Evaluation of Resource Availability for Teaching Science in Secondary Schools: Implications for Vision 20:2020

Daluba, Noah E.

Department of Agricultural Education,
Kogi State College of Education, P. M. B. 1033, Ankpa, Kogi State, Nigeria.

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Abstract
The paper evaluates the availability of resources for the teaching of science and conduct of practicals in secondary schools in Ankpa Local Government Area of Kogi State, Nigeria. This research is imperative as the results of the study will assist teachers to carefully and properly scrutinize resources for science teaching and learning in our educational school system. The teachers' ability to effectively embark on the above tasks will make Nigeria's quest for technological advancement and competitiveness with other advanced countries of the world by the year 2020 a reality. The population for the study was made up of 22 secondary schools, 42 science teachers and 48 laboratory assistants from all the secondary schools. The sample comprised 20 science teachers and 20 laboratory assistants. Questionnaire, observation and interviews were the tools used for data collection. Frequency and simple percentage were used to analyse the data collected. It was found that the secondary schools used for this study have adequate teaching aids, tools and specimens for classroom teaching and laboratory practicals. Science teachers agreed that there are qualified teachers, enough classrooms and furnitures. Very many equipment and facilities were found lacking. The implications of this on vision 20:2020 was discussed. The paper recommended among others that government should make funding as a priority.
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Keywords: comparative evaluation, resources, availability, teaching science, vision 20:2020
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INTRODUCTION
Science occupies a very important and enviable position in Nigeria education system. This importance has been realized by government, parents, the society at large, the teachers and the secondary school students themselves. Science courses are linked together and many professions emanate from their linkages. A good example of these professions include medicine, pharmacy, nursing, engineering, etc. Thus, the importance of science cannot be over emphasized. The effective teaching and learning of science in the school system should be accorded priority in any educational system. The major aim should always be that of assisting science teachers and students to do what is expected of them under prevailing environmental conditions. One of the ways of doing this, is to carefully scrutinize the resources for teaching science. 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 need to use modern and standard resources for teaching science because according to Offormatu (1990) these enable students to improve on their performances.

Effective teaching and learning of science depend 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 (1986) found many teachers to be incompetent and Orji (2006) found strong relationship between teachers' know-how and students' achievement. He further 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 (1991) in his study found that many secondary schools do not have enough materials for teaching basic concepts. He 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. This, 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 at 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 needs to be sought for without delay. It is against this background that the researcher intends to evaluate the state of resource availability for the teaching of

science in secondary school in Ankpa Local Government Area of Kogi State.

Concepts of Vision 20:2020

A vision is a clear mental picture of the future which must represent a significant improvement on the current state (Hornby, 2000). It however must be supported by a clear and realistic path to its realization and requires consistent and sustained effort for its achievement. Vision 20:2020 is aimed at placing Nigeria among the 20 largest economies in the world by the year 2020. The key goals for vision 20:2020 is encapsulated in the vision statement that "by 2020, Nigeria will be one of the largest economies in the world able to consolidate its leadership role in Africa and establish itself as a significant player in the global economic and political arena" (Igbuozor, 2009). Nigeria vision 20:2020 is a grand plan of economic transformation blue print for stimulating Nigeria's economic growth and launching the country into a path of sustained rapid economic growth to become one of the top 20 economies by 2020 (Onyekekaya, 2008). In line with this, seven key parameters were listed as: polity, Macro economy, infrastructure, education, health, agriculture and manufacturing (concept for vision 2020).

PURPOSE OF THE STUDY

The general aim of this study is to evaluate the state of resource availability for the teaching of science in secondary schools in Ankpa LGA. Specifically, the study sought to:

    (a)   determine the extent of material resource availability for science teaching and conduct of practicals.

    (b)   determine the extent of human resource availability for science teaching and conduct of practicals.

RESEARCH QUESTIONS

Based on the purpose of the study, the following research questions guided the study:

1. Are there available resource materials for science teaching?
2. Are there available human resources for the teaching of science?

METHODOLOGY

The study employed a survey research design. The population of the study comprises of 22 secondary schools, 42 science teacher and 48 laboratory assistants. The study is limited to secondary schools offering the basic core science subjects (Mathematics, Chemistry, Physics, Computer Science and Agricultural Science). For the purpose of this study,

ten (10) secondary schools, 20 science teachers and 20 laboratory assistants were randomly selected for the study. This implies that two (2) each of science teachers and laboratory assistants were picked from the ten secondary schools purposively selected for the study. Structured questionnaire made up of 16-items of Agree and Disagree option was designed for the science teachers and the laboratory assistants by the researcher. The questionnaire items were face validated by three (3) experts in science education. A reliability index of 0.86 was obtained using cronbach alpha co-efficient. The questionnaire is made up of two sections. Section "A" dealt with the personal data of the respondents (e.g name, sex, job specification, qualification(s), teaching experience) and section "B" was infact a modified list of items that form the body of the work. In addition to the approach, the researcher also employed observation and interview. The data collected via the above methods were collectively analysed using frequency and simple percentage. The decision rule is that any item(s) that scored 60% and above were regarded as been significant and those that scored below were considered insignificant. This agrees with Odike (2008), who stated that a percentage of 60% and above in the response of the respondent to an item should be considered appropriate in taking decision in an experimental tasks.

Table 1 shows that items 1, 5, 7, 8, 12 and 15 scored 60% and above from the responses of the science teachers. This implies that qualified teachers, well equipped laboratory, teaching aids, classrooms, enough furnitures, appropriate texts and specimens were adequate based on the percentage agreement by science teachers. The rest items 2, 3, 4, 9, 10, 11, 13, 14 and 16 scored percentage below the decision rule of 60% indicating that science teachers saw that these items were not adequate.

On the part of laboratory assistants, they perceived items 6, 12 and 15 to be available as these scored within and above the decision rule of 60%. The rest thirteen items (1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 13, 14 and 16) scored below the percentage agreement of 60%. Indicating that these items were not available.

The serving teachers responded that there are enough and qualified teachers but there are no qualified laboratory assistants and technicians including knowledgeable operators. The laboratory assistant perceived the four (1, 2, 3, and 16) items lacking based on their responses as these items scored below 60%.

RESULTS

The result for the study was presented in Table 1 below and it provides answers to research question 1 and 2.

Table 1: Responses of Science Teachers and Laboratory Assistants

S/No	Description of Items	Science Teachers				Laboratory Assistants			
		A	%	NA	%	A	%	NA	%
1	Qualified teachers	15	75	5	25	11	55	9	45
2	Qualified laboratory assistants	10	50	10	50	8	40	12	60
3	Qualified laboratory technicians	4	20	16	80	2	10	18	90
4	Well equipped libraries	2	10	18	90	1	5	19	95
5	Well equipped laboratory	12	60	8	40	9	45	11	55
6	Teaching aids	16	80	4	20	17	85	3	15
7	Classrooms	12	60	8	40	10	50	10	50
8	Enough furnitures	13	65	7	35	9	45	11	55
9	Regular running water	6	30	14	70	3	15	17	85
10	Constant electricity supply	5	25	15	75	1	5	19	95
11	Appropriate chemicals and reagents	8	40	12	60	5	25	15	75
12	Appropriate texts	14	70	6	30	12	60	8	40
13	Possession of white file	2	10	18	90	-	0	20	100
14	Cabinets	10	50	10	50	5	25	15	75
15	Specimens	13	65	7	35	12	60	8	40
16	Knowledgeable operators	9	45	11	55	5	15	17	80

Key:
A: Available , NA: Not Available, %: Percentage

MAJOR FINDINGS

The following findings were deduced from the study:
(a) Both respondents (science teachers and laboratory assistants) agreed that teaching aids, appropriate texts and specimens were adequate and available in the schools under study.
(b) Science teachers agreed that there are qualified teachers, well equipped laboratory, classrooms and enough furnitures in the schools under investigation.
(c) Availability of teaching aids was highly rated by both the science teachers and laboratory assistants (80% and 85% respectively).
(d) Both science teachers and laboratory assistant rated qualified laboratory assistants, qualified technicians, well equipped libraries, regular running water, constant electricity supply appropriate chemicals and reagents, possession of white file, cabinets and knowledgeable operators low.
(e) Both science teachers and laboratory assistants agree that there are available qualified teachers but qualified laboratory assistants, laboratory technicians and knowledgeable operators are lacking.
(f) Most of the secondary school under investigation were highly neglected in terms of instructional materials.

DISCUSSION OF FINDINGS

It was agreed by both respondents that teaching aids, appropriate science textbooks and varieties of specimens were available in the schools under study. The availability of teaching aids, texts and specimens makes the teaching and learning of science real to students. Knowledge acquisition by students becomes easier as teachers teach the course without difficulty. This is in line with the National Policy on Education (2004) that the practicalization of science teaching and learning should be done with the use of appropriate teaching aids involving useful specimens and up to date text-books. Some of these teaching aids and specimens are laboratory materials/equipment which are positively related to the performance of students. This agrees with Pekene (2002) who stated that science instruction/teaching is more effective when laboratory materials are available and when they are well used.

Science teachers attested that there are qualified teachers, well equipped laboratory and enough classrooms with furnitures in the schools under investigation. The teachers by their attestation appeared baised compared to the laboratory assistants who are the real users of the facilities in question. The biasness may be because the teachers who responded to the items does that to their favour. The reaction could have been true if their responses tallies with that of the laboratory assistants. From

observation and interviews, the schools are not equally funded thus affecting the available facilities as one move from one school to another.

Both respondents (science teachers and laboratory assistants) rated availability of teaching aid high. This may be because teaching aids can be in modern or local form. Again, improvisation of teaching aids for science teaching using local available materials is very much possible at all times thus facilitating its availability in almost all schools under study. This agrees with Musa (1996) who stated that teaching aids can be locally sourced thus making the teaching and learning of science to take place both within and outside the classroom environment at all times by the science teachers.

Finally, from the results, most of the secondary schools were faced with series of constraints which are hindrance towards the attainment of the goal of science education. The constraints must have emanated from non-challant attitude of the teachers, students, government, society, policy makers, curriculum planners and textbooks authors. In agreement with the above, Offormatu (1990) stated that for science teaching to be smooth and effectively taught, all stake holders should join hands and make it a point of duty to provide the necessary raw materials.

IMPLICATIONS FOR VISION 20:2020

Training in science in Nigerian secondary schools prepares the individual to acquire skills, abilities, aptitude, knowledge and understanding necessary to function effectively in the scientific world. In the course of preparing individual for the attainment of the above objectives, the teaching of science need to be improved upon with the use of up to date and matchable resources by the teacher in the classroom and conduct of practical's in the laboratories. To the researcher's greatest dismay, most science equipment and teaching materials including human resources from the result are inadequate to cope with the demand. This anomaly if not rectified without delay will go a long way into jeopardizing the goal attainment of vision 20: 2020 thus making Nigeria to be left behind in the race. Therefore, ti is a big challenge before us as individuals, policy makers, government and stake holders in the education industry to critically re-examine the present policies all geared towards providing a new face lift for improvement towards better placement in the world economies.

Poor quality of teachers, methodology and lack of thought provoking innovation in our secondary schools has led to the production of half baked products that cannot compete effectively in the labour market. If this situation is allowed to continue, out

plight towards attaining the goal of vision 20:2020 will be in jeopardy.

CONCLUSION

For Nigeria as a nation to join the race of the 20 top leading world economies being the dream of vision 20:2020, science teaching and learning must be re-emphasized and given its rightful place with urgency. To effectively do this, all stakeholders in the education industry must join hands to make the provision of both human and material resources a reality.

RECOMMENDATIONS

Based on the findings and discussion of this study, the following recommendations were made:

(a) STME educators should be subjected to training and re-training programmes so as to enable them update their knowledge and face the future challenges.

(b) Quality control unit should be established by government and institutional establishments to facilitate effective monitoring of teachers and their methodology of teaching. This will lead towards the production of the right caliber of products that will be useful towards the attainment of the goal of vision 20:2020.

(c) Funding strategies should be given priority. There is need for proper budgetary allocation to education. Monitoring and evaluation unit should be constituted and this will help in the production of high quality products that will help in the attainment of vision 20:2020 goals.

(d) Enough time lag should be allowed by the government to create room for proper planning towards effective implementation in the actualization of the vision goals.

REFERENCES

Federal Republic of Nigeria (2004). The National Policy on Education. Abuja: NERDC.

Hornby, A. S. (2000). Oxford Advanced Learners' Dictionary of Current English. London: Oxford University Press.

Igbuozor, O. (2009). Nigeria vision 20:2020: Prospects challenges and the way forward. Abuja: African Center for Leadership, Strategy and Development.

Musa, M.J. (1996). Teaching chemistry by improvisation using local available materials. Children – in-science and technology (CIST) Journal, 6 (2), 50-56.

Odike, J.O.(2008). Introduction to experimental procedures and processes. Lokoja: Evan printing press.

Offormatu, G.C. (1990). Influence of teacher use of resources on students' spoken French. Journal of studies in curriculum (JOSIC), 1 (1), 44-49.

Orji, A. B.C.(2006). The effect of greeno and polya problem solving models on student's achievement and interest in physics in senior secondary schools in Abuja metropolis of Federal Capital Territory. NASHER Journal, 6(3), 149-154.

Okeke, E. A. C. & Inomiesa, E. A. (1986). Primary science teachers' perception of the teaching of primary science. Journal of Science Teachers Association of Nigeria (JOSTAN) 25 (1), 55-66.

Oladeji, I.I. (1991). School facilities and students' achievement in secondary mathematics. A case study of secondary schools in Ikale Local Government Area, Ondo State, Nigeria. Unpublished B.Sc. Thesis, Abraka: Bendel State University.

Onyekekaya, I. (2008). Vision 2020 and seven point agenda: Any connection…? Tuesday guidance posted by Nigeria Muse (Archives).

Pekene, D. J. (2002). Effects of greeno and Mettes et al problem solving models on students achievement in physics. Journal of science teachers association of Nigeria (STAN) 37(1& 2), 39.43.