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Infrastructure, Economic Development and Poverty Reduction in Africa

Bassey Anam
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Rethinking Sustainable Development in Africa

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CHAPTER 13

An Investigation Into The Availability And Utilization Of Resources In Teaching Physics At The Secondary School Level

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ABSTRACT
The study investigated the availability and utilization of teaching resources at the secondary school physics. The study adopted a descriptive survey type of research design. One Hundred senior secondary school physics students were randomly selected from three schools in Yaba Local Government of Lagos state. A self-constructed and validated questionnaire (r=0.79) using chronbach alpa of 12 items and a 50 item check list were used in collecting data. Three research questions guided the study. Data collected were analyzed descriptively. Results obtained showed that resources for teaching physics were not readily available. Researchers recommended for quick training of practising physics teachers on improvisation through in service means.

Keywords: Availability, utilization, physics, teaching resources
BACKGROUND TO THE STUDY

Physics is the bedrock of science and technology because many of the tools on which the scientific and technological advancement depends are the direct products of Physics. Physics is therefore a core subject in science and technology since it studies the essence of natural phenomena and helps people understand the rapidly technological changing society (Zhaoyao, 2002). The principles of Physics have been widely used for economic, scientific and technological advancement. This has reduced the world into a global village through the use of satellites and computers. Also, the knowledge of Physics had led to sustainable development in the area of industrialization for improvement of materials useful to the well-being of human race. Furthermore, Physics education enables the learners to acquire problem-solving and decision-making skills that pave way for critical thinking and inquiry that could help them to respond to widespread and radical changes in all facets of life.

Despite the importance of Physics in scientific and technological development of our nations, understanding of the subject had dwindled over the years and performance of the Physics students had not been encouraging. Ho and Boo (2007) discussed that in many countries, has been a decline in the number of students wishing to continue with Physics. Ali (2000), Okebukola (2007), Nneji (2008), Ogunleye (2000) and Umeh (2002) were all of the opinion that students’ performances in the science subjects were poor. Also, previous study had shown that students who hold negative stereotype images of scientists, science and technology in society are easily discouraged from pursuing scientific disciplines and usually performed poorly in science subjects (Changeiwo, 2000). This situation does not favour Nigerians towards developing a scientific and technological nation. Physics as a science subject is an activity oriented subject and the suggested method for teaching it, is guided discovery method which is resource base (NTI, 2007). This suggests that the mastery of Physics concepts cannot be fully achieved without the use of instructional learning materials (Ogunleye 2009). The teaching of Physics without learning materials will certainly result to poor performance in the course. Franzer (2002) stressed that; a professionally qualified science teacher no matter how well trained would be unable to put his ideas into practice if the school setting lacks the equipment and materials necessary for him or her to translate his competence into reality. Bassey (2002) also stressed that science is a resource intensive subject; he also submitted that in a period of economic recession, it will be difficult to adequately find some of the electronic gadgets and equipment for Physics in Schools.

Furthermore, students shun sciences particularly Physics when given an option and this especially applies to girls (Aduda, 2003). This implies that given a choice, a student would rather drop Physics in favour of other science subjects. Improving the learning of Physics and achievement in it requires a lot of input from the teachers because the role of the teacher in the classroom is important. The
teaching approach that a teacher adopts and the available materials he/she teaches with are factors that may affect students' achievement (Mills, 2001). Using adequate and suitable laboratory equipment to teach Physics in Secondary Schools may probably help to improve the academic achievement of learners. The study will provide empirical evidence on the availability and adequate utilization of Physics resources at the senior secondary school level.

The Science Curriculum for Secondary Schools clearly spelt out the objectives of instructional media, as well as the methods/strategies for effective teaching and learning of physics. Much as the Physics curriculum appears laudable, the fact still remains that the successful implementation of any educational programme is, to a large extent contingent on the availability of the appropriate resource materials. To ensure effective teaching and learning of Physics, in Nigeria Secondary Schools therefore, appropriate and sufficient resource materials are required for the implementation of Physics education curriculum. It is only by so doing that the recipients of Physics instructions will be sufficiently groomed and equipped with the knowledge, skills, attitudes and competencies that are expected of them at that level of education. Resource materials are described as information carriers designed specially to fulfill objectives in teaching learning situation. The indispensability of resource materials for teaching Physics cannot be overemphasized. Empirical studies have established that students achieve greater learning as evidence in acquisition of cognitive and psychomotor skills when resource materials are used for instructional purpose (Ifeakor, 2000).

There is a dearth in science facilities in the laboratories and this contributes to students' poor academic performance in science (Physics) at the Secondary School level (Ihualam, 2008; Ifeakor, 2006; Udo, 2006; Okafor, 2000). It is on this note this study investigated the adequacy of laboratory facilities and utilization of teaching resources in Secondary Schools in Lagos State with specific reference to assessing the extent at which laboratory facilities in the Secondary Schools are adequate for the teaching of Physics and to what extent are they utilized? Improving the learning of Physics and achievement in it requires a lot of input from the teachers because the role of the teacher in the classroom is important. The teaching approach that a teacher adopts and the available materials he/she teaches with are factors that may affect students' achievement (Mills, 2001). Therefore, the use of appropriate teaching equipment and teaching method is critical to the successful teaching and learning of Physics. There are still much to be done in the area of effective utilization of available teaching equipment. Therefore, this study aimed at finding out the available and utilized Physics laboratory equipment at the secondary school system.

More often than not, unavailability or inadequacy of suitable teaching facilities is responsible for the poor performance among other factors such as the teacher competency, teacher's methodology and the attitude of the students towards
the subject. Using adequate and suitable laboratory equipment to teach Physics in Secondary Schools may help to improve the academic achievement of learners. The available research in literature does not indicate any research on the utilization of suitable Physics laboratory equipment in Senior Secondary School Physics in Nigeria. This research study was therefore intended to fill this gap in the body of knowledge. The study will provide empirical evidence on the utilization of suitable and available physics laboratory equipment and its adequacy. Improving the learning of Physics and achievement in it requires a lot of input from the teachers because the role of the teacher in the classroom is important. The teaching approach that a teacher adopts and the available materials he/she teaches with are factors that may affect student's achievement (Mills, 2000). Therefore, the use of appropriate teaching equipment and teaching method is critical to the successful teaching and learning of Physics.

Although, studies had been conducted examining different teaching methodology adopted in Physics class for example, Kibett & Kathuri (2006) found that students who were taught using project based learning outperformed their counterparts in regular teaching approach. There are still much to be done in the area of effective utilization of available teaching equipment. Therefore, this study aimed at finding out the availability and utilization of Physics laboratory equipment and its adequacy of suitable teaching facilities was identified for the poor performance among other factors such as the teacher competency, teaching methodology and the attitude of the students towards the subject. Using adequate and suitable laboratory equipment to teach Physics in Secondary Schools will help to improve the academic achievement of learners. The study will provide empirical result on the availability and adequacy of teaching resources in Senior Secondary School Physics.

STATEMENT OF THE PROBLEM
The problems facing the development of Physics education in the country are numerous. Many studies have been carried out to identify factors that contribute to student's poor performance in Physics. Such as non-availability of facilities for teaching, lack of classrooms, textbooks, journals and overpopulation of students, inadequate number of Physics teachers in the Senior secondary schools in Nigeria. Also, lack of qualified teachers and facilities in Physics education.

PURPOSE OF THE STUDY
The purpose of this study is to find out empirically the extent of availability, adequacy and frequency of use of resource materials for the teaching and learning of Physics in Lagos State Secondary Schools.
RESEARCH QUESTIONS
The following research questions were raised to guide the study.
1. What are the available resources for the teaching of Physics?
2. Are the available material resources adequate for the teaching and learning of Physics?
3. How often are the available material resources utilized in the teaching and learning of Physics in the Secondary Schools in Lagos State?

SIGNIFICANCE OF THE STUDY
The study has revealed the existing status of resources in the teaching of physics at the secondary schools in Lagos state. It has also provided empirical data on the availability, utilization and frequency of use of the teaching materials.

LITERATURE REVIEW
Resources for teaching science could be human (e.g. teachers and laboratory assistants), materials (e.g. library, laboratory, teaching aids, classrooms, etc.), facilities (e.g. running water, constant electricity supply, etc.) and appropriate chemicals and reagents. There is the need to use modern and standard resources for teaching science because it enables students to improve on students' performances (Offormatu, 2000). Effective teaching and learning of science depends on teacher know-how in terms of expertise in content areas and teaching strategies, availability of teaching aids, recommended textbooks and other supplementary reading materials, laboratory equipment, chemicals and reagents.

Okeke and Inomiesa (2006) found that library materials and science laboratory equipment are positively related to the performance of students. Science instruction/teaching is more effective when laboratory materials are available and when these are well used. Oladeji (2001) in his study found that many Secondary Schools do not have enough materials for teaching basic concepts. The researcher further added that schools that were poorly equipped produced students with poor performance than those from well-equipped Schools. Other factors attributed to this poor performance include: shortage of qualified staff (teachers), lack of adequate teaching facilities and high teachers' student ratio. The studies reported above show the importance of resources in the teaching-learning process. Thus, the aim of analyzing resources is essentially to direct the teaching-learning activities which in itself is meant to increase students learning and help to improve their performance in examination. In the course of Nigeria's quest to advance technologically and compete favourably with other advanced countries of the world, both human and material resources in the teaching of science need to be sought for without delay.
The success achieved in any educational system would largely depend on the human resources inputs, namely teaching and non-teaching staff. Inadequate staff would constitute a log. Furthermore, Ajani (2005) discovered that the experience of teachers is positively related to the academic achievement of students. Also, the study carried out by Abari (2003) on teacher demand and supply of teachers in Lagos State secondary. The result showed that professionally qualified teachers were inadequate during that period. Also, Adejumobi (2007) used a sample of 90 teachers from 9 secondary schools in Badagry local government of Lagos state. Using a multiple regression and F-ratio analysis for Mathematics, Physics, Biology and English language, the findings showed that the teacher's qualification and experience are significant in predicting students' academic achievement in the four subjects.

Instructional materials have been defined by various authors. For example, Obanya (2009) defined it as didactic materials thing which are supposed to make learning and teaching possible. Isola (2010) referred to them as objects or devices, which help the teacher to make a lesson much clearer to the learner. Instructional materials are also described as concrete or physical objects which provide sound, visual or both to the sense organs during teaching (Agina-obu, 2005). Instructional materials are in various classes, such as audio or aural, visual or audiovisual. Thus, audio instructional materials refer to those devices that make use of the sense of hearing only, like radio, audio tape recording, and television. Visual instructional materials on the other hand, are those devices that appeal to the sense of sight only such as the chalkboard, chart, slide, and filmstrip. An audio-visual instructional material however, is a combination of devices which appeal to the sense of both hearing and seeing such as television, motion picture and the computer. Among the instructional materials the classroom teacher uses, the visuals out-numbered the combination of the audio and audio-visual sufficient, qualified teachers and adequate classrooms with the required numbers of desks and chairs to accommodate the required number of students (EFA News, 2004; WCEFA, 2000). Inadequate number of teachers, textbooks, instructional materials, classrooms, desks and chairs may lead to poor students' academic achievement. This is because students' academic achievement depends on these important educational inputs (teaching resources) Beynon, 2007.

Psacharopolous and Woodhall (2005) assert that a good result in education has to do with the way the educational inputs are transformed into outputs (scores on achievement tests). Input-output or production-function model assumes that performance output of the educational process is related to a series of inputs. For schools, the input groups usually are classified as family resources, school resources, community characteristics, student resources and peer group characteristics, while the outputs are scores on achievement tests. The purpose of input-output research is to predict on outcome rather than to explain how the results
were produced. In terms of the open-systems model, input-output research ignores the system's internal transformational process and uses only inputs to predict outputs (Hoy & Miskel, 2006). One of the goals of all managers is to be productive. Productivity is about the output-input ratio within a time period with due consideration for equality; and it implies effectiveness and efficiency in individual and organizational performance. Effectiveness is the achievement of objectives while efficiency is the achievement of the ends with the least amount of resources. In essence productivity improvement is about effectively performing the basic managerial and non-managerial activities (Olam, 2004). In the education system, teachers, instructional materials, classrooms, desks and pupils form the components. The interaction of these inputs in the education system results into better learning outcomes (Ngalu et al., 2005). The quality of human and material resources (inputs) available for teaching and learning determines the type of results (outputs), which in this study is students' academic achievement.

There have been several studies on instructional materials and academic achievement. For instance, Isola (2010) conducted a research on the effects of instructional resources on students' performance in West Africa School Certificate Examinations (WASCE) in Kwara State. In the study resources were correlated material resources with academic achievements of students in ten subjects. Data were collected from the subject teachers in relation to the resources employed in the teaching. The achievements of students in WASCE for the past five years were related to the resources available for teaching each of the subjects. The study concluded that material resources have a significant effect on student's achievement in each of the subjects. In the same manner, Moronfola (2002) carried out a research in Ilorin Local Government Area of Kwara State. Questionnaires were used to collect data on the material resources available for the teaching of some selected subjects in ten secondary schools and related these to students' achievements in each of the selected subjects and to the amount of resources available for the teaching of the subjects. Finding showed a significant effect of material resources on the Students' academic performance in these subjects.

In the same vein, Popoola (2000) investigated the effect of instructional resources on the academic achievements of students in Ogun State. Five Secondary Schools in Abeokuta were used for this study. Questionnaires were designed to elicit responses on instructional materials that were available for the teaching and learning of each of the three school subjects examined. The researcher collected WASC Examination results for five years and compared achievements of students in schools with adequate material resources and achievements of students in schools with inadequate material resources. The result showed a significant difference in the achievements of the two sets of students. The schools with adequate instructional materials performed better than those with inadequate instructional materials.
Teachers are very important facilitators of the teaching and learning process. They are responsible for arranging learning experience (Shiundu & Omulando, 2002). When there are few teachers, their efficiency in arranging comprehensive learning experiences for learners is hampered. Further, when teachers are few and students are many, their workload becomes more, thus making it difficult for them to perform to their optimum level, to enable students to release the expected learning outcomes (EFA News, 2004). Meaningful learning takes place in the classroom through the interactions of teachers and students. Effective instruction therefore results in meaningful learning process. Teachers are crucial to meaningful learning that results into high student academic achievement (ADEA, 2004).

Free Secondary Education initiative. Teachers are expected to deal with overly-large classes. Further, a lack of facilities at schools and busier teachers are indications that many public Secondary Schools are already struggling to perform well in National Examinations, a situation that could be worsened by students entering institutions that are ill-equipped to receive them (Oyaro, 2008).

The Ministry of Education’s recommendation of 40 students per class is aimed at providing achievement (Republic of Kenya, 2011). However, since most schools do not have prior arrangement for extra classes in anticipation of more students due to Free Secondary School (FSE), this recommendation has caused a major threat to students' academic achievement (Oyaro, 2008). A textbook constitutes an important tool for academic achievement (Owoeye & Yara, 2010). Many writers, as cited in Owoeye and Yara (2010), have variously highlighted the contribution of textbooks to academic achievement. Studies have revealed in some instance, that textbooks provide the only source of information for students as well as the course of study for the subject. After exploring the effects of textbooks and other factors on student achievements, Lockheed et al. (2006) have found in their longitudinal data from a national sample of eight grade mathematics classrooms in Thailand that textbooks may affect achievement by substituting for additional post-secondary mathematics education of teachers and by delivering a more comprehensive curriculum.

Altbach (2003) opines that “nothing has ever replaced the printed word as the key element in the educational process and as a result, textbooks are central to schooling at all levels”. In an empirical study on the use of textbooks and educational achievement involving 1,006 primary school pupils, Fuller (2005) has revealed that students who had used more than two textbooks were almost three times as likely to pass, at 67 percent graduating examination compared to students who had no textbooks in schools (only 24 percent graduating). Squire (2001), writing on teachers' reliance on textbooks, states that those seeking to improve the quality of education believed that improvements in instructional materials would inevitably lead to changes in actual teaching. For many teachers, textbooks can provide an excellent
and useful resource, without usurping the position of the teacher. While the selection of a textbook has been adjudged to be of vital importance to academic achievement, it is sad to say that relevant textbooks are not available for teaching and learning activities (Odulaja & Ogunwemimo, 2009). Laboratory has been conceptualized as a room or a building specially built for teaching by demonstration of theoretical phenomenon into practical terms (Owoeye & Yara, 2010). Farombi (2008) argues that “seeing is believing” is the effect of using laboratories in teaching and learning of science and other science related disciplines as students tend to understand and recall what they see that what they hear or were told. Laboratory is essential to the teaching of science and the success of any science course is much dependent on the laboratory provision made for it. Affirming this, Ogguniyi (2003) says there is a general consensus among science educators that the laboratory occupies a central position in science instruction. It can be described as a place where theoretical work is practicalized whereas practical in any learning experience involves students in activities such as observing, counting, measuring, experimenting, recording, observation and carrying out field work. These activities are totally different from the theoretical work which involves listening to talks and taking down notes from such talks.

Odulaja and Ogunwemimo (2009) points out that the teacher assumes a position of dispenser of knowledge with the laboratory serving the function of drill or verification. The researchers further explain that at the other extreme, the teacher assumes the position of a guide to learning and laboratory as a place where knowledge is discovered. However, there are growing evidences that teachers do not exhibit behaviours which are complementary to achieving the stated objectives. They include methods of teaching practical work; inadequacy or absence of well-equipped laboratories; high enrolment of students; inadequacy of resources for teaching and learning practical work; quantity and quality of teachers.

Balogun (2002) says that no effective science education programme can exist without equipment for teaching. In terms of academic achievement, Soyibo and Nyong (2004) have shown that schools with well-equipped laboratories have better results in the school certificates science examinations than those that are ill-equipped. Corroborating this, Gana (2007) reiterates that students instructed entirely by the laboratory methods had higher attitude's scores but lower achievement scores than students instructed entirely by the traditional lecture or textbook mode.

The adequacy of the human resources according to Adeogun (2009) means having the right quantity and quality of staff in an organization. According to Nwana (2003) teacher quantity refers to total number of teachers in the school system. Nwana was of the view that the teacher is the most important resource in the secondary school system, and for teachers to be effective, they must be adequate in number. Castetter (2002) opined that the success of any human endeavor, secondary
school inclusive, is closely related to the quality of personnel who perform the tasks. Casteteter was of the view that the extent to which public education succeeds will depend to a large extent, upon the quality of the personnel engaged in the educational process, and upon the effectiveness with which they discharge individual and group responsibilities. Lassa (2000) found out the adequacy in the number of teaching staff in relation to students' population has primary influence on the overall efficiency and effectiveness of an educational institution. This implies that for secondary schools to be effective and efficient there is need for adequate provision of human resources.

According to the Federal Ministry of Education, adequacy of material resources means having the required school facilities as recommended in the guidelines on minimum standards in schools nationwide.

METHODOLOGY
This study adopted a survey type of descriptive survey design. The simple random sampling was used to select sample for the study from three (3) schools in Yaba Local Government. The selection was done across all the various classes in Senior Secondary Schools in the Local Government to ensure the selected truly represent the population of the study. The sample of the study comprised one hundred (100) students. Participants were selected from the sampled schools.

The instrument used for data collection was a self-constructed questionnaire and scores of students in Physics. The questionnaire was entitled “Investigation on human and material resources in teaching physics” and a “Laboratory Observation Checklist”. The first part comprised of one section. Section A contained items on demographic data of the participants and questionnaire for resource (human and material) availability (QFRA). Responses to the first section were rated on a four-point Scale as follows: AA = Always Available, SA = Sometimes Available, RA = Rarely Available and NA = Not Available. The second part comprised of Section B which contained all the available resources in teaching Physics. Items were rated on a Scale as follows:

Availability = no of items
Adequacy = adequate (A) and not adequate (NA)
Frequency of use = often use (OU), sometimes use (SU) and rarely use (RU)
The instrument was designed, validated and administered by the researchers. Its reliability coefficient was 0.79 using cronbach alpha.

METHOD OF DATA COLLECTION
One of the researchers administered the instrument personally to the participants. Copies of the questionnaire were distributed to the Physics teachers and 40 students, 30 students and 30 students respectively in each school. The checklist was used to
cross check the available equipment in the laboratory of each school by one of the researchers that went to were collected on the spot which ensured 100% return rate.

The data collected were analyzed with descriptive statistics.

**Research Questions**

1. What are the available resources for the teaching of Physics?
2. What are the available resources for the teaching of Physics in the selected schools.

**Table 1.** Analysis of the available resources for the teaching of Physics in the selected schools.

<table>
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<tr>
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<tr>
<td>22</td>
<td>Drawing boards</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>23</td>
<td>Tracing pins</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>Chopping pins</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>Stop watches</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>26</td>
<td>Stop clocks</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>27</td>
<td>Pendulum bobs</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>28</td>
<td>Convex Lens</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>29</td>
<td>Plane Mirrors (convex)</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>30</td>
<td>Plane Mirrors (convex)</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>31</td>
<td>Conical Mirrors</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>32</td>
<td>Conical Mirrors</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>33</td>
<td>Conical Mirrors</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>34</td>
<td>Conical Mirrors</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>35</td>
<td>Conical Mirrors</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>36</td>
<td>Conical Mirrors</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
The table 1. presented above shows the number of available resources in teaching Physics in the three (3) schools selected for the study. From Table 4.1, the most available materials are dry cell, light bulbs, standard mass, plane mirrors, thermometers, corks, lens holder, meter rule, knife edges and tripod stand. Are the available material resources adequate for the teaching and learning of Physics?

Table 2. Mean responses of students on availability, adequacy and frequency of use of resource materials for the teaching and learning of Physics2

<table>
<thead>
<tr>
<th>Name of School</th>
<th>Number of Students</th>
<th>Availability X</th>
<th>Adequacy X</th>
<th>Frequency of use X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fazil-Omar Senior High School</td>
<td>40</td>
<td>9.44</td>
<td>1.78</td>
<td>1.24</td>
</tr>
<tr>
<td>Birrel Avenue High School</td>
<td>30</td>
<td>8.22</td>
<td>1.64</td>
<td>1.18</td>
</tr>
<tr>
<td>Devickys College</td>
<td>30</td>
<td>2.20</td>
<td>1.36</td>
<td>0.94</td>
</tr>
</tbody>
</table>

From Table 2 of the mean responses of students on availability, adequacy and frequency of use of resource materials for the teaching and learning of physics, it is revealed that 16 out of the 50 available resource materials are adequate for the teaching and learning of Physics in the three (3) selected Secondary Schools.
These includes: Physics laboratory, dry cells, rheostats, standard resistors, light bulbs, connecting wires, resistance wires, resistance boxes, standard masses, plane mirrors, thermometers, lens holder, corks, meter rule, knife edges and tripod stand. This means 32% of the available resource materials were not adequate.

How often are the available material resource utilized in the teaching and learning of Physics in the Secondary Schools in Lagos State?

The results from Table 3 of the table on mean responses of students on availability, adequacy and frequency of use of resource materials for the teaching and learning of physics show that only 12 out of the 50 available resource materials are frequently used in the teaching and learning of Physics in the three (3) selected Secondary Schools. The resource materials frequently used are Galvanometers, masses, standard resistors, vernier caliper, pendulum bob, thermometer, stop clock, meter rule, voltmeters, knife edges, corks and tripod stand. This means 24% of the available resource materials are often used in Physics lessons by the teachers. The inference here is that physics teachers do not averagely use the resource materials available of human and material resources on students' academic achievement in Physics.

SUMMARY OF FINDINGS

The result shows that human and material resources are not readily available and the available ones were not adequately utilized.

DISCUSSION

The study shows that physics material resources are not readily available, the few available ones are not well utilized the view of Jegede (2002) that the absence or insufficient availability of laboratory facilities and other instructional materials necessary for the teaching of science had made the sciences more difficult for the students to understand and hence affect their achievement adversely. Igwe (2000) contended that Physics laboratory equipment facilitates science learning and stimulate learners' interest. Adegboye (2003) linked low achievement trend of students in sciences especially Physics to non-availability of instructional materials in schools. Eshiwani (2004) asserts that availability of classrooms; desks, laboratories, workshops and library are symbols of high education quality. Orji (2006) observed that science instruction/teaching is more effective when laboratory materials are available and when these are well used. Oladeji (2001) further added that schools that were poorly equipped produced students with poor performance than those from well-equipped schools. The National Curriculum, FME (1998) clearly spelt out the objectives, instructional media, as well as the methods/strategies for effective teaching and learning of physics. Much as the physics curriculum appears laudable, the fact still remains that the successful implementation of any educational
programme is, to a large extent contingent on the availability of the appropriate resource materials. To ensure effective teaching and learning of physics, in Nigeria Secondary Schools therefore, appropriate and sufficient resource materials are required for the implementation of physics education curriculum. It is only by so doing that the recipients of physics instructions will be sufficiently groomed and equipped with the knowledge, skills, attitudes and competencies that are expected of them at that level of education.

**SOME POLICY IMPLICATIONS**
Findings from the present study have some implications for the educational policy makers. These include:
1. There should be policy formulation that will ensure adequate provision for material resources, both foreign and local.
2. All Science subjects' teachers should be exposed to, and trained on the use of material resources on regular basis so as to make teaching-learning more effective.
3. Available materials must be properly utilized
4. Available materials must be frequently used by students for better performance.

**CONCLUSION**
This study has established that material resources are not readily available. Available ones are not adequately and often utilized.

**RECOMMENDATIONS**
The following recommendations are made based on the findings of this study:
1. The Secondary Schools should be provided with standard laboratory (especially the state owned public schools) in which improvised and other concrete materials such as models and specimens could be stored for the purpose of science teaching.
2. High priority should be placed on good management techniques of the science laboratories in order to appraise the technology of science instruction in the schools which enables us to develop within the limits of our human and material resources, a system that enhances understanding, thinking, production and problem solving.
3. Inspections should be routinely carried out on schools' laboratories and worn out equipment replaced with new ones.
4. Teachers should be taught on how to improvise on certain laboratory materials as well as help the schools to discover ways of improvising the
laboratory equipment from locally and available materials. It is therefore recommended that the study be carried out on other science subjects such as biology, chemistry and agriculture in order to know the problems associated with teaching the subjects with the view to improving the students' academic achievement.

5. Government should put money into education sector purposely for the purchase of instructional materials, laboratory facilities/apparatus, especially, computer is very important in school at this age of ICT. Individuals, corporate bodies, communities and non-governmental agencies should see financing of education as government responsibility alone; they should come in partnership with government to finance science education. All schools must have internet facility in their schools to ensure students have free access to internet. Teacher should encourage the use of this internet by given assignment to students on internet. Based on the findings of this study the following recommendations are made.

6. Physics laboratories should be adequately equipped. Upon equipping of the laboratories, physics teachers should strive to teach physics by doing rather than theoretically. This will improve the students' hands-on ability and experience besides triggering an inquisitive and analytical mind.

References


Ikegbenum, C.I. (2002), "Role of the Nigerian teachers in youth and Nation Building" Education today vol. 5(3).


