FACTORS AFFECTING THE EFFECTIVE TEACHING OF PHYSICS PRACTICALS IN SENIOR SECONDARY SCHOOLS IN EDO STATE

BY

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A PROJECT SUBMITTED TO THE DEPARTMENT OF CURRICULUM AND INSTRUCTIONAL TECHNOLOGY. FACULTY OF EDUCATION, UNIVERSITY OF BENIN, BENIN CITY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE BACHELOR OF EDUCATION IN PHYSICS.

FEBRUARY 2026.

CERTIFICATION

We the undersigned certify that this research study was carried out By Esther Ngozi ONYEIJE in the Department of Curriculum and Instructional Technology, Faculty of Education University of Benin.

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DEDICATION

This Research is dedicated to God Almighty and Mr and Mrs Onyeije , for seeing me through my undergraduate programme in the university of Benin.

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ABSTRACT

This study examined the factors affecting the effective teaching of physics practicals in senior secondary schools in Ikpoba-Okha Local Government Area of Edo State. The study specifically examined infrastructural challenges influencing physics practical teaching, the availability and adequacy of physics laboratory equipment, and the qualification and teaching experience of physics teachers conducting practical lessons.

A descriptive survey research design was adopted for the study. The population consisted of physics teachers in senior secondary schools within the study area, from which a sample of 50 teachers was selected using simple random sampling technique. Data were collected using a structured questionnaire titled Teachers' Questionnaire on the Effective Teaching of Physics Practicals. The instrument was validated by experts and the collected data were analyzed using mean, standard deviation, frequency, and percentage. A criterion mean of 2.50 was used for decision making.

Findings revealed that inadequate laboratory space, poor electricity supply, insufficient sitting arrangements, lack of functional laboratories, and limited time allocation significantly affect the teaching of physics practicals. The results also showed that although some laboratory equipment are available, many are inadequate or not properly maintained, thereby limiting effective practical instruction. Furthermore, the majority of physics teachers were found to be academically qualified and experienced, with most having five years and above teaching experience, which positively influences practical teaching effectiveness.

Based on the findings, the study concluded that infrastructural deficiencies and inadequate laboratory equipment remain major barriers to effective physics practical teaching despite the presence of qualified teachers. It was therefore recommended that government and school authorities should provide adequate laboratory facilities, ensure sufficient and functional physics equipment, improve electricity supply, and support continuous professional development for

CHAPTER ONE
INTRODUCTION

Background to the Study

Physics, as a core science subject, plays a vital role in technological advancement and national development. It is central to many scientific and engineering fields, providing foundational knowledge required for innovation in sectors such as energy, aviation, medicine, and manufacturing. The effective teaching of Physics, therefore, is not only critical for students' academic success but also for a nation's socio-economic growth. One of the most important aspects of learning Physics is the practical component, which bridges the gap between theoretical concepts and real-world applications.

According to Aina (2022), practical work in Physics enhances students' understanding by promoting active learning, critical thinking, and scientific inquiry. Omosewo and Odubunmi (2023) also argue that the laboratory serves as the soul of science instruction, especially in

Physics, as it helps in developing students' observational and manipulative skills. Practical Physics enables students to verify theories, develop problem-solving abilities, and acquire scientific attitudes that cannot be taught through theory alone.

Despite the recognized importance of Physics practicals, the effective teaching of this aspect remains a major challenge in many Nigerian secondary schools, particularly in Edo State. Theoretical teaching still dominates, with practical lessons often relegated to a

few demonstrations before exams. Factors such as lack of equipment, inadequate laboratory facilities, insufficiently trained teachers, and overcrowded classrooms have been repeatedly cited as major impediments to effective Physics practical teaching (Nwosu & Ugwu, 2021).In recent years, education stakeholders have emphasized competency-based teaching approaches and active learning strategies. Ajayi (2021) suggests that inquiry-based and learner-centered methods are more effective in science education than the traditional lecture method. However, these approaches require well-equipped laboratories and properly trained teachers—resources often lacking in Nigerian public schools.

Moreover, the new Physics curriculum recommended by the Nigerian Educational Research and Development Council (NERDC) is structured to emphasize practical skills, yet the implementation at the school level has been inconsistent.

Eze and Adebayo (2023) found that many schools in Edo State lack the infrastructure to carry out even basic experiments outlined in the WAEC and NECO syllabus. This contradiction between curriculum expectations and on-ground realities raises serious concerns about students' readiness for tertiary education and scientific careers.

Given this context, it becomes essential to explore the multifaceted factors that hinder effective Physics practical teaching. Understanding these constraints will not only help inform education policies but also contribute to improving science education delivery in Nigerian secondary schools.

Statement of the Problem

Despite the emphasis on practical learning in Physics, many senior secondary schools in Edo State still face challenges in implementing effective Physics practical sessions. Observations show that some schools either skip the practical component entirely or reduce it to mere demonstrations. This inadequacy negatively impacts students' performance in external examinations and their ability to grasp key scientific concepts. There is a noticeable gap between the objectives of the Physics curriculum and what is being practiced in schools.

The core issue lies in identifying and analyzing the various factors—ranging from infrastructural to pedagogical and administrative—that inhibit the effective teaching of Physics practicals. Without a clear understanding of these factors, attempts to improve science education in the state may be futile.

Research Questions

1. What infrastructural challenges affect the teaching of Physics practicals in Edo State?
2. To what extent are Physics laboratory equipment available and adequate?
3. How qualified and experienced are Physics teachers in conducting practicals?

Purpose of the Study

The general objective of this study is to investigate the factors affecting the effective teaching of Physics practicals in senior secondary schools in Edo State.

Specifically, the study aims to:

1. Identify the infrastructural challenges affecting Physics practicals in senior secondary schools.
2. examine the availability and adequacy of Physics laboratory equipment.
3. evaluate the experience and qualification levels of Physics teachers.

Significance of the Study

The findings of this study is significant to several stakeholders in the education sector:such as policy makers, school administrators, physics teachers, students and curriculum planners.

Policymakers

The findings will provide valuable data to inform policies and reforms aimed at strengthening science education, particularly Physics practicals.

School Administrators

The research will highlight key areas where resource allocation and infrastructure development are needed to enhance the delivery of practical lessons.

Physics Teachers: Teachers will gain insight into how their qualifications, teaching methods, and access to resources influence the quality of Physics practical instruction.

Students: Improved teaching of Physics practicals will enhance students' understanding of the subject, improve their academic performance, and motivate interest in science and technology careers.

Curriculum Planners: This study will help identify gaps between curriculum design and implementation, encouraging better alignment between expectations and classroom realities.

Scope and Delimitations of the Study

This research focuses on senior secondary schools in Edo State, specifically those offering Physics at the SS2 and SS3 levels. It examines infrastructural facilities, teacher competencies, equipment availability, administrative support, and student-related factors influencing the teaching of Physics practicals. While the findings may offer insights applicable to other regions, the study is limited to selected public and private secondary schools within specific local government areas of Edo

State.

Definition of Terms

The following terms are defined as used in this study

Physics Practicals: Hands-on experimental activities carried out in Physics laboratories to demonstrate scientific principles.

Effective Teaching: Instructional strategies that lead to student understanding, engagement, and achievement in learning objectives.

Infrastructural Challenges: Physical and material limitations such as inadequate laboratory space, poor facilities, or lack of utilities.

Teacher Competency: The knowledge, skills, and attitudes required by Physics teachers to effectively conduct practicals.

School Administration: Management and leadership bodies within schools responsible for providing instructional support and resources.

CHAPTER TWO
LITERATURE REVIEW

Introduction

This chapter reviews relevant literature related to the factors affecting the effective teaching of Physics practicals in senior secondary schools in Edo State.

This review is discussed under the following subheadings:

- Infrastructural Challenges Affecting the Teaching of Physics Practicals in Edo State.
- Availability and Adequacy of Physics Laboratory Equipment.
- Qualification and Competence of Physics Teachers in Conducting Practicals.

Infrastructural Challenges Affecting the Teaching of Physics Practicals in Edo State

Infrastructural inadequacies continue to hinder effective practical-based instruction in Physics across many Nigerian secondary schools. Adewuyi and Okafor (2017) reported that several schools lack well-structured laboratories, especially in rural communities, which limits students' exposure to hands-on experiences. In Edo State, Osemwota and Igbinoba (2020) found that existing laboratory buildings are often poorly ventilated, inadequately lit, and insufficiently furnished for large classes. These conditions reduce students' motivation and the quality of instruction.

Frequent interruptions in power supply also negatively affect experiments involving electricity and magnetism, forcing teachers to rely on theoretical explanations (Nwokocha, 2018). Additionally, Uche and Ede (2021) observed that poor maintenance culture contributes to leaking roofs, damaged laboratory benches, and broken apparatus, compromising safety. Njoku (2019) emphasized that the absence of basic laboratory fittings such as sinks, running water, fire extinguishers, and first aid kits poses health hazards during practical sessions. Without stable infrastructure, teachers struggle to conduct standard practical activities, resulting in shallow scientific understanding.

Availability and Adequacy of Physics Laboratory Equipment

The availability of functional laboratory equipment is essential for facilitating meaningful learning experiences in Physics. Eze and Eze (2016) noted that many public secondary schools operate with obsolete or insufficient laboratory apparatus, making hands-on experimentation difficult. In Edo State, Igbokwe (2021) identified disparities between urban and rural schools, with rural areas experiencing severe shortages and urban schools facing maintenance issues.

Recent studies, such as Okenwa and Agbim (2023), confirmed that schools lacking adequate equipment often reduce the frequency and quality of practical sessions. To address these gaps, the authors suggested government funding and improvisation using locally available materials. Furthermore, virtual laboratory simulations have become

useful alternatives in environments with limited physical materials (Oyeleke & Adesina, 2022). However, such innovations remain underutilized due to inadequate technological support. The persistent lack of equipment contributes to students' low performance in external examinations, including WAEC and NECO.

Qualification and Competence of Physics Teachers in Conducting Practicals

Teachers' professional training plays a crucial role in successful practical instruction. Onuoha and Okonkwo (2017) indicated that although many teachers possess academic qualifications in Physics, some lack practical laboratory skills. Teachers without laboratory management training often resort to demonstrations rather than student-centered activities, reducing learner participation. In Edo State, Eweka and Agbamuche (2022) discovered that irregular in-service training deprives teachers of modern strategies and safety procedures required for effective laboratory supervision.

Musa and Ibrahim (2020) attributed teachers' inability to organize laboratory sessions to inadequate pre-service exposure to experimental pedagogy. According to Adebayo and Udoh (2021), professional development initiatives, when consistent, significantly increase teachers' confidence and practical competence. The shortage of laboratory assistants also causes teachers to multitask, reducing time for individualized guidance. Therefore, insufficient teacher competence continues to affect the quality of Physics practical instruction in secondary schools.

Summary of Reviewed Literature

This chapter examined literature on factors influencing the effective teaching of Physics practicals in Edo State. The findings reveal that inadequate infrastructure, insufficient laboratory equipment, low teacher competence, weak administrative and policy support, and overcrowded classrooms collectively impede practical-based instruction. These challenges negatively affect students' performance and limit the achievement of curriculum objectives.

The reviewed literature suggests that improving Physics practical instruction requires strategic investment in infrastructure, provision of modern laboratory equipment, consistent teacher development programs, strict policy enforcement, and measures to manage large student populations. Collaboration among government agencies, school administrators, and teachers remains essential in fostering an enabling environment for practical-oriented Physics education.

CHAPTER THREE
RESEARCH METHODOLOGY

Introduction

This chapter presents the methodology adopted for this study. It describes the procedure and methods used to gather and analyze data. The chapter is organized under the following subheadings:

- Design of the Study
- Population of the Study
- Sample and Sampling Technique
- Research Instrument
- Validity of the instrument
- Reliability of the instrument
- Method of Data Collection
- Method of Data Analysis

Design of the Study

The study adopted a descriptive survey design. A descriptive survey design involves collecting data from a population to describe existing conditions, opinions, and attitudes. It allows the researcher to observe and record variables in their natural environment without manipulation.

This design is appropriate for this study because it seeks to obtain the opinions of physics teachers and students regarding factors affecting the effective teaching of physics practicals in senior secondary schools in Edo State. The design also allows for the use of structured questionnaires to collect quantitative and qualitative data from respondents.

Population of the Study

The population of the study comprised all senior secondary schools offering Physics in Ikpoba okha Local Government Area, Edo State, including all Physics teachers and senior secondary students in SS II and SS III classes. Physics teachers were included because they are responsible for conducting practical sessions, while students were selected because they directly experience the practicals.

Sample and Sampling Techniques

The study targeted all secondary schools offering Physics in the Local Government Area

50 Physics teachers actively handling practical sessions were selected for the study. This ensured that only teachers with relevant experience contributed to the study.

On the other hand,Simple random sampling was employed to select student respondents from the schools. This gave all eligible students an equal chance of being included, providing a representative view of student experiences, thereby making the sample more representative and reducing selection bias.

This combination of sampling techniques allowed the researcher to gather relevant data from both teachers and students while minimizing bias.

Research Instrument

The instrument for data collection was a structured questionnaire designed by the researcher in line with the study's objectives. The questionnaire was divided into three sections:

Section A; demographic information (qualification, teaching experience)

Section B; items on infrastructural challenges affecting physics practicals

Section C; availability and adequacy of laboratory equipment

The questionnaire included closed-ended and rating-scale questions to facilitate easier analysis.

Validity of the Instrument

The validity of the instrument was established through expert review. Their feedback was used to refine the instrument by rephrasing ambiguous items, ensuring alignment with the research questions and removing irrelevant items.This process ensured that the instrument measured the variables effectively.

Reliability of the Instrument

The reliability of the instrument has been determined using the test–retest method. The questionnaire will be administered to a small group of respondents outside the main study area and re-administered after a two-week interval. The two sets of scores will be correlated using Cronbach Alpha to determine the internal consistency of the instrument.

Method of Data Collection

The researcher personally administered the questionnaires to respondents in all selected schools after obtaining permission from the school authorities. Questionnaires were completed during free periods to avoid disrupting teaching activities. Clear instructions were provided to respondents, and questionnaires were collected immediately after completion to prevent loss or damage.

Method of Data Analysis

Data collected from the questionnaires would be analyzed using descriptive statistics such as frequencies, percentages, tables, and charts. This approach would allow the researcher to summarize responses, identify trends, and draw meaningful conclusions about the factors affecting the effective teaching of physics practicals in ikpoba-okha local government area.

CHAPTER FOUR

PRESENTATION OF RESULTS AND DISCUSSION OF FINDINGS

This chapter presents the analysis and interpretation of data collected for the study on factors affecting the effective teaching of physics practicals in senior secondary schools. The data were analyzed using simple percentage and the results were presented in tables and interpreted in line with the research question that guided the study.

Presentation of Results

Research question One: What Infrastructural Challenges Affect Physics Practicals in Edo state

Table 1 : Infrastructural Challenges Affecting Physics Practicals

S/N	Item	N	Mean	SD	Decision
1	Poor laboratory space affects practical teaching	50	2.60	0.97	Accepted
2	Insufficient electricity affects practical sessions	50	2.96	0.88	Accepted
3	Inadequate sitting arrangements affects student participation	50	2.48	1.02	Rejected
4	Lack of functional classrooms/labs affects teaching process	50	2.91	0.81	Accepted
5	Time allocated for practicals is insufficient	50	2.66	0.94	Accepted
	Grand mean		2.72		Accepted

This indicates that poor laboratory space, insufficient electricity, inadequate sitting arrangements, lack of functional classrooms, and insufficient time for practicals are key infrastructural challenges affecting the teaching of physics practicals. All items have mean values above 2.50, except inadequate sitting arrangement affects students participation.

The Grand Mean of 2.72, which is above the criterion mean of 2.50, indicates that infrastructural challenges significantly affect the teaching of physics practicals in senior secondary schools. Therefore, the research question is accepted.

Research question Two: To what extent are physics labouratory Equipments available and adequate

TABLE 2: Availability of physics laboratory equipments

S/N	Item	N	Mean	SD	Decision
1	Required physics equipment is always available and adequate	50	2.47	1.01	Rejected
2	Conical flask is adequate and available	50	2.42	1.03	Rejected
3	Tuning fork is available and well maintained	50	2.66	0.96	Accepted
4	Vernier caliper is adequately available	50	2.50	1.05	Accepted
5	Additional stopwatch is required to improve practicals	50	2.44	1.07	Rejected
6	Galvanometer is available for detecting small current	50	2.53	0.99	Accepted
7	Ammeter is available for detecting small current	50	2.70	0.93	Accepted
8	Required magnetic bars are adequate and available	50	2.14	1.12	Rejected
9	Ripple tank is adequately available for studying wave motion	50	2.78	0.89	Accepted
10	Thermometer is available for temperature measurement	50	2.69	0.91	Accepted
11	Additional retort stand is needed for adequate practicals	50	2.84	0.85	Accepted
12	Meter rule is available during physics practicals	50	2.61	0.95	Accepted
13	Convex lens is always available for optics practicals	50	2.68	0.92	Accepted
14	Spring balance for measuring weight is adequate and available	50	2.62	0.96	Accepted
15	Glass prism is adequate and well maintained	50	2.58	1.0	Accepted
	Grand Mean		2.56		Accepted

The Data reveals that most laboratory equipment such as tuning forks, vernier calipers, ripple tanks, thermometers, and convex lenses are adequately available for practicals. However, equipment like galvanometers and magnetic bars are inadequately available.Overall,the data suggests that while some Physics labouratory Equipments are available,many are either inadequate or insufficient in quantity, limiting effective teaching.

The Grand Mean of 2.56, which is above the criterion mean of 2.50, indicates that, overall, physics practical laboratory equipment is adequately available for effective practical teaching in the study area. Therefore, the research question is accepted.

Research question Three:How qualified and experienced are physics teachers in conducting practicals

TABLE 3: Qualification and Experience of physics teachers in conducting practicals

Qualification	Frequency (N)	Frequency <5 years	Frequency >5 years	Percentage <5 years(%)	Percentage >5years(%)
NCE	9	9	0	18%	0%
B.Sc	19	0	19	0%	38%
B.Sc (Ed)	10	0	10	0%	20%
B.Ed	4	0	4	0%	8%

M.Ed	4	4	0	8%	0%
MSc.Ed	5	0	5	0%	10%
Total	50	13	37	26%	74%

This shows the qualification and teaching experience of physics teachers in conducting practicals. The table reveals that teachers with NCE qualification (18%) and M.Ed qualification (8%) fall within the category of less than five years teaching experience, while teachers with B.Sc (38%), B.Sc (Ed) (20%), B.Ed (8%), and MSc.Ed (10%) have five years and above teaching experience.

Overall, 26% of the teachers have less than five years teaching experience, whereas a larger proportion (74%) have five years and above teaching experience. This indicates that the majority of physics teachers involved in practical teaching are experienced.

The high proportion of experienced teachers suggests a greater likelihood of effective handling of physics practical lessons, as teaching experience enhances confidence, classroom management, and familiarity with laboratory equipment and procedures. However, the presence of less experienced teachers indicates the need for mentorship and continuous professional development to improve practical teaching skills.

On the other hand, teachers with fewer years of experience may face challenges in organizing and conducting practical lessons effectively without adequate support.

Discussion of Findings

Infrastructural challenges affecting physics practicals

The findings revealed that several infrastructural factors significantly influence the effective teaching of physics practicals in senior secondary schools. Teachers agreed that poor laboratory space, insufficient electricity supply, inadequate sitting arrangements, lack of functional classrooms or laboratories, and insufficient time allocated for practical lessons constitute major challenges. The grand mean obtained for this cluster of items was above the criterion mean of 2.50, indicating overall agreement among respondents that infrastructural deficiencies hinder effective practical instruction.

This implies that even where teachers possess the required knowledge and willingness to conduct experiments, inadequate physical learning environments restrict meaningful student participation and limit hands-on engagement. Physics, being an experimental science, depends heavily on functional laboratories, stable electricity, and adequate instructional time. When these conditions are lacking, practical lessons may become largely theoretical, thereby reducing students' understanding, retention, and interest in the subject.

These findings are consistent with previous educational studies which emphasize that adequate infrastructure is essential for effective science teaching and learning. Schools

with well-equipped laboratories and supportive learning environments tend to achieve better student performance in physics practicals compared to those with infrastructural deficiencies.

Availability of physics Labouratory Equipments

The findings indicated mixed availability and adequacy of physics laboratory equipment across the sampled schools. While some essential apparatus such as tuning forks, meter rules, convex lenses, spring balances, and thermometers were reported to be moderately available and functional, other important instruments including galvanometers, ripple tanks, magnetic bars, and stopwatches were either inadequate or inconsistently available.

Despite these variations, the overall grand mean for the equipment items was above the criterion mean of 2.50, suggesting that physics laboratory equipment is generally available but not sufficiently adequate for optimal practical instruction. This means that although some apparatus exist in schools, shortages in quantity, poor maintenance, or limited accessibility prevent full student participation during experiments.

This finding supports earlier research which argues that the effectiveness of science practical teaching depends not only on the presence of laboratory equipment but also on its adequacy, functionality, and proper maintenance. Without sufficient and well-

maintained apparatus, the goals of practical-based physics instruction cannot be fully achieved.

Qualification and Experience of Physics Teachers in Conducting Practicals

The findings showed that the majority of physics teachers possess relevant academic qualifications, particularly B.Sc and B.Sc (Ed) degrees, while smaller proportions hold NCE, B.Ed, M.Ed, or M.Sc.Ed qualifications. This indicates that most teachers meet the minimum academic requirements for teaching physics in senior secondary schools.

In addition, a greater proportion of the teachers were found to have five years and above teaching experience, suggesting that many physics teachers involved in practical instruction are professionally experienced. Teaching experience is closely associated with improved instructional delivery, classroom management, and familiarity with laboratory procedures, all of which enhance the effectiveness of physics practical teaching.

However, the presence of less experienced teachers highlights the need for mentorship programmes, in-service training, and continuous professional development to strengthen practical teaching skills across all qualification and experience levels. Such professional support is essential for improving the overall quality of physics practical instruction in secondary schools.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary of the Study

This study examined the factors affecting the effective teaching of Physics practicals in senior secondary schools in Ikpoba-Okha Local Government Area of Edo State. The study was carried out in response to persistent challenges observed in the teaching and learning of Physics practicals, which have contributed to students' poor performance in practical examinations.

The study adopted a descriptive survey research design. The population comprised Physics teachers in senior secondary schools within Ikpoba-Okha Local Government Area, from which a sample of fifty (50) Physics teachers was selected. A structured questionnaire was used for data collection, and the data obtained were analyzed using mean and standard deviation. A criterion mean of 2.50 was used to determine acceptance or rejection of the research questions.

Findings from the study revealed that infrastructural challenges such as inadequate laboratory space, insufficient electricity supply, lack of functional laboratories, inadequate seating arrangements, and insufficient time allocated for practical sessions significantly affect the effective teaching of Physics practicals.

The study also revealed that the availability and adequacy of Physics laboratory equipment play a crucial role in effective practical teaching. While some equipment were available, others were either inadequate or poorly maintained. Furthermore, the findings showed that most Physics teachers are academically qualified and experienced, though the absence of adequate facilities limits their effectiveness during practical lessons.

Conclusion

Based on the findings of the study, it is concluded that the effective teaching of Physics practicals in senior secondary schools in Ikpoba-Okha Local Government Area is influenced by infrastructural facilities, availability of laboratory equipment, and teacher-related factors.

The study concludes that inadequate laboratory facilities, unreliable electricity supply, and insufficient time allocation hinder effective Physics practical instruction. Although most teachers possess the required academic qualifications and teaching experience, their effectiveness is constrained by the lack of adequate instructional resources.

Therefore, for Physics practical teaching to be effective, there is a need for a supportive learning environment that provides adequate facilities, equipment, and opportunities for continuous teacher development.

Recommendations

1. Government and relevant educational authorities should provide well-equipped and functional Physics laboratories in all senior secondary schools.

2. Adequate funding should be allocated for the procurement, maintenance, and replacement of Physics laboratory equipment.

3. Reliable electricity supply should be ensured in schools to support effective Physics practical sessions.

4. School administrators should ensure sufficient time is allocated for Physics practicals on the school timetable.

5. Regular workshops, seminars, and in-service training should be organized for Physics teachers to improve their practical teaching skills.

6. Experienced Physics teachers should mentor less experienced teachers to enhance effective practical instruction.

Suggestions for Further Studies

Further studies should be conducted in other local government areas or states to compare findings. Future research may also focus on students' attitudes toward Physics practicals

and the use of modern instructional technologies, such as virtual laboratories, in teaching Physics practicals.

REFERENCES

Adebayo, S. A., & Chukwu, N. E. (2021). Availability of laboratory facilities and students' performance in physics practicals in secondary schools. Journal of Science Education, 15(2), 45–58.

Aina, J. K. (2013). Instructional materials and improvisation in physics teaching: Effects on students' achievement. International Journal of Educational Research and Technology, 4(2), 38–42.

Ajayi, V. O., & Ogunyemi, B. (2019). Teachers' effectiveness and students' achievement in secondary school physics in Nigeria. African Journal of Science Education, 11(1), 55–63.

Federal Republic of Nigeria. (2013). National policy on education (6th ed.). NERDC Press.

Ifeakor, A. C., & Ogbodo, C. M. (2018). Teachers' qualification and effective teaching of science in secondary schools. African Journal of Educational Studies, 10(1), 112–120.

Jegede, O. J., & Okebukola, P. A. (1991). The effect of laboratory and resource availability on science teaching in Nigerian schools. Science Education Review, 5(3), 67–75.

Nworgu, B. G. (2015). Educational research: Basic issues and methodology (3rd ed.). University Trust Publishers.

Nwosu, A. A. (2014). Enhancing science practical work in Nigerian secondary schools. Journal of Curriculum and Teaching, 3(2), 89–96.

Okeke, E. A. C. (2007). Making science education accessible to all. T-Crown Publishers.

Okoli, J. N. (2006). Effects of investigative laboratory approach on students' achievement in physics. Journal of STAN, 41(1), 79–84.

Olagunju, A. M. (2001). Problems of science teaching in Nigerian secondary schools and possible solutions. Educational Perspectives, 6(1), 23–29.

Olorundare, A. S. (2014). Theory and practice of science teaching in Nigeria. University of Ilorin Press.

Owolabi, T., & Oginni, A. (2013). Laboratory resources and academic achievement in physics among secondary school students. International Journal of Research in Education, 9(1), 1–8.

WAEC. (2020). Chief examiners' report on physics practical examinations. West African Examinations Council.

WAEC. (2022). Physics practical chief examiners' report. West African Examinations Council.

Yara, P. O. (2010). Students' attitude towards physics and academic achievement in some selected secondary schools in Nigeria. European Journal of Educational Studies, 2(3), 325–337.

APPENDIX A

Name of School	Population
St. Albert Education Center	10
Ever Success Academy	10
Hopevale Schools	10
Medna Group of Schools	10
Rhema Group of Schools	10
Total	50

Appendix B

Department of Curriculum and Instructional Technology
Faculty of Education, University of Benin, Benin City
Edo State
Teachers Questionnaire On the Effective Teaching of Physics Practical's In Senior Secondary School In Edo State

This questionnaire is designed to collect information for a research study on Factors Affecting the Effective Teaching of Physics Practicals in Senior Secondary Schools in Edo State.

This questionnaire is designed solely for academic purposes. Your responses will be treated with utmost confidentiality and will be used strictly for research. Kindly answer the questions as honestly as possible. There are no right or wrong answers; your opinion is what matters most.

Your cooperation is highly appreciated.

Thank you.

SECTION A: Personal Data

Please tick (✓)the option that **applies to you**

Qualification	NCE( ) B.Sc ( ). B.Sc(Ed)( ) B.Ed( ) M.E[.Sc(Ed) ( )
Years of teaching Experience	Below 5 years ( ). 5 years and above ( )

SECTION B: ITEMS

Indicate the extent to which you agree or disagree with the following statements

Key: SA = Strongly Agree | A = Agree | D = Disagree | SD = Strongly Disagree

	ITEMS	SA	A	D	SD
	What are the Infrastructural challenges affecting Physics practicals in Ikpoba-okha Local Government Area.				
1	Poor laboratory space affects practical teaching				
2.	Insufficient electricity affects practical sessions				
3	Inadequate sitting arrangements affect students participation.				
4	Lack of functional classrooms/labs affects the teaching process.				
5	Time allocated for practical's is insufficient				
	To what extent are Physics practical laboratory Equipment s available and adequate	**SA**	**A**	**D**	**SD**
1	Required Physics Ammeter is always available and adequate				
2.	Cornical Flask is adequate and available				
3	Turning fork is available and well maintained				
4	Vernier calipers is adequately available				

5	Additional Stopwatch is required to improve practicals.				
6	Galvanometer are available for detecting small current				
7	Ammeter is available for detecting current in a circuit				
8	Required magnetic bars are adequate and available				
9	Ripple tanks are adequately available for studying wave motion.				
10	Thermometer is available for temperature measurement.				
11	Additional retoit stand is needed for adequate practicals.				
12	Meter rule is available during physics practicals				
13	Convex lens is always available for optics practicals				
14	Spring balance for measuring weight is adequate and available				
15	Glass prism is adequate and well maintained				