

ASSESSMENT OF MALE AND FEMALE ACHIEVEMENT IN SSCE FURTHER MATHEMATICS IN KWARA STATE, NIGERIA: IMPLICATION FOR EDUCATIONAL POLICYMAKERS

BY

Olarewaju Adijat Omoladun: Academic Planning Unit, Al-Hikmah University, Ilorin, Kwara State, Nigeria

&

Yusuf Suleiman: Department of Educational Management and Counselling, Al-Hikmah University, Ilorin, Kwara State, Nigeria

Abstract

This study assessed the male and female achievement in SSCE Further Mathematics in Kwara State, Nigeria. Two research questions and objectives were formulated. Descriptive research design of ex-post facto type was employed. All senior secondary school offering Further Mathematics within Ilorin Metropolis constitutes the study population. Secondary data comprising students' results with photo album which indicates gender of students in WASSCE and NECO from 2007-2016 were adopted. Data was analysed using Percentage and Auto-regressive (AR) processes for modelling of time series analysis. Findings revealed that in WASSCE, the percentage of male students who obtained credit ranged from 26.5 to 91.0; pass ranged from 9.0 to 50.60 and fail ranged from 0.0 to 41.2 while the percentage of female students who obtained credit ranged from 12.5 to 86.2; pass ranged from 13.8 to 66.7 and fail ranged from 0.0 to 52.6. In NECO, the percentage of male students who obtained credit ranged from 14.6 to 84.4; pass ranged from 14.7 to 72.9 and fail ranged from 0.0 to 19.8 while female with credit ranged from 11.8 to 70.4; pass ranged from 14.8 to 62.5 and fail ranged from 0.0 to 40.0. On the difference in students' achievement in Further Mathematics, results showed that male students obtained credit than female students in both examinations. Based on the findings, it was recommended that educational policy makers should employ more qualified Further Mathematics teachers and that female participation in Further Mathematics should be encouraged by the school principals and teachers.

Keywords: *Further Mathematics, Gender, Students' Achievement, Educational Policymakers and Secondary School*

Introduction

Mathematics can be regarded as the queen of all sciences due to the role it plays in human daily activities while Further Mathematics is one of the science subjects that deals with numbers and space. Sound knowledge of Mathematics can only be achieved through the knowledge of Further Mathematics (Awofala, Arigbabu & Awofala, 2013; Olarewaju, 2017). Salman (2005) affirmed that mathematics is an indispensable tool in the study of sciences, humanity and technology.

According to Oluwole and Muraina (2016), Further Mathematics is perceived as an advanced portion of Mathematics that goes beyond Ordinary Arithmetic, Geometry, Algebra and Trigonometry. The tropical contents of Further Mathematics include Calculus, Coordinate Geometry, Differential Equation, Matrices, Sets and Logic, Mechanics, Theory of Numbers, Probability and Statistics. Therefore, Further Mathematics is the center force for future progress if the craves for science and technology is to be realistic. The negligence of Further Mathematics is due to the general assumption that Further Mathematics is carved out for few who may be interested to pursue higher mathematics and a discipline like engineering (Inekwe, 2006).

With reference to WAEC (2019), Further Mathematics is a subject that bridges the gap between Elementary Mathematics and Higher Mathematics. Considering the usefulness of Further Mathematics in the study of sciences, Asim, Basse and Essien (2005); Suleiman (2010), highlighted the relevance of science, technology and mathematics to technological development and concluded that there would be no modern society without science, technology and mathematics. Fajemidagba (2001) and Jonah (2010) asserted that students who offer Further Mathematics have opportunities to perform better especially in mathematics than their counterparts who do not offer Further Mathematics but only few science students offer Further Mathematics due to the optional subject for science students.

National Council for Curriculum Assessment (2005) noted that many students perceive Further Mathematics as an elite subject for only the best students. Further Mathematics Curriculum is a curriculum document, published in 1985 with a complete philosophy, a set of goals, some selected mathematics contents, some pedagogical specifications and, some necessary evaluation prescriptive suggestions for its interpretation. Curriculum could be seen as a medium through which educational institutions translate their societal values into concrete reality (Ameen & Salman, 2016; Odili & Asuru, 2011). Hence, Further Mathematics is a subject that meant for potential mathematician, engineers and scientists.

On factors responsible for students' poor performance in Further Mathematics, Gegbe and Koroma (2014) found that students' poor achievements in General and Further Mathematics is traceable to a number of factors such as teaching methods, attitudes of the teacher towards the subject, teachers' inadequate understanding of the basic concept in Further Mathematics while Odili and Asuru (2011) are of the view that senior school students were deficient in all concepts of Further Mathematics except in indices and logarithms and concluded that most of the candidates did not cover the syllabus before attempting the examination. Awofala (2017) opined that in Nigeria, both male and female students not only struggle with mathematics learning but consider Further Mathematics difficult subject than Mathematics. There is also issue of stereotypical assertion that females are poor in mathematical ability, even though research indicates that both males and females display little difference in their performance.

Despite the fact that both male and female students struggle with Mathematics learning because they consider Mathematics as a difficult school subject, the study of Further Mathematics education has the possibility to transform the type of mathematical learning that students are

exposed to regardless of their gender status because the gender element is a recurrent element of investigation in the field of Mathematics Education.

In view of the above, the current study assessed male and female achievement in SSCE Further Mathematics in Kwara State, Nigeria with the implication for educational policy makers. Specifically, since achievement is the educational goals of student measured by examinations, thus achievement was measured by WASSCE (West Africa Senior School Certificate) and NECO (National Examinations Council) results based on gender.

Generally, previous studies indicate that gender issue is very paramount in science education especially in the world of technological development and that the effect of gender on students' achievement has been a major subject of discussion that many people are interested in the field (Fakogbon, Omiola, Awoyemi & Mohammed, 2014; Kajuru, Ibrahim & Olaleye, 2015).

For instance, study conducted by Fakogbon *et al* (2014) established that male and female students who used Computer Assisted Instruction (CAI) package in teaching mathematics performed better in Further Mathematics. Specifically, male students performed better than their female counterpart. The work of Kajuru *et al* (2015) found no significant difference between male and female performance in Further Mathematics while Odili and Asuru (2011) concluded that male and female have equal perception on poor instructional strategies and content coverage of the teaching and learning Further Mathematics.

In the research conducted by Aigbomian (2002), he found that male performed better than female in science, technical and mathematical subjects. Female have been shown to have performed better than male in certain instances in some researches on the gap between academic achievement of male and female. Ibikunle (2010) established that female usually make external attributions for successes and failures, and that when they make internal attributions these refer not so much to effort, but to ability.

On the issue of gender disparity in mathematics achievement of secondary school students, Alio and Harbor-Peters (2000) confirmed that that there existed a significant difference in the achievement of male and female students in favour of male why the study conducted by Ezeugo and Agwagah (2000) showed that male perform better than their female counterparts in algebra. In the same vein, Ballah and Ugwumba (2015) focused on gender difference in academic achievement of students in physics, the result showed that there is significant difference in academic achievement of male and female students in physics. Aminu (2008) in attempt to find the effect of gender on students' achievement observed that there is significant difference in the performance of boys over girls in his self-developed mathematics test. Also, Betiku, (2002) and Eze, (2008) asserted that gender had significant effects on students' achievement in their studies.

Furthermore, Odili and Asuru (2011) investigated the impact evaluation of Further Mathematics Curriculum in Nigeria. Their result showed equal perception between male and female students on poor instructional strategies and content coverage of the teaching and learning Further Mathematics. Kajuru *et al* (2015), analyses showed that there is no significant difference between male and female students' achievement in Further Mathematics among the senior

secondary school in Zaria metropolis of Kaduna state. Salman (2004) found no difference in gender influence on students' achievement in Mathematics. In most aspect of human endeavour males see themselves as superior person to their female counterpart, when in actual sense there are some aspects that female overtake males.

Additionally, Abdullahi (2013) investigated the effect of teaching methods, gender and school location on the performance of secondary school students in mathematics in Kano State, Nigeria. The findings showed that gender have significant effect in learning mathematics in favour of males. Also, Kolawole (2008) study on gender in relation to mathematics achievement in Ekitistateand discovered that girls in federal government colleges are performing better than boys in numeracy and other mathematical skills.

Taken the above studies together, it can be said that empirical studies are yet to be fully explored to examine male and female academic achievement in Further Mathematics using WASSCE and NECO results. Specifically, little research has been conducted to do a comparative study regarding male and female achievement using two examination bodies. In view of the foregoing, therefore, this study considered WASSCE and NECO examinations as important factors that can be used to establish students' academic achievement in Further Mathematics based on gender.

Research Objectives

The main purpose of this study is to assess male and female achievement in SSCE Further Mathematics in Kwara State, Nigeria. The specific objectives of the study are to:

1. Find out the trend of students' achievement in WASSCE and NECO SSCE in Ilorin Metropolis from 2007 to 2016.
2. Identify the differences in achievement of male and female students in WASSCE and NECO SSCE Further Mathematics Examination between 2007 to 2016

Research Questions

1. What is the trend of students' achievement in WASSCE and NECO SSCE in Ilorin Metropolis from 2007 to 2016?
2. What is the difference in students' achievement in WASSCE and NECO SSCE in Ilorin Metropolis from 2007 to 2016 based on gender?

Methodology

The study adopted a descriptive survey design of the ex-post facto research type. The population for the study comprised of all senior secondary school students offering Further Mathematics at Senior Secondary Certificate Examination level in Ilorin metropolis of Kwara State Nigeria. The sample for this study consists of 79 public senior secondary schools within Ilorin Metropolis. This consists of Ilorin East (30), South (21) and West (28) local government areas. Both stratified and purposive sampling techniques were used to select (32) senior secondary schools in Ilorin metropolis, since only the results of schools registered students for Further Mathematics examinations with WAEC and NECO bodies were considered.

Secondary data were collected on students' achievement from schools between 2007 and 2016through the collection of records sheet and photo album which shows total number of

students based on gender that registered and sat for WASSCE and NECO SSCE in Further Mathematics. In analysing the data collected, percentage and time series analyses were used to analyse the data. Specifically, percentage was used to do the analysis and time series was used to do the graphical representation of data collected between 2007 to 2016 while estimation technique used for the study is Autoregressive (AR) processes for modelling of time series.

Results

Research Question 1: What is the trend of students' achievement in WASSCE and NECO SSCE in Ilorin Metropolis from 2007 to 2016?

Table 1 presented the number and percentage of male and female students who obtained Credit (A₁-C₆), Pass (D₇& E₈) and Fail (F₉) in WASSCE in selected secondary schools in Ilorin metropolis from 2007-2016. The percentage of male and female students who obtained credit ranged from 26.5 to 91.0 and 12.5 to 86.2; pass ranged from 9.0 to 50.60 and 13.8 to 66.7 and fail ranged from 0.0 to 41.2 and 0.0 to 52.6.

Table 1: *Percentage of male and female students who obtained Credit (A₁-C₆), Pass (D₇&E₈) and Fail (F₉) in WASSCE Further Mathematics between 2007 and 2016.*

Year	Total number of students sat		Number of students obtained credit (%)		Number of students obtained pass(%)		Number of students obtained fail (%)	
	Male	Female	Male	Female	Male	Female	Male	Female
2007	62	36	30(48.4)	10(27.8)	12(19.3)	10(27.8)	20(32.3)	16(44.4)
2008	62	21	30(48.4)	10(47.6)	24(38.7)	10(47.6)	8(12.9)	1(4.8)
2009	68	38	18(26.5)	6(15.8)	22(32.3)	12(31.6)	28(41.2)	20(52.6)
2010	172	64	52(30.2)	8(12.5)	86(50.0)	42(65.6)	34(19.8)	14(21.9)
2011	218	68	146(67.0)	48(70.6)	44(20.2)	18(26.5)	28(12.8)	2(2.9)
2012	148	48	80(54.1)	16(33.3)	62(41.9)	32(66.7)	6(4.0)	-
2013	172	76	78(45.3)	24(31.6)	66(38.4)	34(44.7)	28(16.3)	18(23.7)
2014	164	74	116(70.7)	50(67.6)	44(26.8)	24(32.4)	4(2.5)	-
2015	144	78	86(59.7)	46(59.0)	46(32.0)	22(28.2)	12(8.3)	10(12.8)
2016	178	58	162(91.0)	50(86.2)	16(9.0)	8(13.8)	-	-
	Mean (%)		54.13	45.20	30.86	38.49	15.01	16.31

Table 2 presented the number and percentage of the male and female students who obtained Credit (A₁-C₆), Pass (D₇& E₈) and Fail (F₉) in NECO SSCE in selected secondary school, Ilorin metropolis from 2007-2016. The percentage of the students who obtained credit ranged from 14.6 to 84.4 and 11.8 to 70.4; pass ranged from 14.7 to 72.9 and 14.8 to 62.5 while fail ranged from 0.0 to 19.8 and 0.0 to 40.0

Table 2: Percentage of male and female students obtained Credit(A₁-C₆), Pass (D₇&E₈) and Fail (F₉) in NECO SSCE Further Mathematics between 2007 and 2016.

Year	Total number of students sat		Number of students obtained credit (%)		Number of students obtained pass (%)		Number of students obtained fail (%)	
	Male	Female	Male	Female	Male	Female	Male	Female
2007	50	16	28(56.0)	6(37.5)	22(44.0)	10(62.5)	-	-
2008	64	24	54(84.4)	14(58.3)	10(15.6)	6(25.0)	-	4(16.7)
2009	96	34	14(14.6)	4(11.8)	70(72.9)	24(70.6)	12(12.5)	6(17.6)
2010	162	70	52(32.1)	12(17.1)	78(48.1)	30(42.9)	32(19.8)	28(40.0)
2011	104	18	24(23.1)	4(22.2)	74(71.1)	8(44.5)	6(5.8)	6(33.3)
2012	108	34	68(63.0)	16(47.1)	34(31.5)	18(52.9)	6(5.5)	-
2013	128	60	70(54.7)	20(33.3)	44(34.4)	28(46.7)	14(10.9)	12(20.0)
2014	106	60	78(73.6)	24(40.0)	28(26.4)	26(43.3)	-	10(16.7)
2015	136	52	112(82.4)	24(46.2)	20(14.7)	24(46.2)	4(2.9)	4(7.6)
2016	106	54	82(77.4)	38(70.4)	22(20.7)	8(14.8)	2(1.9)	8(14.8)
Mean (%)			56.13	38.39	37.94	44.94	5.93	16.67

The time series plot represented by figure1 and 2 showed non-stationary trends in achievement patterns. The trends showed upward and downward patterns over times. These implied that the trends of male and female students’ achievement by Credit in WASSCE and NECO SSCE Further Mathematics in Ilorin metropolis from 2007 to 2016 were stochastic with random walk.

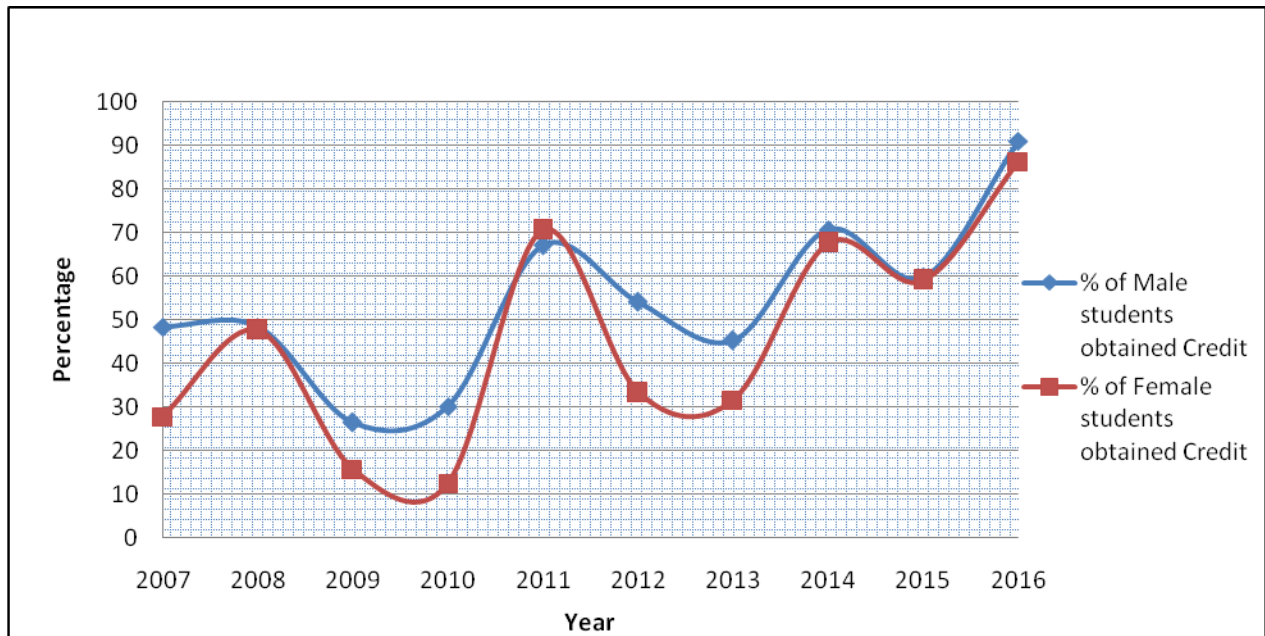


Figure 1: Trends of male and female students’ achievement in WASSCE Further Mathematics by Credit between 2007 and 2016.

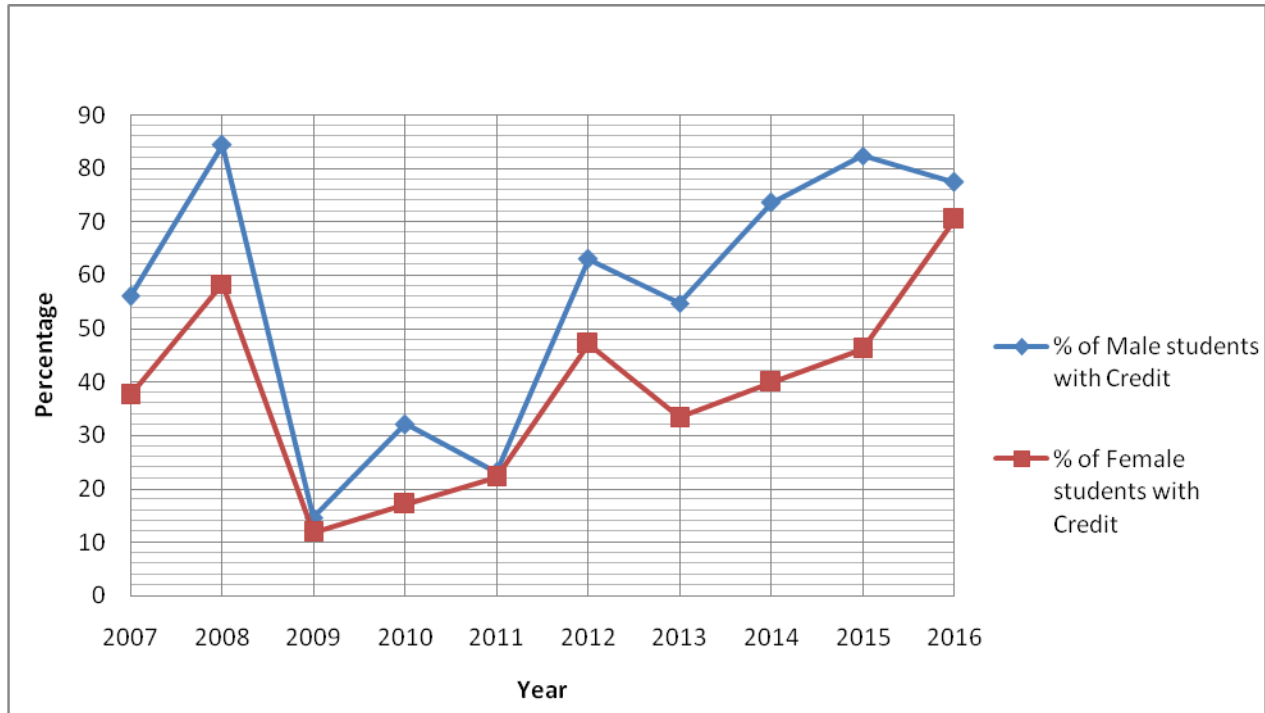


Figure 2: Trends of male and female students' achievement in NECO SSCE Further Mathematics by Credit between 2007 and 2016.

Research Question 2: What is the difference in students' achievement in WASSCE and NECO SSCE Further Mathematics Examination between 2007 and 2016 based on gender?

Table 3: Mean percentages of the number of male and female students who obtained Credit(A₁-C₆), Pass (D₇&E₈) and Fail (F₉) in WASSCE and NECO between 2007 and 2016.

Gender	Mean (%) of students obtained Credit		Mean (%) of students obtained Pass		Mean (%) of students obtained Fail	
	WASSCE	NECO	WASSCE	NECO	WASSCE	NECO
Male	54.13	56.13	30.86	37.94	15.01	5.93
Female	45.20	38.39	38.49	44.94	16.31	16.67

As it shown in table 3, male students obtained credit than female students and more than average number of male students obtained credit while less than average number of female students obtained credit in WASSCE and NECO SSCE.

Discussion of Findings

The first research question stated to ascertain the trends of students' achievement in Further Mathematics in WASSCE and NECO in Ilorin Metropolis based on gender. In line with the first research objective, findings show that the trends of both male and female students' achievement in WASSCE and NECO SSCE from 2007 to 2016 displayed upward and downward patterns over times and that the trend were stochastic with random walk as shown in figure 1 and 2. The

current findings are in congruent with the studies of Kajuru, *et al* (2015) whose findings showed trend in male and female students' achievement in Further Mathematics among senior secondary school in Zaria metropolis of Kaduna state.

The second research question stated to identify the differences in achievement of male and female students in WASSCE and NECO SSCE Further Mathematics Examination between 2007 to 2016. In line with the foregoing objective, findings indicate that there is difference in male and female students' achievement in WASSCE and NECO SSCE Further Mathematics in Ilorin metropolis from 2007 to 2016. Specifically, in WASSCE, the percentage of male students who obtained credit in Further Mathematics from 2007 to 2016 is 54.13%, while the percentage of female students with credit is 45.20%. In NECO examination, the percentage of male with credit is 56.13% while percentage of female with credit is 38.39%. Based on the findings, it can be said that male performed more than female in both WASSCE and NECO examinations. This is in line with the study of Abdullahi (2013) who established that gender has significant effect in learning mathematics and that male students usually perform more than their female counterpart. The finding is also in agreement with the studies of Aminu (2008) and Alio and Harbor-Peters & Ezeugo and Agwagah (2000) who found a significant difference in the achievement of male and female students and that male performance cannot be compared with female because male usually show passion for Further Mathematics than female. In the same vein, the study conducted by Ezeugo and Agwagah (2000) showed that male perform better than their female counterparts in algebra. This is in agreement with the study of Asim (2005) who recorded low female participation in science subject. In the same vein, the finding is also in tandem with the study of Abdullahi (2013) that established a significant effect in learning mathematics in favour of males. Also, the study of Kolawole (2007) discovered that girls in federal government colleges are performing better than boys in numeracy and other mathematical skills.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Female students should be encouraged to create interest in science and science related courses.
2. Further Mathematics teachers should be encouraged to allocate more time to the teaching and learning of Further Mathematics on school time-table. This is to assist in full coverage of teaching syllabus and preparing well-grounded learners on relevant topics for future challenges.
3. There is need to review government policy on gender participation in science related subjects. This could be more affirmative for female participation to and it will also stem gender disparity against women in discipline such as engineering, Physics and other science related subjects.
4. Contents of Further Mathematics curriculum should be all inclusive and non-discriminating to allow development of problem-solving ability which could be useful for daily needs of our society.

Conclusion

Based on the findings of the study, it can be said that students' achievement in both WASSCE and NECO SSCE Further Mathematics examinations from 2007 to 2016 in Kwara State on the basis of gender was more to the favour of male students than their female counterpart. In view of the foregoing, researchers in the field of science education are encouraged to replicate this study by including other variables (i.e age, class, parent's status) that were not included in this study. Also, this study was limited to Ilorin metropolis (Ilorin East, Ilorin South and Ilorin West Local Governments) area of Kwara state. Further studies are needed to be carried out to widen the scope of the study by covering all the 16 local governments so that generalization can be made.

References

- Abdullahi, H.L. (2013). *Effects of teaching methods, gender and school location on the performance of secondary school students in mathematics in Kano state*. A dissertation submitted to the Department of Science and Vocational Education, Usman Danfodiyo University, Sokoto Nigeria.
- Aigbomian, D. O. (2002). *Science for All: Implication for the teacher and national development*. 14th Inaugural lectures of Ambrose Ali University, Ekpoma, Edo State, Nigeria.
- Alio, R.C. & Harbor-Peters, V.F. (2000). Effects of polya's problem solving Technique on secondary school students' achievement in mathematics. *Abacus: The Journal of Mathematical Association of Nigeria*. 25(1).20-25.
- Ameen, S. K. & Salman, M.F. (2016). Perceived difficult concepts in Mathematics by Senior School Students and Mathematics Teachers in Ilorin, Kwara Stat, Nigeria. *Ilorin Journal of Education*, 1(35).168-174.
- Aminu, A. (2008). The effect of Gender on students' performance in mathematics. *Kano Journal of Science Education (KAJOSE)*. 3(2), 11-15.
- Asim, A. E., Bassey, U. U., & Essien, M. I. (2005). *Trend analysis of West African Senior Certificate Examination results in Science, Technology and Mathematics (STM): Implication for learning in Nigerian secondary schools*. Paper presented at the 31st Annual Conference of International Association for Educational Assessment, with the theme Assessment and the future of schooling and learning in Nigeria, Nicon Hilton Hotel, Abuja.
- Awofala, A. O. A., Arigbabu, A. A., & Awofala, A. A. (2013). Effects of framing and team individualised instructional strategies on senior secondary school students' attitudes toward mathematics. *Acta-Didactica Napocensia*, 6(1), 1-22.
- Awofala, A.O.A. (2017). Assessing senior secondary school students' mathematical proficiency as related to gender and performance in mathematics in Nigeria. *International Journal of Research in Education and Science (IJRES)*, 3(2), 488-502.

- Ballah, A. G., & Ugwumba, A. O. (2015). Attitude and academic performance of senior secondary school students in physics in Nigeria. *2nd International Conference on Education, Social Sciences and Humanities* 499-508.
- Betiku, O. F. (2002). Gender equality in Science, Technology and Mathematics education male and female comparison. In S. O. Oriafio, P. O. E. Nwaokolo, G. C. Igboragbor (Eds.): *Refocusing Education in Nigeria* (pp. 62-63). Benin City: DasyIva influence.
- Chamber, E. A. & Schreiber, J. B. (2004). Girls academic achievement Varying association of extracurricular activities. *Gender and Education* 16(3), 327-346.
- Eze, C.C. (2008). *Comparative effects of two questioning techniques on students' achievement retention and interest in chemistry*. M.Ed. project report. Department of Science Education, University of Nigeria, Nsukka.
- Ezeugo, N.C. & Agwagah, U.N.V. (2000). Effects of Concept Mapping on Students' Achievement in Algebra: Implication for Secondary Schools Mathematics Education in the 21st Century. *Abacus: Journal of Mathematical Association of Nigeria*. 25(1), 1-12.
- Fajemidagba, M. O. (2001). Trends in Mathematics Education in Nigeria: Issues and Problems. *ABACUS Journal of Mathematics Association of Nigeria*, 21(1), 131-153.
- Fakogbon, M.A., Omiola, M.A., Awoyemi, S.O., Muhammed, R.E. (2014). Effect of Computer assisted instructional package of the performance of students in Mathematics in Ilorin metropolis. *European Scientific Journal*, 10(25),196-206.
- Gegbe, B., & Koroma, J.M. (2014). Students and teachers' perception of the causes of poor academic performance in General and Further Mathematics in Sieria Leone. *International Journal of Engineering Research and General Science*, 2(5), 240-253.
- Ibikunle, O. F. (2010). *Gender issues: Students performance in senior secondary school mathematics examination in Nigeria*. Faculty of Education, University of Leeds, Leeds, United Kingdom.
- Inekwe, O.I. (2006). A critical and situational analysis of Further Mathematics in the Northern States of Nigeria. *Ilorin Journal of Science Education*, 2(3), 167-174.
- Jonah, W. A. (2010). Implementation of the Further Mathematics Curriculum in schools in Bayelsa state. *Multidisciplinary Journal of Research Development*, 15(5), 1-9.
- Kajuru, Y. K., Ibrahim, M. O., & Olaleye, O. O. (2015). Effects of teachers' qualification and competency on performance in Further Mathematics among senior secondary school students in Kaduna state, Nigeria. *International Journal of Educational Research and Information Science*, 2(4), 93-97.

- Kolawole, E.B. (2008). Effects of comparative and cooperative learning strategies on academic performance of Nigerian students in Mathematics. *Journal of Educational Research and Review*, 3(1), 33-37.
- National Council for Curriculum Assessment (2005). *Discussion paper on International trends in mathematics*. A paper published by the Government of Ireland.
- Odili, G. A., & Asuru, V. A. (2011). Impact evaluation of Further Mathematics curriculum in Nigeria. *Educational Research and Reviews* 6(20). 997-1004.
- Olarewaju, A.O. (2017). *Analysis of Students' Achievement in Senior School Certificate Further Mathematics Examination in Kwara State*. (Unpublished M.Ed. Project). University of Ilorin, Ilorin, Nigeria.
- Oluwole, D. A and Muraina, K. O. (2016). Effectiveness of Motivational Enhancement Therapy in Enhancing Mathematics Learning Gains among School-Going Adolescents in Oyo State, Nigeria. *The Pacific Journal of Science and Technology*, 17(1), 140-151.
- Salman, M. F. (2004). Analysis of gender influence and performance of junior secondary students' technique in solving simultaneous linear equations by graphical methods. *Gender discuss* 1(1), 87-99.
- Salman, M. F. (2005). Teacher identification of difficulty level of topics in primary school Mathematics curriculum in Kwara State, *ABACUS: Journal of Mathematical Association of Nigeria*, 30(1), 20-29.
- WAEC (2019). West Africa Examination Council Syllabus. Retrieved from <https://awajis.com/download/waec/syllabus/ssce/FURTHERMATHEMATICS>, 1-18.