Examining the challenges of Non-Physics majors teaching Physics curriculum contents in secondary schools in Rivers State, Nigeria

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Abstract

The study was conducted to examine the challenges of Non-Physics majors teaching Physics curriculum contents in secondary schools in Rivers State, Nigeria. Mixed method research design was adopted for the study. The participants consisted of 52 Non-Physics major Physics teachers obtained using a purposive sampling method. Qualitative and quantitative data were collected using Interview Template for Non-Physics Major Teachers Teaching Physics and Non-Physics Major Teachers Teaching Physics Questionnaire (NPMTTPQ) [r = 0.79]. Data was analyzed using frequency count, percentage and mean. The findings of the study revealed that 21.5% of non-Physics major teachers teaching Physics are very knowledgeable about the Physics curriculum content while 27.9% had knowledge of the Physics curriculum content and 50.6% had little knowledge of the Physics curriculum content. It was also revealed that there was inadequate learning materials and practical apparatus and technology facilities for the teaching of the Physics curriculum content among others. The study recommended that in-service refresher courses and development trainings, adequate learning materials and practical apparatus and technology facilities as well as effective administrative support towards the teaching of the Physics curriculum content by non-Physics major teachers teaching Physics.

Keywords: *Non-Physics majors, Physics, Curriculum, Contents, Teachers*

Introduction

The aim of providing education to learners is to identify and develop those inherent potentials of the learner that are essential in tackling socio-economic problems that impede national progress. Zakira (2021) explained that education plays a major role in a country's all round development as it promotes human capital development and accelerates economic growth through a society's knowledge, skills and creative strength. Vital to the actualization of the aim of education is the teacher who actively engages learners by imparting the fundamental knowledge through effective teaching and learning process via interpretation of the curriculum. The school curriculum consist of several school activities and subjects that knowledge and skills required of the learners are cocooned. Murphy and Whitelegg (2006) observed that some of these subjects are

viewed 'complex, yet important and are basic requirement for further progression in choosing field of academic specialization. Research report by Adolphus, Ekineh and Aderonmu (2021) have shown that as learners progress in their learning of these subjects, there is massive decline in their interest and participation which results to a pyramid pattern enrolment.

Physics is one of the science subjects that fall within these subjects that experience decline in enrollment and students participation. The study of Physics in the secondary schools is crucial because it provides the baseline knowledge for further studies in astronomy, engineering, Information Communication Technology (ICT), agriculture, electronics among others. Given the importance of Physics, the secondary school Nigeria Physics curriculum document (FRN, 2009) explicitly stated that;

> "Physics is crucial for effective living in the modern age of science and technology. Given its application in industry and many other professions, it is necessary that every student is given an opportunity to acquire some of its concepts, principles and skills".

Quality teaching of Physics entails that students understand the underlying concepts and principles that permeate the subject. This understanding according to Brass, Gunstone and Fensham (2003) demands a rich array of knowledge such as affective, intellectual and motor skills with extensive links between the elements of knowledge as well as the ability to employ the elements of knowledge in identifying, interpreting and solving complex challenges. The pillar of quality education and the development of the needed citizens that are scientific literacy rest on the teachers. The Nigeria government knowing the importance of teachers in the attainment of national development explicitly stipulated that no educational system can rise above the quality of its teachers. Today, various countries have implemented notable changes and innovations in their education systems to increase the level of development. Also in Nigeria, there have been series of symposia and meetings, conferences, workshops, policy formulations and recommendations all geared towards the production of highly competent teachers that will train and develop our students to be intellectually sound, morally fit and possess the required psychomotor dexterity expected for responsible citizens. A competent teacher must have a sense of efficacy, mastery of the subject, and pedagogical knowledge (Corpuz & Salandanan, 2015). The 21st century Physics teacher is a guide and facilitator responsible for helping their learners to understand, that is, placing them in a positon to be a problem solver, provide educational environment commensurate to physical, social, intellectual and emotional development of students. Physics teachers are required to help in the cultivation of students' interest in Physics and be their partner in the process of learning and intellectual development. Walck (1997) wrote that;

> "the teaching life is the life of the explorer, the creator, constructing the classroom for free exploration. It is about engagement. It takes courage. It is about ruthlessly excising what is flawed, what no longer fits, no matter how difficult it was to achieve. It is about recognizing teaching as a medium that can do some things exquisitely but cannot do everything".

A Physics teacher is someone who teaches Physics at the secondary school or high school level. The enormous task placed on the Physics teacher includes but not limited to planning and presentation of suitable learning experiences for the students, select, design and change instructional materials that are suitable for the students' academic attainment and analyzes students' academic outcome in Physics. Aderonmu and Adolphus (2021) explained that what happen during the teaching and learning of Physics is critical because teachers controls what is taught, how is taught and have direct contact with their students. While teaching Physics, Bugas and Gellica (2017) stressed that premium should be placed on the process of instructional interaction because Physics is viewed to be abstract, difficult and boring for most part of the content and which is a known perception. It therefore implies that Physics teachers' knowledge, skills and disposition is a function of students' achievement in the study of Physics.

There are two categories of Physics teachers in secondary schools in Nigeria. The first category are those referred to as Specialist Physics teachers that majored in Physics Education at first degree [B.Sc (Ed)] or Physics (B.Sc) with a Post Graduate Diploma in Education (PGDE). The second category of Physics teachers are those referred to as non-specialist that did not major in Physics. The latter set of Physics teachers migrated from Science, Technology or Engineering related fields. Although Ahiakwo (2006) asserted that quality of science teachers can never be short changed because it is the distinguishing factor that differentiates between the "actual" from the "notional" teachers. Achufusi (2015) also commented that quality Physics teachers demonstrate expertize by achieving the curriculum objectives consequently enhancing the academic performance of students. However, the quality and quantity of professional secondary school Physics teachers is a major global issue based on the importance of the subject to national and as well international development (Aderonmu & Goswami, 2020). In cognizance of the above, Udoh (2012) noted that;

> Physics is crucial for effective living in the modern age of science and technology. Given its application its application in industry and many other professions, it is necessary that every student is given an opportunity to acquire some of its concepts, principles and skills *(p.13)*

The current Nigeria Physics curriculum is a product of critical reforms in Physics education in an effort to actualize the implementation of scientific and technological innovation in the modern era. The curriculum emphasize on the thematic approach for content selection while applying the guided discovery for instructional purpose. Seven themes were highlighted for the curriculum with several topics subsumed in each of the themes across the three year of the Physics programme in the senior secondary school.

1. Interaction of matter, space and time	
i	Fundamental and derived quantities and units
ii	Position, distance and displacement
iii	Time
iv	Speed and Velocity
v	Rectilinear acceleration
vi	Vectors and scalars
vii	Motion and equations of uniformly accelerated motion
viii	Projectiles
ix	Equilibrium of forces
x	Simple Harmonic Motion

2. Conservative principle	
i	Work, Energy and Power
ii	Heat Energy
iii	Electric chagres
iv	Linear momentum
v	Mechanical Energy

3. Wave: Motion without transfer	
i	Production and Propagation of waves
ii	Types of waves
iii	Light waves
iv	Sound waves
v	Applications of light and sound waves
vi	Electromagnetic waves

4. Field at rest and in motion	
i	Description and properties of fields
ii	Gravitational fields
iii	Electric fields
iv	Magnetic fields
v	Electromagnetic fields
vi	Simple A.C circuit

5. Energy quantization and duality of matter	
i	Particulate nature of matter
ii	Elastic properties of solids
iii	Crystal structure
iv	Fluids at rest and in motion
v	Molecular theory of matter
vi	Models of the atom
vii	Nucleus
viii	Energy quantization
ix	Wave particle paradox

6. Field at rest and in motion	
i	Description and properties of fields
ii	Gravitational fields
iii	Electric fields
iv	Magnetic fields
v	Electromagnetic fields
vi	Simple A.C circuit
7. Physics in technology	
i	Battery and electroplating
ii	Electrical continuity testing
iii	Solar collector
iv	Solar energy panel

The Physics curriculum explicitly stated the level of knowledge, skills, activities, instructional materials and learning outcomes required for the interactive process. However, it is important to note that the aim and objectives of any educational programme cannot be achieved if the curriculum is not fully implemented. Over two decades ago, Shulman (1986) had presented a term known as teachers' "curricular knowledge" which is enshrined in the Pedagogical Content Knowledge (PCK). Curricular knowledge consists of programs designed for teaching a particular subject or topic, the variety of instructional materials available, and the set of indications and contra-indications for the use of particular curriculum materials in particular circumstances.

It is quite unfortunate that the implementation of the secondary school Physics curriculum has been fraught with numerous challenges that consequentially affects students' academic performance. Studies in secondary school physics (Omeodu, 2020; Twahirwa & Twizeyimana, 2020; Aderonmu & Arokoyu, 2021) have noted that reasons associated to difficulties in students' performance in Physics include low interest level and lack of motivation, erroneous usage of concepts that have their bases on scientific thought and belief, inability to relates meaning to abstract Physics concepts, misconceptions among others. More worrisome is the proliferation of Non-Physics major teachers teaching Physics in secondary schools with limited knowledge of curriculum interpretation and implementation. In light of the above, the study examined the

challenges of Non-Physics majors teaching Physics curriculum contents in secondary schools in Rivers State, Nigeria.

Aim and objectives of the study

The aim of the study is to examine the challenges of Non-Physics majors teaching Physics curriculum contents in secondary schools. Specifically, the objectives of the study are to;

1. Ascertain the proportion of Physics curriculum content knowledge possessed by Non-Physics majors teaching Physics in secondary schools.
2. Determine the adequacy of learning material and practical apparatus for the teaching of the themes in the Physics curriculum content by Non-Physics majors teaching Physics in secondary schools.
3. Investigate the level of adequacy of technology facilities for the teaching of the Physics curriculum content by Non-Physics majors teaching Physics in secondary schools.
4. Ascertain the level of administrative support to Non-Physics majors teaching Physics curriculum content in secondary schools.

Research Questions

1. What is the proportion of Physics curriculum content knowledge possessed by Non-Physics majors teaching Physics in secondary schools?
2. Are there adequate learning materials and practical apparatus for the teaching of the themes in the Physics curriculum content by Non-Physics majors teaching Physics in secondary schools?
3. Are there technology facilities for the teaching of the Physics curriculum content by Non-Physics majors teaching Physics in secondary schools?
4. What is the level of administrative support to Non-Physics majors teaching Physics curriculum content in secondary schools?

Methodology

The design adopted for the study was the mixed method research design. Mixed method research design according to Fischler (2021) is a procedure for collecting, analyzing, and "mixing" both quantitative and qualitative research and methods in a single study to understand a research problem with "more in-depth exploration" or clarification. The study was conducted in Port Harcourt Local Government Area of Rivers State, Nigeria. Port Harcourt is the capital of Rivers State with a population of 356,000 (Federal Office of Statistics, 2003). Port Harcourt is located within latitudes 6^{o} 58´N to 7^{o} 6´N and Longitude 4^{o} 40´E to 4^{o} 55´E. There are 13 public secondary schools and over 200 registered private senior secondary schools in Port Harcourt Local Government Area.

The population of the study consisted of all the Non-Physics major teaching Physics in public and private senior secondary schools in Port Harcourt Local Government Area. Using a purposive sampling technique, a total of 52 Non-Physics major Physics teachers were used for the study. The Profile data of Non-Physics teachers teaching Physics used for the study is presented in Table 1 based on gender, school type and teaching experience.

Table 1: Profile characteristics of Non-Physics major teachers teaching Physics.

Gender	**Frequency**	**Percentage**
Male	33	63.5%
Female	19	36.5%
Total	52	100%
School type	**Frequency**	**Percentage**
Public	17	32.7%
Private	35	67.3%
Total	52	100%
Experience	**Frequency**	**Percentage**
< 5 years	23	44.2%
5 – 10 years	10	19.2%
11years and above	19	36.6%
Total	52	100%

Source: Research fieldwork, 2021.

The profile characteristics of Physics teachers used for the study indicated that 33 (63.5%) were male while 19 (36.5%) were female. 17 (32.7%) were Non-Physics major teachers teaching Physics in public secondary schools while 35 (67.3%) were Non-Physics major teachers teaching Physics in private secondary schools. Conclusively, 23 (44.2%) of the teachers have less than 5 years teaching experience, 10 (19.2%) had between 5 to 10 years teaching experience while 19 (36.6%) of the secondary school Physics teachers have 11 years and above teaching experience.

Two research instruments were adopted for the study which were Non-Physics Major Teachers Teaching Physics Questionnaire (NPMTTPQ) and Interview Template for Non-Physics Major Teachers Teaching Physics (ITNPMTTP). Non-Physics Major Teachers Teaching Physics (NPMTTPQ) was designed having three sections A, B and C. Section A considered the profile data of the participants while section B was divided into 4 sub-sections focused on topical challenges (Content Knowledge, Learning material and practical apparatus, Technological facilities and Administrative support) that Non-Physics Major Teachers Teaching Physics encounter during the teaching and learning of Physics. Section C was designed to provide responses to the prospects for the effective teaching of Physics by Non-Physics majors.

Interview Template for Non-Physics Major Teachers Teaching Physics (ITNPMTTP) consisted of 5 questions which the researcher asked the participants that required there oral expression which was supplement their response on NPMTTPQ. The interview session for each respondent lasted for 30mins and a recorder was used to record their expressions during the interview with the permission of the participants. The recorded responses were further transcribed for coding using the thematic content analysis to ascertain existing similar patterns across the data set which provided answers to research questions being addressed. Both instruments were validated for face and content validity by three experts in Physics education. The instrument NPMTTPQ was further subjected to a pilot study to determine the reliability. 12 Non-Physics Major Teachers Teaching Physics were used for the pilot study. A test-retest method was employed

for a duration of one week while data collected during this process was analyzed using the Pearson Product Moment Correlation. A correlation coefficient of 0.79 was obtained making the instrument 79% reliable to be employed for the study. Data was analyzed for the main study using frequency count, percentage and mean.

Results

Research Question 1: What is the proportion of Physics curriculum content knowledge possessed by Non-Physics majors teaching Physics in secondary schools?

Table 2: Responses of Non-Physics majors teaching Physics on Content knowledge.

Physics Curriculum Themes	Very knowledgeable	Knowledgeable	Little knowledge
Interaction of matter, space and time	21 (40.4%)	19 (36.5%)	12 (23.1%)
Conservative principle	13 (25.0%)	21 (40.4%)	18 (34.6%)
Wave: Motion without transfer	11 (21.2%)	14 (26.9%)	27 (51.9%)
Field at rest and in motion	9 (17.3%)	13 (25.0%)	30 (57.7%)
Energy quantization and duality of matter	8 (15.4%)	12 (23.1%)	32 (61.5%)
Physics in technology	5 (9.6%)	8 (15.4%)	39 (75.0%)
Average percentage (%) mean	**21.5%**	**27.9%**	**50.6%**

Source: Research fieldwork, 2022.

Table 2 indicated the responses of Non-Physics majors teaching Physics based on their content knowledge of the Physics curriculum. The study showed that Non-Physics majors teaching Physics in secondary schools are knowledgeable in themes such as *interaction of matter, space and time and conservative principle*. However, it was revealed that Non-Physics majors teaching Physics in secondary schools had little knowledge in Physics curriculum themes such *Wave; motion without transfer, Field at rest and in motion, Energy quantization and duality of matter* and *Physics in technology*. The findings of the study therefore revealed that 50.6% of Non-Physics majors' teachers teaching Physics in secondary schools had little knowledge of the topics imbedded in the themes of the Physics curriculum.

Research question 2: Are there adequate learning materials and practical apparatus for the teaching of the themes in the Physics curriculum content by Non-Physics majors teaching Physics in secondary schools?

Table 3: Non-Physics majors teaching Physics responses on learning material and practical apparatus for the teaching of the themes in the Physics curriculum content.

Physics Curriculum Themes	Very Adequate	Adequate	Not adequate
Interaction of matter, space and time	19 (36.5%)	17 (32.7%)	16 (30.8%)
Conservative principle	11 (21.2%)	8 (15.4%)	33 (63.4%)
Wave: Motion without transfer	5 (9.6%)	6 (11.5%)	41 (78.9%)
Field at rest and in motion	14 (26.9%)	13 (25.0%)	25 (48.1%)

Energy quantization and duality of matter	5 (9.6%)	7 (13.5%)	40 (76.9%)
Physics in technology	(0.0%)	3 (5.8%)	49 (94.2%)
Average percentage (%) mean	**15.7%**	**17.3%**	**66.0%**

Source: Research fieldwork, 2022.

The analysis shown in Table 3 above is the response of Non-Physics majors teaching Physics on learning material and practical apparatus for the teaching the themes in the Physics curriculum content. The study indicated that among the themes in the Physics curriculum, it is only *interaction of matter, space and time* that learning materials and practical apparatus for the teaching of the Physics curriculum content are adequate. The findings of the study revealed that 66.0% of Non-Physics majors' teachers teaching Physics in secondary schools responded that learning materials and practical apparatus for the teaching of the Physics curriculum content is not adequate.

Research Question 3: Are there technology facilities for the teaching of the Physics curriculum content by Non-Physics majors teaching Physics in secondary schools?

Table 4: Non-Physics majors teaching Physics responses on technology facilities for the teaching of the Physics curriculum content.

s/no	Technology facilities	Available (%)	Not Available (%)	Decision
1	Electronic Whiteboard	5 (9.6%)	47 (90.4%)	NA
2	Electronic graphic board	1 (1.9%)	51 (98.1%)	NA
3	Physics e-learning software	9 (17.3%)	43 (82.7%)	NA
4	Desktop computers	12 (23.1%)	40 (76.9%)	NA
5	Laptops	8 (15.4%)	44 (84.6%)	NA
6	Internet connectivity	2 (3.8%)	50 (96.2%)	NA
7	Projectors	6 (11.5%)	46 (88.5%)	NA
8	Screen	5 (9.6%)	47 (90.4%)	NA
9	Printing device	7 (13.5%)	45 (86.5%)	NA
10	Scanners	7 (13.5%)	45 (86.5%)	NA
Average percentage (%) mean		**(11.9%)**	**(88.1%)**	**NA**

Source: Research fieldwork, 2022.

Table 4 revealed the analysis of Non-Physics majors teaching Physics responses on technology facilities for the teaching of the Physics curriculum content. The average percentage (%) mean showed that technology device available is 11.9% while those not available is 88.1%. The study therefore indicated that technology facilities for the teaching of the Physics curriculum content as reported by Non-Physics majors teaching Physics is not adequate.

Research Question 4: What is the level of administrative support to Non-Physics majors teaching Physics curriculum content in secondary schools?

Table 5: Non-Physics majors teaching Physics responses on administrative support towards the teaching of the Physics curriculum content.

To what extent is administrative support towards Non-Physics majors teaching Physics in secondary schools?	Very Supportive	Supportive	Not Supportive
	8 (15.4%)	9 (17.3%)	35 (67.3%)

Source: Research fieldwork, 2022.

Analysis of Table 5 indicated the response of the participants on administrative support by their school managements for the teaching of Physics curriculum in secondary schools. 15.4% of the participants indicated that they have very supportive administration as regard the teaching of Physics, 17.3% noted that there school administration is supportive while 67.3% mentioned that they do not have supportive school administration as regard the teaching of Physics.,

Discussion of findings

The study was concerned with examining the challenges of Non-Physics majors teaching Physics curriculum contents in secondary schools in Rivers State, Nigeria. The findings of the study revealed that 50.6% of Non-Physics majors' teachers teaching Physics in secondary schools had little knowledge of the topics imbedded in the themes of the Physics curriculum. This findings collaborates with the view of Malicoban et al (2019) where they noted that most of the participants (Non-Physics majors teaching Physics) in their study lack knowledge of Physics concepts. Thomas, Christensen and Wittmann (2011) also found that Physics teachers who do not have degrees in Physics were less likely to identify the difficulties students had concerning Physics concepts than those who were not physicists. Excerpts from participants interviewed revealed that;

> *"I studied chemical engineering, most of the contents of Physics I teach my students is as a result of continuous studying so that it can be part of me. Most times, I don't teach those contents that I find difficult." (R_6)*

> *"Topics that are in the new theme… that is Physics in Technology are practical oriented. I actually lack knowledge of the aspect especially the practical part of using continuity tester." (R_{11}).*

While other participant interviewed noted that:

> *"In private schools you are sometimes expected to teach more than one subject. As a Chemist, I teach Chemistry, Basic Science and Physics. I encounter so much challenges while teaching some contents in Physics because they are quite different from contents I learnt in my undergraduate days" (R_2)*

> *"Where I find complex is topics that have much mathematical calculations like vectors, momentum, heat measurement and also the advance part like energy quantization. I try to follow already solved problems and present it to my students" (R_{18})*

The content knowledge of teachers is considered as one of the qualities of teachers because it influences the academic outcome of learners. Olasehinde-Williams, Yahaya and Owolabi (2018)

concluded by acknowledging that teachers can only teach "what" they know in the ways they know "how" to teach.

The study also revealed that 66.0% of Non-Physics majors' teachers teaching Physics in secondary schools responded that learning materials and practical apparatus for the teaching of the Physics curriculum content is not adequate. Some of the interviewed participant lamented that;

> *"Truly, we are short of learning materials and laboratory equipment. I believe that if there are adequate instructional facilities, the process of teaching Physics will not be complex" (R_{24}).*

> *"This is the lab where I teach Physics, are there learning materials and practical apparatus? No. This alone affect students learning in Physics" (R_3).*

Akçayir (2016) opined that when instructional materials and laboratory tools are effectively utilized in teaching science, students are equipped with abilities to be creative, posing scientific oriented questions, perform science experiments, converse and defend scientific argument and develop skills for further scientific inquiry. Oluwasegun, Ohwofosirai and Emagbetere (2015) assert that proper use of learning materials and physics laboratory apparatus enhances students' academic performance in Physics as well as inculcates scientific reasoning to tackle tack beyond the classroom.

The study also indicated that technology facilities for the teaching of the Physics curriculum content as reported by Non-Physics majors teaching Physics is not adequate. The availability of technological facilities in this 21st century cannot be over emphasized as its integration provides easy-to-access information for teachers, accelerate learning and create a conducive teaching and learning environment that enables students to explore and deepen their understanding of difficult concepts, especially in Physics. An excerpt from an interviewed participant noted that;

> *"I had opportunity to have gone for training that has to do with integrating technology in the teaching like creating simulations and animations for teaching purpose, Goggle 360 classroom and others but in my school no technology facilities to executive it" (R_9).*

> *"I only use the WhatsApp platform through my smart phone to sometimes send assignments and other information in the WhatsApp group to my students via their parents contact. But the school do not have better technological facilities for teachers to engage students in and out of the classroom" (R_{27}).*

> *"We still use the blackboard to teach Physics in this 21st century…not even the white mark board not to talk of interactive white board" (R_6).*

The effective use of technology learning tools in classrooms can increase student engagement, help teachers improve their lesson plans, and facilitate personalized learning. It also helps students build essential 21st century skills (American University, 2020). Availability and effective implementation of technology in teaching prepares learners for the future as it was captured in ViewSonic Library (2022) that a nation's competitiveness depends on having a population that is

well informed and capable, failing to incorporate and benefit from the technology available would do students and everyone a terrible disservice.

A successful educational process is hinged on quality and efficient role of administration. Paget (2019) explained that Effective administration and operations support an education that goes well beyond imparting knowledge. Researchers have noted that teachers' effectiveness and commitment positively correlates with the quality of administrative operations and services provided by schools (Ololube, 2009; Lai & Cheung, 2015). Effective school administration is an off shoot of leaders that are acquainted with the knowledge and process of enhancing teachers' motivation and creating atmosphere germane for teaching and learning. However, the study of Agi (2018) on a preliminary administrative issues that bothers on secondary school teaching and learning was essentially negative. In fact, teacher issues were not considered relevant, while the respondents had negative view of the relevance of supervisory issues of the curriculum to teaching and learning in secondary school education.

Excerpts from participants interviewed revealed that;

> *"The school administrative system is not supportive at all. For instance, as mechanical engineering graduate that teaches Mathematics and Physics, some Physics content/practicals might require me to seek for extra materials/apparatus which might need the exigent support from the school administration. Most times, those contents/practicals are skipped" (R_{19}).*

> *"if I encounter difficulties implementing the Physics curriculum content as a result of inadequacy of school materials, the principal pay deaf ears to my complains" (R_5).*

Teachers' productivity, especially Non-Physics majors teaching Physics in secondary schools can be high if there is genuine administrative support which includes having an open-door policy and engagement in peer collaboration, then positive school culture and high student attainment in Physics can be a reality.

Conclusion

The present study was purposed to examine challenges of Non-Physics majors teaching Physics curriculum contents in secondary schools. The study adopted a mixed method design to obtain in-depth data from the participants. Findings herein conspicuously reveal the challenges of Non-Physics majors teaching Physics which affects their effective teaching of the Physics curriculum content which among others is a major setback to students learning.

Recommendation

Based on the findings of the study and the conclusion reached, the following recommendations were made;

1. In-service refresher courses and development trainings should be provided for Non-Physics majors teaching Physics curriculum contents in secondary schools so that they can be abreast with both content and methods of Physics delivery.
2. There is the need for the provision of adequate learning materials and practical apparatus for the teaching of the themes in the Physics curriculum content in secondary schools by both governments and private school owners.
3. In attaining the demands of 21st century teaching, government and private school owners should provide technological facilities to support the teaching of Physics curriculum contents by Non-Physics majors teaching Physics.
4. Heads of secondary schools should ensure that adequate administrative support is provided for Non-Physics majors teaching Physics to enhance their level of commitment and productivity in facilitating better students' attainment in Physics.

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