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**THE EFFECTIVE UTILIZATION OF BASIC
BIOLOGY LABORATORY EQUIPMENT
TOWARD ENHANCING QUALITY ASSURANCE
IN TEACHING BASIC BIOLOGY: A CASE
STUDY OF SOME SELECTED SECONDARY
SCHOOLS IN KANO MUNICIPAL L.G.A., KANO**

**Sabo A. Abdullahi*, Gambo Chiroma*, Garba
Abdu* & Shafaatu Tasi'u****

*Department of Biology, School of Science Education,

**C.D.C. Staff School,

Sa'adatu Rimi College of Education Kumbotso, Kano

Abstract

This study investigated the problem of utilizing basic Biology laboratory equipment, in selected Senior Secondary Schools under the Municipal Zonal education office, Kano State, using Personal contact and questionnaire. In this survey, 10 Senior Secondary Schools were randomly selected from the zone. Two instruments were prepared, validated and used for collecting data. Description statistics such as tabulation, percentages and arithmetic mean were used in data analysis. Although there were 80% trained Biology

teachers, their numbers was not enough to cover the populated Biology Classes. The problem of poor exposure to biology practical lessons was also observed in all the schools. However, the SS 3 classes claimed that they were introduced to practical lessons during which they became aware of laboratory equipment, but hardly utilized it, then 70% of the schools have only one partially functional biology laboratory, but the remaining 30% had none. The ruined condition of the laboratories was a barrier towards learning. Lack of well trained laboratory technicians and assistants exerts another obstruction in the smooth running of the laboratories. Poor concern by the government was the major complaint. Priority should be given to practical classes.

Keywords: Laboratory Biology; Effective Utilization; Quality Assurance

Introduction

The laboratory has been regarded as a unique venue, place, field or room which is suitably equipped with tools, apparatus, specimens, samples, gadgets, models, reagent and other instructional media. Nowadays in Nigeria, classroom experience shows that a large number of secondary school biology students face considerable difficulties in appreciating and learning biological concepts, especially in laboratory activity. Egwuyenga (2014) stated that learners are to acquire useful science base knowledge, good analytical measurement, testing

skills and experimental and team based learning as well as critical thinking in a good laboratory.

A survey of secondary school biology laboratory reveals that many of them are under funded with outdated equipment (Onyegegbu, 2009). It has also been reported that, practical biology activities, if done in the laboratory, are done with lack of interest and in an unimaginative manner (Onyegegbu, 2009). It has been proven that secondary school students irrespective of their age, group, location or even tribal character that equally eager for science laboratory experimentation, which include biology (Felder and Brent, 2004).

Nigerian Secondary School biology teachers are facing challenges in the area of knowledge and also in having access to the new set of devices for teaching biology (Onyegegbu, 2009). Nwoji (2014), in an empirical study, revealed that essential facilities such as equipment like radio, television, computers, chemicals, specimens, microscope, lens, stones, burners, models and charts are not available in school. This inadequacy of teaching materials, resources, laboratory equipment/regents/chemicals and laboratory space has been of serious concern to educators. Abdullahi (2015) explained that adequate laboratory demonstration and/or field practice facilitates the learning of biology.

In this study, therefore, an attempt is made to investigate the problem of utilizing basic biology laboratory equipment as well as investigating the quality of the biology teachers in the selected secondary schools. The study will also assess the teachers' ability to improvise

the unavailable basic biology laboratory equipments where necessary. This study addressed the following research questions:-

- Why is biology laboratory equipment not utilized in a proper way?

Methodology

For this survey, ten (10) Senior Secondary School were randomly selected from the Municipal zonal education office, Kano State. The survey research technique was employed to investigate, explain and describe the nature of the existing conditions of biology laboratory equipment and their utilization in the selected school, as explained by Cohen and Manion (2014), as well as Bebbie (2016). Two instruments were used, basically:

- i) Biology Teachers and Principal Questionnaires (the principal of each school)
- ii) Specimen questionnaire for senior secondary school students.

The two questionnaires were given to experts from the School of Education, Sa'adatu Rimi College of Education, Kano. The first questionnaire is for both biology teachers and principals and consists of 16 items. 1-4 are asking about personal data and working experience, items 5-9 are asking about the school and items 10-16 about the details of the problem of utilizing basic biology equipment and the means of solving the problems for effective teaching and learning.

The second questionnaire is specifically for students in the Senior Secondary Class SS I, SS II, and SS III that offer biology in the selected school. It has 12 items. i and ii were for the personal data of students. Item iii-xii were on the student exposure to the biology lesson and laboratory practicals. The availability of a functional and well equipped biology laboratory as well as the attitude of teachers towards effective utilization of these facilities was also monitored.

The data was collected by the researcher personally and also through research assistants for ten days. Descriptive statistics, such as tabulation, parentages, sum and arithmetic means, were used in data analysis.

Results and Discussions

Table 1a shows the teachers and the population of the students in the schools studied. Out of the 8 principals that responded, 75% had basic science education skills, while among the other two, one has qualified as a B.Sc Biology graduate and the other Bachelor of Arts Education (Table 16). Out of the 25 biology teachers served with the questionnaire, 20 (80%) responded 35% of whom had teaching experience of less than five years, while 65% had between 5 and 10 years (Table 1c).

Table 1 Number of Biology teachers and population of the students

S/N	Name of Schools	Number of Biology teachers	Number of student per class (SS)		
			I	II	III
1	G.S.S Sabuwar Kofa	05	100	80	75
2	G.S.S Kofar Nasarawa	04	90	60	50
3	Sch for Arabic Studies	01	60	40	40
4	G.S.S Gwale	01	90	60	55
5	G.S.S Sharada	02	61	30	40
6	G.S.S Shekara	04	80	75	60
7	G.S.S Warure	02	40	35	42
8	G.S.S GandunAlbasa	02	40	30	40
9	G.S.S Kofar Famfo	03	90	76	80
10	G.S.S Umma Zaria	01	60	42	40

Table 2: Qualification of Principals of the Studied Schools

Qualification	F	%
Basic Science Education Skill	6	75
B.Sc. Biology Graduate	1	12.5
Bachelor of Education (B. Ed) or B.Sc. Ed.	1	12.5
Total	8	100

Table 3: Qualification of biology teachers where research was carried out

Qualification	F	%
Teachers with working experience of less Than five years	7	35
Teachers with working experience of Between 5 and 10 years	13	65
Total No of Biology teacher responded to the Questionnaire	20	100

The extent of exposure to the biology laboratory and its utilization at the SS class are shown in Table 4.

Table 4: Exposure and utilization of basic biology lab equipments by senior secondary school students (numbering about 50)

	Always	Sometimes	Not used
How frequent do you make use of the laboratory	- (0.00%)	55 (36.7%)	95 (63.3%)
How frequent do you use the microscope?	- (0.0%)	45 (30%)	105 (70%)
How often do you use hand lens?	100 (66.7%)	12 (8%)	38 (25.3%)
To what extent do you use Preserved specimen?	82 (54.7%)	14 (9.3%)	54 (36%)
How often do you use food test reagents and chemicals in the Laboratory	30 (20%)	18 (12%)	102 (68%)
How frequent do you use the Measuring cylinder?	94 (62.7%)	16 (10.6%)	40 (26.7%)
How often do you make use of wall chat?	62 (41.3%)	08 (5.3%)	80 (53.3%)
How frequent do you use reagents?	31 (20.7%)	11 (7.3%)	108 (72%)
How often do you use the models?	101 (67.3%)	31 (20.7%)	18 (12%)
How frequently do you take you to aquarium?	- (0.0%)	38 (25.3%)	112 (74.7%)

From Table 4, 150 students responded to the questionnaire. The Table reveals that there is the poor utilization of laboratory equipment by students. Most of the students have no insight of the importance of the laboratory in the area of learning science. This is because both the government and the teacher are not putting any emphasis on this aspect, which leads to the poor teaching and learning of science in secondary schools without exception. Most teachers show negligence and

carelessness to utilize the laboratory, where they mostly rely on the theoretical aspect.

Conclusion

This problem leads to the drastic falling of educational standard in the entire nation, most stressfully in Kano State. In reviving the standard and improve the student interest towards learning science courses, emphasis must be laid on providing good and equipped laboratories in all secondary schools and teachers of science courses with qualified personnel must be put in place in order to provide a conducive atmosphere for learning Biology and other related disciplines.

Recommendations

1. Time table schedule should be strictly followed
2. Constant lesson observation must be put in place.
3. Classroom practice should be 50-50 (that is, 50% practical class & 50% theory per week).
4. There should be at least one lab technician for each school to improve the quality of teaching.
5. PTA should intervene in the supply/purchase of equipment.
6. Teachers should try as much as possible to improvise equipment (where possible).
7. Where possible a levy should be created and spread on every head (students) to get materials because of their importance.

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