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CASE STUDY OF STUDENTS' LOW PERFORMANCE IN PHYSICS EXTERNAL EXAMINATIONS IN ONDO-STATE, NIGERIA

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Abstract

The study investigated some factors responsible for Physics students' low performance in external examinations. The study employed a qualitative, exploratory case-study design. The population of the study is three senior secondary school students preparing for external examinations in Ikale Local Government Area of Ondo State. Purposive sampling was used to select 20 students from two public secondary schools and two private schools, one from a rural area and one from an urban area, who participated in focus group discussions. In contrast, Two Physics teachers with over 5 years of teaching experience in urban and rural schools were purposively selected for key informant interviews. Braun and Clark's approach to thematic analysis was used to generate four themes: teachers' factors, students' factors, schools' factors and government factors. MAXQDA version 20 was used in the analysis and data management. The findings revealed that school facilities such as laboratories and apparatus capable of improving students' performance are unavailable. In contrast, the recruitment of unqualified physics teachers and the use of ill-equipped and obsolete physics apparatus in the laboratory are government factors that contribute to low performance. Finally, it was revealed that a lack of proper knowledge, laziness, examination anxiety, a lack of understanding, and distractions are the factors contributing to low performance among students. The study recommended that the government equip school laboratories with apparatus and prioritise recruiting qualified teachers.

Keywords: Low Performance in Physics, External examinations

Introduction

The advancement of any nation is determined by its strong and formidable foundation in Education. In the 21st century, developed nations focus on improving science and technology. There is a sharp link between science and technology. Physics is the branch of science concerned with the nature and properties of matter and energy. Daramola and Omosewo (2012) argued that the advancement of any nation depends on its worthwhile technological infrastructure and development. Physics plays a crucial role in the development of machinery, tools, and equipment that make life easier. Despite the significant role of this subject in national and technological advancement, it appears that students' performance is not commensurate with the effort expended by teachers, government and other stakeholders in education. The West African Examinations

Council (WAEC) and National Examination Council (NECO) in Nigeria are responsible for administering summative assessments to students in senior secondary schools for certification, which is used for admission into universities, colleges of education, polytechnics, and other higher institutions of learning. Several factors contribute to the low performance of students in Physics in external examinations. Naki (2018) stated that student attitudes towards Physics, such as studying habits, postponing school work, and perceptions of the subject, impact students' academic achievement. According to Owolabi (2007), the government must find all possible means to ensure that experienced teachers willing to serve are motivated and retained in the senior secondary schools. Mushtaq and Khan (2012) established that the performance of science students is affected by various factors, which could be social, psychological, economic, environmental and personal factors, which vary from country to country and from person to person, and this is more challenging in rural areas where students face a whole lot of problems. Well-equipped laboratories that prepare physics students for external examinations play a significant role. Ojediran, Oludipe, and Ehindero (2014) argued that using laboratory-based instructional intervention methods of teaching greatly improves the students 'performance. Poverty and inadequate school facilities are among the factors that affect students' performance in examinations. John Aduwa (2021) stated that one of the current problems facing secondary education in Nigeria is the shortage of Classroom Buildings and Laboratories. John Aduwa (2021) argued that due to the ever-increasing population of Nigeria, there are not enough classrooms to accommodate students during teaching and learning in most secondary schools owned and managed by state governments. The student's attitude during teaching is a critical factor that determines the learner's interest. Salleh (2014) believed that most learners find physics challenging because of the teaching and learning methodologies involved in understanding, which demand students to work with formulas, calculations, graphics, and even concepts. The lack of understanding of the problem and poor mathematical skills also significantly hinder students' ability to solve physics problems (Fadaei & Mora, 2015).

Research efforts have been geared to investigate the causes of underlying Physics students' low performance in public and internal examinations. Azunna Igbokwe and Nsirim (2024) conducted a study on the impact of teachers' qualifications on students' performance in external examinations in the Isiala-Ngwa North Local Government Area (LGA) of Abia State. The author found a strong correlation between teachers' qualifications and students' success in the WASSCE and NECO SSCE exams. The study also indicated that students taught by qualified teachers consistently outperformed those taught by less qualified teachers in external examinations. A quasi-experimental study on the effects of laboratory-based instructional intervention on the learning outcomes of senior secondary students in Physics who do poorly was conducted by Ojediran, Oludipe, and Ehindero (2014). The study's findings showed that low-performing students exposed to laboratory-based instructional intervention (LBII) and those exposed to conventional teaching techniques (CTM) significantly differed in their physics achievement.

It concludes that Physics Students and teachers in senior secondary schools should embrace laboratory-based instructional intervention as a valuable asset. Oladejo, Olosunde, Ojebisi and Isola (2011) examined the effect of standardised and improvised instructional materials on the academic achievement of secondary school physics students in Oyo state, Nigeria. The result showed a significant difference in the achievement of students taught using standard instructional materials, those taught with improvised instructional materials and those in conventional instruction, although there was no significant effect of gender on students' achievement in Physics; females did better than males.

Statement of Problem

The daily advancement in technology and science has made it necessary for every nation to prioritise the teaching and learning of Physics in schools and colleges. However, the sub-optimal performance of physics students in public examinations poses a significant concern for the government and stakeholders involved in physics education. Several studies have been conducted on pedagogical methods and skills adopted by Physics teachers in the classroom, the effects of teacher qualification on Physics student performance, the provision of instructional materials, and the impact of hands-on practicals and adequately equipped laboratories, among many others. A perusal of the literature reveals that research efforts are heavily geared towards a quantitative method of investigating the causes of low performance by Physics students in examinations; there is a paucity of research efforts utilising qualitative methods. On this basis, the study seeks to explore the causes of low performance in physics in external examinations using qualitative methods to have in-depth perceptions of both students and teachers regarding the underlying causes.

Research Questions

The following research questions guided the study:

1. What school factors affect the academic performance of Physics students in external examinations?
2. What government factors affect the academic performance of Physics students in external examinations?
3. What teacher factors affect the academic performance of Physics students in external examinations?
4. What student factors affect the academic performance of Physics students in external examinations?

Methodology

The study employed an exploratory case-study design to investigate the reasons behind the poor academic performance of Physics students in external examinations in the Okitipupa local government area of Ondo State. An exploratory case study is a qualitative research method that enables the researcher to explore the reason (why) for a concept or

a problem from participants (Cresswell, 2016). it allows for an in-depth understanding of the factors responsible for the low performance of Physics students in external examinations.

The population of this study comprises all SS3 Physics students preparing for the West African Examinations Council (WAEC) and the National Examination Council (NECO) in the Okitipupa local government area of Ondo State. The study employed purposive sampling to select a sample of twenty students from two public secondary schools and two private schools who participated in focus group discussions. Two Physics teachers with over 5 years of teaching experience in urban and rural schools were purposively selected for key informant interviews. Purposive sampling allowed for the selection of participants with knowledge and experience relevant to the factors affecting low student performance in external examinations.

The data was collected using the Assessment of Physics Student Low-Performance (APSLP). This allowed the study participants to express their viewpoints and explain the underlying causes/factors responsible for low performance in physics external examinations. To ensure the credibility and validity of the data collected, the interview guide was reviewed by an expert in qualitative research to determine whether the questions effectively addressed the research problem and whether any necessary corrections had been made before administration.

This study adhered to ethical protocols by obtaining informed consent from each participant. Students' and teachers' participation was entirely voluntary, as students who were not interested in the study did not participate. Before conducting the study, a letter of introduction, written by the head of the Institute of Education at the University of Ibadan, was given to school principals and proprietors, gaining their permission for their schools to be used for the study. The school's principal permitted the research before recruiting participants, students and teachers. The Participants were informed that the focus group and interview sessions would be recorded and used for research purposes only. The participants gave their consent before the recording was made.

The data analysis started with the verbatim transcription of the audio files. During the familiarisation stage, the audio files were listened to thoroughly to ensure a comprehensive understanding of the content and to verify that the transcripts accurately aligned with the audio files. During the process, the researcher was immersed in the data, gaining insights from codes and patterns. Subsequently, initial codes were generated, capturing the key concepts and ideas emerging from the data. These codes were then collated and organised into potential themes, which were further reviewed and refined for clarity and coherence. With this iterative process, four robust themes were identified. The MAXQDA version 20 analytical software was used to analyse, organise, and manage data effectively.

Presentation of findings

This section presents the study's analysis findings. The results are organised according to the research questions that guided the study.

Research Question 1: What school factors affect the academic performance of Physics students in external examinations?

These factors that mitigate against the success of Physics students who sat for senior secondary school examinations, such as the West African Examinations Council (WAEC) and the National Examination Council of Nigeria (NECO). The findings revealed that school facilities such as laboratories and apparatus capable of improving students' performance are unavailable. From the participants' responses, it is evident that students have limited access to laboratory and practical classes, as manifested in teachers' reluctance to organise practical classes and the ill-equipped laboratories. The result shows how Physics teachers did not organise practical classes for students who wanted to sit external examinations. One of the participants from a public secondary school expressed that students fail in external examinations because they were not taught practicals.

> *They do not usually do practical. However, if you have to do practicals in WACE, you will find it difficult to pass the practical very well because you do not usually do practicals in class. That is why they used to fail. Some students used to fail the practical exams.* The participants explained further that those students go to laboratories without conducting hands-on practical work. *What is the essence of going to the laboratory when we are not doing a practical? What is the laboratory for?''*(D2)

The result also revealed how teachers preparing students for external examinations organised practical classes infrequently. One of the participants in a private secondary school in a rural location expressed *that they are doing practicals, but not too frequently.* (D2) The participants' responses also revealed that a lack of laboratory facilities, unused laboratories, schools' inability to procure apparatus, and non-utilisation of instructional materials are the school factors that cause students' low performance in external examinations.

One of the participants from a public secondary school expressed that students do not have access to apparatuses for practicals in physics classes: "We do not have equipment for practicals" (D2). On the other hand, one participant from a private secondary school in an urban centre stated that their school has a laboratory but does not use it for Physics practicals.

At my school, we now have a lab, but most of the time, the lab is not in use. (Student laughed because their Lab was not used most of the time) In my school, we have a lab, but should I say that we are not using it? (D5)

One of the participants in a private secondary school in an urban centre stated that schools cannot procure apparatus for Physics Practical. *I believe students underperform during practicals due to the school's inability to acquire practical instruments. For example, some schools do not have standard laboratories like the mushroom schools*. (D6)

The result also shows that some schools have apparatus for Physics Practical but are locked up in the Physics laboratory without student access. One of the participants in a private secondary school in an urban centre stated

They should also teach us and provide the necessary instruments that we need for practical work, rather than requiring us to buy and store them in the lab. They should also inform us about the functions and their applications. (D6)

Apart from that, what of the teachers who are good in the theory aspect, though teachers do not bring us the instruments for us to know the name of the instruments, for us to know the type and what they are used for? That is not good. Furthermore, that is uncalled for. Moreover, they should also teach us and provide the necessary instruments that we need for practical work, rather than just buying and storing them in the lab. They should also tell us the functions and what they are used for..(D5)

2. What government factors affect the academic performance of Physics students in external examinations?

These government factors mitigate against the success of Physics students who sat for senior secondary school examinations, such as those administered by the West African Examinations Council and the National Examination Council, Nigeria Education. The results show that the recruitment of unqualified Physics teachers and the use of ill-equipped and obsolete physics apparatus in the laboratory are among the government factors that affect the performance of Physics students in external examinations. The response revealed that the government is recruiting graduates who did not study physics at the university and have no teaching qualifications. One of the participants, who was a Physics teacher, expressed

> *I am not a Physics graduate. I am not a Physics graduate, but due to the country's current situation, the lack of job opportunities, and the limited prospects, I have decided to pursue a teaching career. So, finding myself in the teaching line, I have been trying to cope. I have been trying to cope.* (T1)

Ill-equipped laboratories are one factor contributing to Physics students' failure in external examinations. One of the participants, who was a Physics teacher, expressed

We conduct practicals for the students, but they are not a regular occurrence here. It is not regular here because this lab is not equipped and lacks some equipment. So I think in a term we carry out two experiments for the students. (T2)

One of the participants in a private secondary school in an urban centre was probed. *What about schools that lack laboratories? At my school, we now have a lab, but most of the time, the lab is not in use. (Student laughed because their Lab was not used most of the time)* (D5)

What teacher factors affect the academic performance of Physics students in external examinations?

The study presents the teacher factors that mitigate against the success of Physics students who sat for senior secondary school examinations, such as the West African Examination Council and the National Examination Council, in Nigeria. These factors

include teachers not organising practicals for students, teachers rushing students' practical classes when exams are imminent, and unqualified teachers. One of the participants in School 4 expressed concerns about how teachers often overlook the practical aspect of Physics in senior secondary schools. The discussant expressed
Teachers pile up practical classes till examination periods. One of the participants in a public secondary school in an urban centre expressed

> *That is when it is now, maybe a few months, or maybe just a few weeks to the start of the term, that is when they begin to rush these students. So because of that, they will not be able to equip... take this to them very well, to impart that knowledge of those things into them very well. There will not be enough time to teach them, so they will not have sufficient time to learn and understand those things.* (D3)

Similarly, the discussant added that teachers teach only the theory and pile up the practicals until the examination periods. *Yes, one of the issues that I think may occur during regular classes, the normal lesson, is that some of those topics involve practicals. At times, the teacher is supposed to take the student through those practicals, but maybe I am not familiar with the details. Some teachers skip the practical; they forget about it, the practical side. So they continue with other topics like that. Continue, they just.*
Furthermore, the study also revealed that teachers tend to overlook the practical session during teaching. One of the participants in a private secondary school in an urban centre indicated that teachers fail to teach students practical skills.
When after teaching us the theory, teachers also fail to give us the practical aspects of the topic, which is very bad for us, because during the WACE period, that is the topic that the WACE always focus on. It will have a bad influence on us, because we are not taught that much in the practical aspect. (D5)
The study also revealed that some physics teachers did not study physics at university and have no qualifications to teach physics in secondary schools. One of the participants, who was a Physics teacher, expressed

> *I am not a Physics graduate. I am not a Physics graduate, but my field of study was industrial chemistry. Due to the country's situation, there were no job opportunities available. I have been showing off, so I decided to take the lead in teaching. So, finding myself in the teaching line, I have been trying to cope. I've been trying to cope.* (T1)

This implies that some physics teachers preparing students for external examinations are not professionally qualified to teach the subject.

4. What student factors affect the academic performance of Physics students in external examinations?

These are the factors that mitigate against the success of students who sat for senior secondary school examinations, such as the West African Examinations Council and the National Examination Council, in Nigeria's Education System. These factors are

cramming without proper knowledge, laziness, examination anxiety, lack of understanding and distractions. The results show that cramming without proper knowledge of concepts and equations is one of the factors that contribute to low student performance in external examinations. One of the participants in a private secondary school in an urban centre lamented how students crammed concepts without proper knowledge. ‘’*The students crammed as a formula into the examination hall. So they forgot, and like they forgot to use G instead of A. So that is the problem, they crammed it into a formula.’’*(D1)

The finding also revealed that students have little or no Knowledge about fundamental quantities (Mass, Length and Time), which serves as a foundation that upholds Physics in senior secondary schools. For instance, one of the participants in a private secondary school in an urban area expressed

> *The reason is that the students sometimes forget, and sometimes the problem is that they do not know how to derive the unit due to the fundamental units and the derived quantity. So, why do they sometimes mistakenly interchange the unit instead of new things, such as putting newtons (N) and metres per second (m/s) in certain circumstances? Sometimes, it is part of the process, where maybe they lack confidence, and sometimes it is the least effective, leading slowly.* (D4)

In the same vein, one of the participants in a private secondary school in a rural location expressed

> *Most students are unaware of the correct formula for the given words. Let me say resistance. Everybody knows it is measured in ohms, but most students are unaware of this. So instead of writing, I know that the best thing for them is just to quit, not to write anything. After solving it, you go to the correct answer, instead of putting all that in there, because you do not know the correct unit. You leave it and probably do not put anything there.* (D1)

A lack of understanding of the questions being asked in external examinations is another cause of student failure. For instance, one of the participants in a private secondary school in a rural local area expressed ‘’ *The cause is that the students do not come themselves and they do not have full interpretation, as in the full knowledge of the question. All the use to bang into the question and start solving instead of listening and studying it carefully to know the real interpretation.*’’(D1)

The study also showed that the lack of academic attitude among students is one of the student factors that underlie the failure of physics students in external examinations. These attitudes manifested in students demanding an area of concentration and neglecting the elementary. One of the participants in a private secondary school in a rural location expressed

> *We find it very difficult to return to a short topic to read and go through it again. Moreover, we think the topic is a minor issue that you can overlook. So they do not go through it again. What they have to do is study how to navigate it and*

complete it, going through this cycle. So, everyone helps to go through it to discuss the better aspects. (D1)

The discussant added that students should read extensively and not focus on one aspect. *You should not overlook things like this, as this is the area of concentration; this is where you usually focus, and you should not be distracted by one part if you want to write an exam.* (D1)

The study further revealed that examination pressure causes students to omit units in their calculations during external examinations. One of the participants in a public secondary school in an urban centre noted that examination pressure causes students to forget the formula.

I think that thought is not coming from the teacher, maybe due to the pressure of the examination of this. Perhaps because of that, if my students do forget at times, yes. Perhaps they do not know it all. (D3)

In the same vein, one of the participants in a private secondary school in an urban centre expressed that examination makes students anxious.

However, due to WACE, when people tell students that they will either fail or pass if they take WACE, it can be misleading. They will be anxious about it, so they will be scared to enter the examination. Moreover, again, that will lead to forgetting the formula. (D4)

Distraction is one of the reasons for the low performance of Physics students in external examinations. The age we are currently living in comes with many distractions, which affect students' performance in external examinations. As a physics teacher in a private secondary school, I know that students nowadays have a lot *on their minds. They are not being carried away in the educational line at all. Many things are distracting them now."*(T2) In the same vein, one of the participants in a private secondary school in an urban centre expressed One of the problems I see for students nowadays is one *of seriousness.* (D4)

Discussions and Recommendations

The findings revealed that school facilities such as laboratories and apparatus capable of improving students' performance are unavailable. From the participants' responses, it is evident that students have limited access to laboratory and practical classes, as manifested in teachers' reluctance to organise practical classes and the ill-equipped laboratories. The result shows how Physics teachers did not organise practical classes for students who wanted to sit external examinations. The result corroborates John Aduwa's (2021) finding that most laboratories in schools are either not equipped or poorly equipped with facilities. Therefore, most of the school's laboratories have inadequate practical facilities, which may hinder the achievement of physics objectives, as many physics topics involve practical applications.

The results show that the recruitment of unqualified Physics teachers and the use of ill-equipped and obsolete physics apparatus in the laboratory are among the government factors that affect the performance of Physics students in external examinations. Providing well-equipped laboratories will enhance student achievement.

Ojediran, Oludipe, and Ehindero (2014) found that students taught through laboratory-based instruction performed better than those taught through conventional methods. The results show that cramming without proper knowledge, laziness, examination anxiety, lack of understanding, and distractions are student factors that contribute to low performance in external examinations. Students' lack of understanding of a concept often leads them to cram formulas, SI units, and definitions without grasping the underlying working principles behind them. This corroborates with Fadaei and Mora (2015), who argued that a lack of understanding of the problems and poor mathematical skills also constitute significant obstacles to the difficulties students experience in solving physics problems.

It was concluded that students preparing for external examinations are not adequately exposed to practicals due to ill-equipped laboratories in public and private schools. It was also concluded that the recruitment of unqualified teachers and student factors contributed to students' low performance in external examinations. Based on the findings of the study, the following was recommended;

i. The government should equip Physics laboratories with the necessary apparatus and equipment to facilitate practical classes.
ii. The government should prioritise the recruitment of qualified teachers in public secondary schools.
iii. Teachers should organise practicals for students and not pile up practicals during examination periods.
iv. Students should desist from cramming concepts and formulas but rather seek to understand and fully grasp them.

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