TEACHERS' PERCEPTIONS OF THE CAUSES OF STUDENTS' LOW ENROLMENT IN SENIOR SECONDARY SCHOOL PHYSICS IN OYO-NORTH, NIGERIA

MUHAMMED ABDULLAHI LAWAL
Department of Science Education
University of Ilorin, Ilorin, Nigeria
E_Mail: lawalmuhammed900@gmail.com

RIDWAN ENUWA MOHAMMED
Department of Science Education
University of Ilorin, Ilorin, Nigeria
E_Mail: ridemedu@gmail.com

AFEES AKANNI AMUDA
Department of Science and Vocational Education,
Faculty of Education and Extension Services,
Usmanu Danfodiyo University, Sokoto
E_Mail: afees.akanni@udusok.edu.ng

Abstract

Despite the significant contribution of physics to modern society, a decline in physics enrollment has been observed over the years. This study specifically investigated the reasons behind students' low enrollment in Physics. The objectives focused on exploring the impact of teachers' qualifications and gender on their perceptions of the causes of this low enrollment in senior school physics in Oyo-North, Nigeria. The study employed a descriptive survey research design, utilizing a self-designed questionnaire with a reliability index of 0.89. A convenient sampling technique was used to gather responses from 170 physics teachers across 172 senior secondary schools in Oyo-North. Data analysis included percentages, mean, standard deviation, and Chi-square tests. The findings identified various causes for the low enrollment, such as students' interest, insufficient physics textbooks, inadequate physics laboratories, the mathematical nature of physics, poorly equipped physics labs, and parental influence. The study found no significant difference in the perceptions between qualified and unqualified physics teachers regarding the causes of students' low enrollment, nor was there a significant difference between male and female physics teachers. Ultimately, the study concluded that teachers' qualifications and gender had no bearing on physics teachers' perceptions of the causes behind students' low physics enrollment in senior secondary schools. The recommendations included concerted efforts by educational stakeholders to enhance physics enrollment by providing adequate textbooks, well-equipped laboratories, and other resources to foster student interest and prevent the decline of physics in senior secondary schools in Oyo-North, Nigeria.

Keywords: Teachers, Perception, Low, Enrolment, and Physics.

Introduction

Science stands as a fundamental instrument for industrial and national progress. When effectively managed, it fosters a nation's economic and social development. Cohen (2020) defines science as a systematic endeavor that constructs and organizes knowledge, providing testable explanations and predictions about the universe. It encompasses Physical Sciences, Life Sciences, as well as Medical and Technical Sciences. The field of Physical Sciences includes subjects like Physics and Chemistry, with Physics contributing significantly to global development (Omosewo, 2012).

At the senior secondary education level in Nigeria, Physics is a crucial subject. It serves as the cornerstone of science and technology, as many tools essential for scientific and technological progress are direct products of Physics (Gallo & Veronese, 2022). Therefore, Physics remains a fundamental discipline in the realm of science and technology, delving into the essence of natural phenomena and facilitating an understanding of societal technological changes. It focuses on energy and its interactions, serving as the foundational science upon which other branches build their concepts and techniques (Omosewo, 2012; Mankilik, & Ofodile, 2015).

Despite the pivotal role of Physics in our nation's scientific and technological advancement, there exists a persistent trend of low enrollment in Physics among students (Adolphus & Aziaka, 2020). Researchers such as Aina and Ayodele (2018) and Adolphus and Aziaka (2020) have noted this decline, especially in students' interest in science subjects like Physics. Joseph (2014) highlighted that this tendency is more pronounced among female students, posing a challenge to Nigeria's aspiration to become a technologically proficient nation. Furthermore, observations by Aina and Ayodele (2018) indicate a decline in students' willingness to pursue Physics at higher educational levels across several countries.

According to Fennena and Franke (2006), the effectiveness of teaching any subject greatly depends on teachers' grasp of the subject's nature. Proper teaching perception emerges when teachers effectively convey the subject's content. Ifiok (2005) highlighted that a lack of relevant background or orientation pertinent to the curriculum leads to negative attitudes toward implementing a new curriculum. This attitude impacts student enrollment regardless of the curriculum's design.

The quality of a nation's educational system is directly tied to the caliber of its teachers. Qualified teachers hold teaching certificates or state licenses, possess at least a Bachelor's Degree from a four-year program in higher education, and are well-versed in their specialization (Musau & Abere, 2015). Teachers are pivotal assets in the school system, driving the realization of a nation's educational policy that reflects societal needs and aspirations.

Teacher qualifications significantly impact their effectiveness. Academically qualified teachers possess deeper subject knowledge compared to less qualified counterparts. Yakubu (2023) underscores the importance of specific teacher qualities in enhancing students' academic achievement, which also affects the low enrollment of Physics students in senior secondary schools (Adolphus & Aziaka, 2020).

Gender is a social construct encompassing male-female associations shaped by socialization methods. Oliver and Wood-mcConnney (2017) noted a low enrollment of female students in Physics and science-related subjects. However, Ochoche and Oguche (2022) concluded that urban and rural junior secondary school students' performance varies according to gender differences, favoring female students. Enrollment of females in science, particularly Physics, remains notably low (Olatoye, Falokun, Olasehinde, & Abdulmalik, 2016). These gender disparities affect Physics and other science subjects (Oliver & Wood-mcConnney, 2017). Negative attitudes toward Physics, combined with the complexity of Mathematics, an unsupportive environment, and parental and peer influences, contribute to the low enrollment of females in Physics (Osagie & Alutu, 2016).

To propel technological development, addressing the causes behind low enrollment of Physics students in senior secondary schools is imperative. This study sought to uncover teachers' perceptions of the factors influencing students' low enrollment in senior secondary school Physics in Oyo-north, Nigeria.

Literature Review

The study conducted by Obiadazie (2016) focused on the factors contributing to low enrollment in science among senior secondary schools in Onitsha South L.G.A. It utilized a descriptive research design and employed stratified sampling to select 10 secondary schools from 47 government-owned schools in Onitsha's education zone. Forty students from each school, totaling 400, were surveyed using a well-structured questionnaire. The findings indicated a decline in science enrollment over time in Onitsha's education zone, attributing this trend to factors such as the perceived difficulty of science, inadequate teaching methods, students' attitudes, lack of motivation, and the mathematical nature of physics.

Joseph (2014) investigated factors influencing girls' enrollment and performance in Physics across selected schools in Nandi South District, Kenya. Employing a descriptive survey design, the study included 17 secondary schools chosen through stratified sampling. Data were collected from Heads of Science Departments, Physics teachers, and Form Three Physics students using interviews, questionnaires, and achievement tests. The analysis highlighted the school environment as a significant determinant of girls' performance and enrollment in Physics. Contrary to expectations, the study revealed that the mathematical component in Physics had minimal influence on girls' performance, with 70% of participants passing this aspect. Furthermore, parental guidance and motivation significantly influenced girls' enrollment in Physics, as indicated by 80% of parents positively impacting their daughters' choices.

In a related study by Orodho and Kiruki (2015), the focus was on the impact of student and teacher attitudes on Physics enrollment in secondary schools within Kenya's Imenti South constituency. Employing a descriptive survey design, the study involved 138 Physics teachers, 1,864 students, and 61 principals from 61 public secondary schools. The research utilized purposive and random sampling to select respondents, totaling 240. Questionnaires for students and Physics teachers, along with interview schedules for principals, were the primary data collection tools. The study revealed positive attitudes toward Physics among both female and male students, indicating their potential for performing well in the subject. However, inadequate teaching and learning resources emerged as a significant challenge, limiting the array of instructional techniques available to effectively teach Physics.

The study by Adolphus and Aziaka (2020) explored the impact of teacher qualification and experience on Physics students' enrollment and academic achievement in selected secondary schools in Rivers State, Nigeria. Using mixed research methods - quantitative and qualitative, the study found a positive correlation between students' academic attainment and teachers' qualifications. Moreover, the availability and utilization of resources by teachers also positively correlated with students' academic achievement. Interestingly, there wasn't a significant correlation between teacher qualification/experience and students' attainment based on gender.

Additionally, teachers' qualification and experience didn't influence students' enrollment.

In a related investigation, Salman (2011) highlighted the lower enrollment of female students in science, mathematics, technology, and engineering subjects at secondary and tertiary education levels. Factors contributing to this included negative attitudes toward schooling, traditional values, and inadequate gender equity implementation. Recommendations suggested the ongoing support of professional competencies among teachers in these subjects, focusing on learner-centered and cooperative teaching approaches.

Aina's work (2013) focused on the gender analysis of students' academic performance in Physics practicals within colleges of education in Nigeria. This descriptive survey research examined Physics students' practical course results from three public Colleges of Education in Kwara State. While the analysis found no correlation between male and female students' performance in Physics practicals, it did highlight that male students tended to perform better in these practical sessions. However, consistent findings on the influence of gender on students' achievement in Physics have been lacking, warranting further investigation into the impact of gender on low enrollments in Physics.

The review of literature provided significant insights for the present research. While several studies shared similarities in methodology, such as descriptive research and the use of questionnaires, the present study differs in its simultaneous utilization of percentage, mean, standard deviation, and chi-square for data analysis. Thus, the current study aims to explore teachers' perceptions regarding the causes of low enrollment in senior school Physics in Oyo-North, Nigeria, considering school teachers' qualifications and gender as moderating variables.

Statement of the Problem

Low enrollment in senior secondary school physics has remained a significant concern within the educational sector. Investigations into its causes have highlighted factors such as lack of interest, unqualified physics teachers, inappropriate teaching methods, inadequate laboratory facilities, financial constraints, and gender differences (Joseph, 2014; Obiadazie, 2016). Obiadazie (2016) identified a lack of qualified science teachers, insufficient instructional materials, the nature of the subject, and lack of motivation as contributing to low science enrollment. Aina and Ayodele (2018) also pinpointed reasons for low physics enrollment, including students' perception of Physics as difficult, negative attitudes toward Mathematics and Physics, a shortage of physics teachers, and inadequate teaching materials and facilities. Addressing these challenges becomes essential to prevent the scarcity of physics teachers, particularly in Oyo-North and Nigeria as a whole, which could impact the country's future development. The existing literature indicates a gap in studies focusing on science students as respondents, and none of them utilized convenient sampling techniques. Therefore, this study sought to investigate teachers' perceptions regarding the causes of low enrollment in senior school Physics in Oyo-North, Nigeria. Additionally, it aimed to explore how teachers' qualifications, experience, and gender influence their perception of the reasons behind low enrollment in senior school Physics.

Objectives of the Study

The main objective of this study was to find out teachers' perceptions of causes of students' low enrolment in senior secondary schools Physics in Oyo-North, Nigeria. Specifically, the study determined the;

i. causes of students low enrolment in senior school physics as perceived by the Physics teachers.
ii. influence of Physics teachers' qualifications on their perceptions of the causes of students' low enrolment
iii. influence of Physics teachers' gender on their perceptions of the causes of students' low enrolment.

Research Questions

This study seeks to answer the following questions:

i. What are the causes of students' low enrolment in senior school Physics as perceived by the Physics teachers?
ii. What is the influence of Physics teachers' qualifications on their perceptions on students' enrolment in Physics?
iii. What is the influence of Physics teachers' gender on their perceptions on students' enrolment in Physics?

Null Hypotheses

The following hypotheses were formulated to guide the study at 0.05 level of significance.

Ho_1: There is no significant difference in perceptions of qualified and unqualified Physics teachers on students' low enrolment
Ho_2: There is no significant difference in perceptions of male and female Physics teachers on students' low enrolment

Research Design

This study adopted a descriptive survey approach, utilizing a questionnaire to assess the reasons behind the low enrollment of students in Physics. The target population consisted of senior secondary school Physics teachers in Oyo-North, Nigeria. Convenient sampling was employed, resulting in the selection of 170 Physics teachers from a total of 172 public Senior Secondary Schools in Oyo-North.

The research instrument used was a self-designed questionnaire named "Teachers' Perception of the Causes of Students' Low Enrolment Questionnaire (TPCSLEQ)." This questionnaire comprised two sections: Section A gathering demographic data, including qualification, gender (male/female), and specialization; and Section B, focusing on teachers' perceptions of the reasons for low enrollment. Responses were rated on a scale from Strongly Agree (SA) to Strongly Disagree (SD).

To ensure the validity of the questionnaire, it underwent a review by three lecturers from the Department of Science Education, University of Ilorin, and two practicing

Physics teachers. Additionally, reliability testing using Cronbach's Alpha method yielded a coefficient of 0.89, involving twenty Physics teachers from non-participating schools.

Three research assistants were enlisted and trained on ethical guidelines, instrument distribution, and data collection. With a letter of introduction from the Head of the Department of Science Education, University of Ilorin, the research assistants sought permission from school authorities to engage their teachers for the study. Consent forms were provided to interested teachers, emphasizing the confidentiality of their contributions.

Participants were assured that their involvement would be treated confidentially and solely for research purposes. The questionnaire was administered to selected teachers, collected on completion, and the gathered data were analyzed using descriptive statistics (percentage for demographic data, mean, standard deviation for research questions) and inferential statistics (chi-square test at a 0.05 level of significance) to address the null hypotheses.

Results

Table 1 illustrates that the majority of respondents were qualified, comprising 151 individuals (88.8%), while 19 respondents (11.2%) did not meet the qualification criteria. Additionally, the male respondents dominated the sample, constituting 134 individuals (78.8%), whereas their female counterparts were a minority, totaling 36 individuals (21.2%).

Table 1: Demographic Information of the Respondents

Academic Qualification	**Frequency**	**Percentage**
Qualified	151	88.82
Not Qualified	19	11.18
Total	**170**	**100**
Gender	Frequency	Percentage
Male	134	78.82
Female	36	21.18
Total	**170**	**100**

Field work (2023)

Research Question 1: What are the causes of students' low enrolment in senior school Physics as perceived by the Physics teachers?

Table 2 presents the findings regarding the perceived causes of students' low enrolment in senior secondary school Physics among Physics teachers in Oyo-North, Nigeria. The identified causes encompassed various factors, including student interest, insufficient Physics textbooks, lack of Physics laboratory facilities, the mathematical nature of Physics, ill-equipped Physics laboratories, parental influence, among others. Among these, twenty-one (21) causes yielded mean values above the 2.5 benchmark, while four (4) had mean values below this benchmark. This suggests that these 21 factors, as perceived by Physics teachers, significantly contribute to the low enrolment observed in senior secondary school Physics.

Table 2: Frequency and Mean Distributions of Students' Enrolment in Physics

S/N	Items	SA	A	SD	D	Mean	StD
1.	Lack of Students interest in Physics due to related Career	2	93	1	74	2.14	0.84
2.	There is no enough physics textbook in my schools	85	45	38	2	3.25	1.08
3.	Ill-equipped Physics laboratory facilities	88	11	58	13	3.02	1.04
4.	Physics topics are full of mathematical concepts	66	34	54	16	2.88	1.02
5.	Students poor mathematical background	35	86	14	35	2.71	1.07
6.	Inadequate and malfunctioning Physics equipment for practical	65	7	83	15	2.72	0.83
7.	Students are not motivated by Physics teachers to study physics	55	87	16	12	3.09	0.73
8.	Parental background do not encourage physics enrolment	47	104	10	9	3.11	0.84
9.	Students' poor performance discourage enrolment in physics	79	62	22	7	3.25	0.87
10.	Students do not choose physics in rural schools due to lack of amenities	64	69	27	10	3.10	1.18
11.	Unqualified Physics teachers do not encourage students' enrolment	67	57	5	41	2.88	0.77
12.	Gender of students do not influence physics enrolment	25	18	121	6	2.36	1.29
13.	Student's attitude do not determine physics enrolment	63	33	17	57	2.60	0.93
14.	Less experienced Physics teachers do not encourage Students' enrolment	87	58	9	16	3.27	1.10
15.	Students believed physics has no prospect	51	73	8	38	2.81	0.90
16.	Poor Performance of Students due to inadequate time for Physics Practical	23	68	54	25	2.52	0.98
17.	The topics in physics curriculum are not orderly arranged	66	8	94	2	2.81	0.90
18.	Insufficient learning facilities do not influence physics enrolment	56	60	45	9	2.96	1.17
19.	Career choice in physics do not influence physics enrolment	92	28	20	30	3.07	0.85
20.	Inefficient of physics teachers do not influence physics enrolment	74	57	34	5	3.18	0.78
21	Parents' type of business do not encourage Students' enrolment in Physics	28	79	56	7	2.75	1.15
22	Peer pressure do not influence enrolment in physics	32	65	14	59	2.41	0.97
23	Lack of innovative methods of teaching do not encourage enrolment	66	18	82	4	2.86	1.08
24	Abstract nature of physics not	48	31	62	29	2.58	0.97

S/N	Items	SA	A	SD	D	Mean	StD
	determine the choice of physics						
25	Industrial sectors of the Country do not influence Physics enrolment	27	93	16	34	2.66	1.01

Field work (2023)

Research Question 2: What is the influence of Physics teachers' academic qualifications on their perceptions on the causes of low enrolment in Physics?

H_{01}: There is no significant difference in perceptions of qualified and unqualified Physics teachers on students' low enrolment.

Table 3 displays the outcomes of the chi-square analysis concerning Physics teachers' perceptions of the causes of low enrolment in Physics categorized by their qualifications. The results demonstrate no significant disparity in the perceptions of Physics teachers based on their qualifications. The calculated chi-square value of 0.41 was lower than the chi-square critical value of 7.82 at 3 degrees of freedom. Therefore, Physics teachers, regardless of their qualifications, held similar perceptions regarding the reasons behind the poor enrolment in Physics among senior secondary school students studying the subject.

Table 3: Chi-square Statistics on Students' Low Enrolment in Physics Based on Qualification

Qualification	Agree	Disagree	Df	X^2 cal	X^2 cri	Sig.
Qualified(O/E)	2428(2429.32)	1347(1345.68)				
			3	0.41	7.82	NS
Unqualified(O/E)	307(305.68)	168(169.32)				

Field work analysis (2023)

Research Question 3: What is the influence of Physics teachers' gender on their perceptions on the causes of low enrolment in Physics?

H_{02}: There is no significance difference in perceptions of male and female Physics teachers on students' low enrolment.

Table 4 presents the outcomes of the chi-square analysis regarding Physics teachers' perceptions of the causes of low enrolment in Physics categorized by gender. The results indicate no significant disparity in the perceptions of Physics teachers based on gender. The calculated chi-square value of 1.52 was lower than the chi-square critical value of 7.82 at 3 degrees of freedom. Consequently, Physics teachers held similar perceptions based on gender regarding the reasons for the poor enrolment in Physics among senior secondary school students studying the subject.

Table 4: Chi-square Statistics on Students' Low Enrolment in Physics Based on Gender

Gender	Agree	Disagree	df	X^2 cal	X^2 cri	Sig.
Male(O/E)	2170(2155.82)	1180(1194.18)				
			3	1.52	7.82	NS
Female(O/E)	565(579.18)	335(320.82)				

Field work analysis (2023)

Findings

The study's major findings are as follows:

1. The identified causes of low enrolment in Physics, such as student interest, insufficient Physics textbooks, lack of laboratory facilities, the mathematical nature of Physics, ill-equipped Physics labs, parental influence, and others, were listed in Table 1. Among these, 21 items had mean values above the 2.5 benchmark, indicating that these factors significantly contributed to students' low enrolment in senior secondary school Physics according to perceptions held by Physics teachers. Conversely, 4 items had mean values below the 2.5 benchmark.
2. Analysis regarding teachers' qualifications revealed no significant difference in the perceptions of Physics teachers. The calculated chi-square value of 0.41 was less than the chi-square critical value of 7.82 at 3 degrees of freedom, indicating uniform perceptions irrespective of qualifications
3. The study found no substantial difference in the perceptions of Physics teachers based on gender. The chi-square calculated value of 1.52 was lower than the chi-square critical value of 7.82 at 3 degrees of freedom, indicating similar perceptions held by Physics teachers regardless of gender.

Discussion

The study revealed several potential causes of low enrolment in Physics as perceived by Physics teachers, including student interest, insufficient textbooks, inadequate laboratory facilities, the abstract nature of Physics, and parental influence, among other factors. This trend is aligned with previous research by Aina (2012), Orodho, Kiruki (2015), and Obiadazie (2016), which identified similar issues related to students' attitudes, resource scarcity, and the challenging nature of the subject.

Interestingly, the findings indicated no significant disparity in the perceptions of Physics teachers based on their qualifications. This could potentially stem from a shortage of qualified Physics educators in the schools involved. It echoes the observations of Adolphus and Aziaka (2020), emphasizing how teacher qualifications influence student enrolment; qualified educators tend to foster better student engagement, which might lead to increased enrolment in Physics.

Similarly, the study found no marked difference in perceptions based on gender among the Physics teachers surveyed, possibly due to a predominance of male teachers. However, this outcome contrasts with Joseph's (2014) research on factors influencing girls' enrolment and performance in Physics. Joseph's findings emphasized the role of the school environment in girls' performance and enrolment,

indicating that while Physics enrolment might exhibit gender bias, both male and female teachers acknowledged the issue of low enrolment in Physics.

This suggests that while Physics enrolment might lean towards gender bias, both male and female teachers recognized and shared concerns about the low enrolment trends in Physics.

Conclusion

The study concluded that, teacher's qualification, and gender had no influence on Physics teachers' perception of the causes of students' low enrolment of Physics in senior secondary schools Oyo North, Nigeria.

Recommendations

The following recommendations have been made in line with the findings of this study:

1. There should be deliberate efforts by all stakeholders in educational sectors towards improving students' enrolment in Physics by the provision of Physics textbooks, equipped Physics laboratory amongst others, to motivate students' interest in Physics and to avoid low enrolment of students' in physics in senior secondary schools in Oyo-north, Nigeria.
2. Stakeholders must not compromise the employment process in education especially in the secondary schools. This is necessary because for students to enroll in Physics qualified teachers are required.
3. Scholarship should be given to the Physics students, particularly the female students who show interest to study Physics. This will improve enrolment and address gender bias in study of Physics.

References

Adolphus, T. & Aziaka, L. S. (2020). Influence of teacher quality and experience on secondary school Physics students' enrolment and academic attainment in Rivers State, Nigeria. *IOSR Journal of Research & Method in Education (IOSRJRME),* **10** (2): 2020, pp. 25-32. doi: 10.9790/7388-1002012532.

Aina, J. K. & Ayodele, M.O. (2018). The decline in science students' enrolment in Nigeria colleges of education; causes and remedies. *International Journal of Education and Practice,* **6** (4): 167-178. https//doi:10.18488/journal.61.2018.62.

Aina, J. K. (2013). Gender analysis of students' academic performance in Physics practical in colleges of education, Nigeria. *Science and Education Development Institute,* **3** (5): 447-452. Retrieved from: http://www.ejournal.sedinst.com

Akanbi, A.O. (2003). Trend in Physics education in secondary school in Kwara State. *Lafiagi Journal of Science Education,* **5** (1 & 2): 69- 75.

Cohen, J. (2020). Vaccine designers take first shot at COVID-19. Google Scholar.

Federal Ministry of Education (FME), (2009). *Secondary school physics curriculum.* Lagos: NERDC Press,

Fennema, E., & Franke, M. I. (2006). Teacher knowledge and its impacts. In D. A. Grooms (Ed.,) *Handbook of research in mathematics teaching and learning*. New York: Macmillan.

Gallo, S. & Veronese, I. (2022). Application of medical Physics. *Appl. Sci.12.1852 https//doi.org/10.3390/app12041852.*

Ifiok, E. E. (2005). *Teachers' variable and teaching effectiveness among Christian religious educators in Calabar Metropolis of Cross River Sate, Nigeria* (Unpublished M.Ed dissertation). University of Calabar.

Joseph, K. N. (2014). *Factors influencing girls' low enrolment and poor performance in Physics in Mfangano Island Ward, Homa Bay County, Kenya*. University of Nairobi Thesis Achieve.

Mankilik, M. & Ofodile, U. C. (2015). Effects of hybrid active learning strategy on secondary school students' understanding of direct current electricity concepts in Nigeria. *International Journal of Learning, Teaching and Educational Research,* **3** (2): 77-87.

Musau L. M. & Abere, M. J. (2015). Teachers' qualification and students' academic performance in science, mathematics, and technology subjects in Kenya. *International Journal of Educational Administration and Policy Studies,* **7**: 83-89.

Obiadazie, C. S. (2016). Poor enrolment of senior secondary students in science. *International Journal of Research in Education,* **1** (1): 66 – 75. Available on: www.oasisinternationaljournal.org

Ochoche, V. O & Oguche, B. A (2022). Comparative assessment of academicperformance in mathematics in urban and rural junior secondary schools in Apa Local Government Area of Benue State, Nigeria. *An International/Multidisciplinary Journal of Network for Grassroots Science and Mathematics Education*, **3** (1): 1-25.

Olatoye R. A., Falokun V. K., Olasehinde K. J., & Abdulmalik S. (2016). Female And performance in science subjects in senior secondary schools in Katsina State, Nigeria*, Int. J. Educ. Bench. (IJEB)*, **4** (1): 57-71.

Oliver M. C. & Wood-mcConnney A. (2017). Female senior secondary physics students' engagement in science a qualitative study of constructive influences. *Int. J. STEM Educ*. https://doi.org/10.1186/ s4059 017-0060-9.

Omosewo, E. O. (2012). *Why dread the Science of the state of the Universe.* 118th Inaugural Lecture, University of Ilorin, Ilorin, Nigeria: Library and Publications Committee.

Orodho, J.A. & Kiruki, M. M. (2015). Influence of students and teachers attitudes on students enrollment in Physics in secondary schools in Imenti South, Meru County, Kenya. *Journal of Humanities and Social Science,* **20** (4): 01-11.

Osagie, R. & Alutu, A. (2016). Factors affecting gender equity in the choice of science and technology careers among students in Edo State, Nigeria. *International Education Studies*, **1** (1) doi:10.5539/IE.V9N10P231.

Salman, M. F. (2011). Active learning techniques in a mathematics workshop: Nigerian primary school teachers' assessment. *International Journal of Mathematics Education,* **4** (1): 23-36.

Tate, G. & Yang, L. (2014). Female leadership and gender equity; evidence from plan tclosure.*J.Financ.Econs*.http://dx.doi.org/10.1016/j.jfineco.2011. 04.

Yakubu, A. S (2023). Teacher academic qualification as a correlate of students' academic achievement in fine and applied arts at the colleges of education in Northeast Nigeria. *International Journal of Innovative Education Research* **11** (1): 15-24.