students' in the achievement test with symbolic notations and without symbolic notations.

MATERIALS AND METHODS

Research Design

This research adopted a descriptive and a survey design. This is aimed at collecting information on the algebraic concepts in mathematics perceived to be difficult or complex by senior secondary school students.

Population for the Study

The target population for this study comprised of all senior secondary school one (SS1) students in Kuje Area Council of Federal Capital Territory, Abuja, Nigeria.

Sample Size and Sampling Techniques

Sampling techniques is a plan specifying how members/elements are drawn from the target population (Oyewobi et al, (2012) in order to avoid biased sample. A sample size of two hundred (200) senior secondary school students was chosen from five senior secondary schools using simple random sampling technique in Kuje Area Council of Federal Capital Territory, Abuja, Nigeria. The sample consists of both males and females whose age ranges between 14-15 years.

Instrument for data Collection

The instrument used in gathering information/data was designed by the researchers named: Basic Algebraic Concepts in Mathematics Curriculum Perceived Difficult (BACMCPD) which consisted of three sections. Section A consisted of respondents' personal Information, Section B contained thirty-three (33) concepts in algebra which cuts across the senior school mathematics curriculum from which the students were to identify concepts perceived difficult to learn. There were four (4) choices to respond. These included: very difficult, difficult, moderately difficult and not difficult while Section C contained identified items on reasons why the concepts were perceived difficult to learn.

Validation of the Instrument

Validation of the instrument was carried out by face and content validity. The questionnaire was given to two qualified mathematics teachers (experts) for proper scrutiny and necessary corrections of the instrument before its administration. They assured the researchers that the instrument could capture the data/information necessary for analysis.

Reliability of the Instrument

The test re-test reliability method was adopted to ascertain the suitability of the instrument. The instrument was trial tested on sixty (60), students who were not part of the sample size for the study. The data gathered was subjected to Pearson product moment correlation coefficient (r) to obtain the reliability index at 0.05 significant. This yielded a coefficient (r) of 0.76 which was reliable for the study.

Procedure for Data Collection

Permission was obtained from the schools management. Thereafter, the researchers personally embarked on familiarization visit to the schools in order to interact as well to establish rapport with the mathematics teachers and the students. The researchers with the help of the two research assistants in the field of mathematics who were trained on what to do personally administered the instrument to the students who formed the respondents. Relevant information was provided to the respondents for accurate responses while the completed questionnaires were retrieved immediately and taken for analysis

Procedure for Data Analysis

The data gathered from the field survey was analyzed using both descriptive and inferential statistics. All the research questions and the null hypothesis formulated were answered and tested by means of descriptive and inferential statistics which includes percentages, mean, standard deviation and t-test.

DATA ANALYSIS AND RESULTS PRESENTATION

For the purpose of analysis, very difficult, difficult and moderately difficult were merged and categorized as difficult while not difficult were classified as simple or easy. This gives answers to research questions 1, 2 and 3 respectively.

Research Question One: What are the possible basic algebraic concepts perceived difficult to learn by secondary school students in Kuje Area Council of Federal Capital Territory, Abuja, Nigeria?

Table-1
Frequency and Percentage of Difficulty Level of Basic Algebraic Concepts in Mathematics

S/N	Basic Concepts	Freq.	Percentage of respondents of difficult (complex) concepts	Freq	Percentage of respondents of not difficult (simple/easy) concepts
	Sets of Numbers and Interval Notation				
1	Set of Real Numbers	42	21.0%	9	4.5%
2	Inequalities	13	6.50%	66	33.0%
3	Interval Notations	63	31.5%	108	54.0%
4	Translations Involving Inequalities	182	91.0%	61	30.5%
5	Union and Intersection of Sets	12	6.0%	166	83.0%
	Operations on Real Numbers				
6	Opposite and Absolute Value	157	78.5%	16	8.0%
7	Addition and Subtraction of Real Numbers	90	45.0%	23	11.5%
8	Multiplication and Division of Real Numbers	22	11.0%	87	43.5%
9	Exponential Expressions	126	63.0%	39	19.5%
10	Square Roots	53	26.5%	61	30.5%
11	Order of Operations	138	69.0%	70	35.0%
12	Evaluating Expressions	74	37.0%	33	16.5%
	Simplifying expressions				
13	Recognizing Terms, Factors and Coefficients	65	32.5%	93	46.5%
14	Properties of Real Numbers	60	30.0%	77	38.5%
15	Simplifying Expressions	39	19.5%	73	36.5%
	Linear Equations in One Variable				
16	Definition of a Linear Equation in One Variable	55	27.5%	71	35.5%
17	Solving Linear Equations	85	42.5%	110	55.0%
18	Clearing Fractions and Decimals	66	33%	129	64.5

19	Conditional Equations, Contradictions, and Identities	160	80.0%	68	34.0%
Applications of Linear Equations in One Variable					
20	Introduction to Problem Solving	94	47.0%	49	24.5%
21	Applications Involving Consecutive Integers	177	88.5%	70	35.0%
22	Applications Involving Percents and Rates	81	40.5%	72	36.0%
23	Applications Involving Principal and Interest	93	46.5%	68	34.5%
24	Applications Involving Mixtures	177	88.5%	67	33.5%
25	Applications Involving Distance, Rate, and Time	29	14.5%	30	15.0%
Linear Equations and Applications to Geometry					
26	Applications Involving Geometry	58	29.0%	82	41.0%
27	Literal Equations	84	42.0%	88	44.0%
Linear Inequalities in One Variable					
28	Solving Linear Inequalities	75	37.5%	99	49.5%
29	Inequalities of the Form $a < x < b$	180	90.0%	165	82.5%
30	Applications of Inequalities	19	9.5%	1	8.5%
Properties of Integer Exponents and Scientific Notation					
31	Properties of Exponents	49	24.5%	50	25.0%
32	Simplifying Expressions with Exponents	170	85.0%	156	83.5%
33	Scientific Notation	79	39.5%	96	48.0%

The analysis in Table 1 indicates frequency and the percentage of respondents for basic algebraic concepts perceived difficult to learn by the students. Comparatively, the Concepts for which percentage response for difficulty falls below 50% (that is $<50\%$) are categorized as not difficult (simple) while the concepts for which percentage difficulty is 50% or above (that is $> 50\%$) are categorized as difficult. With respect to this categorization, out of 33 concepts, thirteen (13) concepts are perceived difficult to learn by the students. These include: interval notations, translations involving inequalities, union and intersection of sets, opposite and absolute value, exponential expressions, order of operations, solving linear equations, clearing fractions and decimals, conditional equations, contradictions and identities, inequalities of the form $a < x < b$, applications involving consecutive integers, applications involving mixtures and simplifying expressions with exponents while twenty (20) concepts were perceived not difficult (simple or easy) by the students. These include the following; set of real numbers, inequalities, addition and subtraction of real numbers, square roots, evaluating expressions, recognizing terms, factors and coefficients, properties of real numbers, simplifying expressions, introduction to problem solving, definition of a linear equation in one variable, applications involving percents and rates, applications involving principal and interest, applications involving distance, rate, and time, applications involving geometry, literal equations, solving linear inequalities, applications of inequalities properties of exponents and scientific notation.

Research Question Two: What are the possible causes of the perceived difficult of basic algebraic concepts by senior secondary school students?

Table-2

Reasons (Why) Given by Students in Concepts Perceived Difficult to Learn

S/No.	Reasons	Number/Percentage (%)	Rank (Position)
1	Teachers' method of teaching	185 (92.5%)	2 nd
2	Inadequate of instructional materials (Teaching aids)	187 (93.5%)	1 st
3	Gender/sex of students	109 (54.5%)	4 th
4	Complexity	156 (78.0%)	3 rd
5	Misconception of concepts	42 (21.0%)	5 th

Table 2 indicates the number or frequency and the percentage of reasons adduced by students in concepts perceived difficult to learn. It was revealed that inadequate of instructional materials had the highest percentage of (93.5%) as the main or the most reason for perceiving the concepts difficult to learn. Also the teachers' method of teaching which had (92.5%) follows, complexity of teachers which was 78.0%, gender of students yielded (54.5%) while misconception of concepts had the lowest percentage (21.0%) of the reasons for perceiving the concepts difficult to learn.

Research Question Three and Hypothesis One:

Is there any difference in the number of basic algebraic concepts perceived difficult by male and female students?

H₀₁: There is no significant difference in the number of basic algebraic concepts perceived difficult by male and female students.

Table-3

t- test Analysis of Male and Female Students on the Level of Difficult in Basic Algebraic Concepts

Variable (Gender)	Number	Mean(x)	St. Dev	Df	t-Cal.	t-Crit.	Decision
Male	79	4.215	1.05	198	0.795	1.960	Accepted
Female	121	4.074	1.18				

The analysis of the t-test in table 3 reveals the t-calculated value of (0 .795) while t-critical value (table value) = 1.960 with df =198 at the level of significance of 0.05. Since the t-cal. value of 0.795 is less than the t-crit. (table value), the null hypothesis of no significance is accepted. This implies that there is no significant difference in the number of algebraic concepts perceived difficult to learn by male and female students. The results further provides an answer to research question three, which means that there is no difference in the number of algebraic concepts perceived difficult to learn by male and female students as observed.

DISCUSSION OF FINDINGS

The result of this study indicated that, students perceived thirteen (13) basic algebraic concepts out of thirty-three concepts presented to them difficult to learn. These included: interval notations, translations involving inequalities, union and intersection of sets, opposite and absolute value, exponential expressions, order of operations, solving linear equations, clearing fractions and decimals, conditional equations, contradictions and identities, inequalities of the form $a < x < b$, applications involving consecutive integers, applications involving mixtures and simplifying expressions with exponents. While twenty (20) concepts were perceived not difficult (simple or easy) by the students. These included the following; set of real numbers, inequalities, addition and subtraction of real numbers, square roots, evaluating expressions, recognizing terms, factors and coefficients, properties of real numbers, simplifying expressions, introduction to problem solving, definition of a linear equation in one variable, applications involving percents and rates, applications involving

principal and interest, applications involving distance, rate, and time, applications involving geometry, literal equations, solving linear inequalities, applications of inequalities properties of exponents and scientific notation.

Reasons specified or adduced by the students for perceiving the algebraic concepts difficult comprised inadequate instructional materials/ teaching aids 187(93.5%) which had the main reason, teachers' teaching methods 185 (92.5%), Complexity of teacher 156 (78.0%), gender/sex of students 109 (54.5.%) and concepts misconception 42 (21.0%) which had the least reason of perceiving the algebraic concepts difficult. This result corroborates with the finding of Telima (2011) who revealed that students' difficulty in mathematics concepts were caused by inadequate instructional materials/teaching aids and teachers' method of teaching.

Similarly, it was also found that there is no significant difference in the number of basic algebraic concepts perceived difficult to learn by male and female students This result contradicts the finding of Sule and Musa (2018) who found a significant difference in the mean achievement score of male and female students in algebra.

CONCLUSION

Based on the results obtained in this investigation, the following conclusions were advanced:

- 1) Thirteen (13) basic algebraic concepts were perceived difficult to learn by the students and twenty (20) concepts were perceived not difficult to learn by the students (simple/easy).
- 2) The causes of difficulty in the learning of basic concepts in algebra was linked to teachers' method of teaching, inadequate of instructional materials/ teaching aids, gender or sex of students, complexity, and concepts misconception.
- 3) There was no significant difference in the number of basic algebraic concepts perceived difficult to learn by male and female students.

RECOMMENDATIONS

In the light of the conclusion, the following recommendations were offered:

- 1) Governments at all levels should provide important instructional materials to various schools for teaching of concepts in algebra.
- 2) The difficult basic algebraic concepts identified in mathematics by the students should be taught by using suitable method of teaching by mathematics teachers.
- 3) School managements should assign enough time for mathematics especially algebraic concepts that students perceived difficult to learn.
- 4) Workshops and seminars should be organized for mathematics teachers to train them on how to effectively teach the identified difficult algebraic concepts which students struggle with.

REFERENCES

1. Abiam, P.O. and Odok, J.K. (2006). Factors in students' achievement in different branches of secondary school mathematics. *Journal of Education and Technology*, 1(1), 161-168.
2. Adegun, I. K. (2013). Students and teachers' views of difficult areas in mathematics syllabus: Basic requirement for science and engineering education. *Journal of Education and Practice*, 4(12), 235-243.
3. Aysen, O. (2012). Misconceptions in geometry and suggested solutions for seventh grade students. *International Journal of New Trends in Arts, Sports and Science Education*, 1(4),1-13.
4. Salman, M. F. (2005). Teachers' identification of the difficult levels of topics in the primary school mathematics curriculum. *Journal of Mathematical Association of Nigeria*, 30(1), 20-28.
5. Azuka, B.F, Jekayinfa, O. Durojaye, D and Okwoza, S.O .(2013). Difficulty levels of topics in the new senior secondary school mathematics curriculum as perceived by mathematics teachers of federal unity schools in Nigeria. *Journal of Education and Practice*, 4(17), 23-25.
6. Abdul-Raheem, D.A. (2012). Ratings of the difficulty levels of senior school mathematics topics by teachers and students in Ibadan, Nigeria, Unpublished M. Ed Thesis, University of Ilorin, Ilorin, Nigeria.

7. Adebule, S.O. (2004). Gender differences on a locally standardized anxiety rating scale in mathematics for Nigerian Secondary schools, *Nigerian Journal of Counselling and Applied Psychology*, 2(1), 22-28.
8. Dike, G. (2013). Mass Failure in WASSCE: Daily Sun www.sunnewsonline.com. Friday, December 20.
9. Ebiendele, E.P. and Adedunji, A.O. (2013). Symbolic notations and students' achievement in algebra. *Educational Research and Review*, 8(15), 1294-1303
10. Sharma M.K. Bansal K.K. [2015] A Comparative Study of Reliability Analysis of a Non-Series Parallel Network. *International Journal of Education and Science Research Review Vol.2(6)*
11. M.K.Sharma Dr.Kapil Kumar Bansal C.S. Prasad (2014) ; Vague Approach to Multiobjective Matrix Payoffs. *International Journal of Education and Science Research Review Vol.1(1)*
12. Federal Ministry Education (2014) National curriculum for senior secondary school mathematics. Lagos: NERDC.
13. Gunawarda, E. (2011). Secondary school students' misconception in algebra, (Ph.D) Thesis, University of Toronto.
14. Iyi, U. (2011). Result of WAEC Examination 2010. Daily Sun News Paper of 11th August;2011.
15. Kurumeh, M.S. & Imoko. B. I.(2008). Universal Basic Education. A Way Forward for Development of Mathematics Education. *ABACUS: The Journal of Mathematical Association of Nigeria*, 33 (1), 36-40
16. Mason, M. (2002). The van Hiele levels of geometric understanding. Retrieved from <http://jwilson.coe.uga.edu/EMAT8990/Geometry>.
17. Moseri, P.O.(2010). Constructivist: A Tool for Improving the Teaching and Learning of Mathematics for attainment of Seven Point Agenda. *Proceeding of Annual National Conference of Mathematical Association*. Ilorin: Uni-Ilorin press.
18. Noraini, I. (2006) Teaching and learning of mathematics: Making sense and developing cognitive abilities (Perak: Utusan Publication Sdn. Bhd. Nigeria).
19. Nigerian Educational Research and Development Council, NERDC (2012). Teachers' guide for the revised 9- ear basic education curriculum mathematics for JS1-3 (Lagos: NERDC Press,) 62-67.
20. Okafor, A. A. (2005). *Developing mathematics at UBE level for reliable science, technology and engineering education*. A paper presented at the international conference on children in science and technology.
21. Sule, S.S. and Musa, D.C. (2018). Effect of Cognitive learning style and Gender on students' Achievement in mathematics in Mararaba Education zone, Nasarawa state, *International Journal of Education and Social Science Research*, 1(3), 226-243
22. Telima, A. (2011). Problems of teaching and learning of geometry in secondary schools in River State, Nigeria. *Geometry Concepts in Mathematics Perceived Difficult To Learn By Senior Secondary School* DOI: 10.9790/7388-0701018390 www.iosrjournals.org. *International Journal of Emerging Science*, 1(2), 143-152.
23. Uduosoro, U. J.(2011). Perceived and actual learning difficulties of students in secondary school mathematics. *International Multidisciplinary Journal, Ethiopia*, 5 (5), 357-366.
24. WAEC (2007-2011). West African Examinations Council Chief Examiners' Report