

# 4

---

## Conceptual Framework of Laboratory Facilities and Teaching of Science in Secondary Schools

---

By

**N. U. EKANEM**

*Department of Chemistry,  
School of Science  
College of Education  
Afaha Nsit*

And

**M. I. OBODOM**

*Department of Chemistry,  
School of Science  
College of Education  
Afaha Nsit*

### Abstract

*Laboratory has been conceptualized as a room or a building specially built for teaching practical terms. It is essential to the teaching of science and the success of any science course is much dependent on the laboratory provision made for it. This paper emphasized the conceptual framework of laboratory facilities and teaching of science in secondary schools. Availability and functionality of science laboratory facilities will enhance positive teaching of science in secondary schools.*

The place of laboratory in science teaching is not a neglected issue, several studies of the social interactions within which lessons in the laboratory are constituted also exist. Nwosu (2008) emphasized therefore that laboratory work holds greater promise in helping to prepare students for higher level studies. Nwosu (2008) also reported inadequate resource materials in science teaching. He further stated that where there

are little resources, they are not usually in good condition while the few ones that are in good condition are not enough to go round those who need them. This poses a great challenge to government on the need to raise the fund to schools where science subjects such as chemistry, physics and biology are being offered. This is because where the materials are not available in large quantities to meet the demand; effective teaching and learning of science, especially chemistry, physics and biology which are core subjects in science become very difficult. In this case, only but the highest creative, resourceful, committed and dedicated teachers can resort to improvisation of science resources. Nwosu (2008) concluded that to avoid the prospect of a possible negative background, there should be provision of adequate laboratory facilities and equipment.

A Laboratory has been conceptualized as a room or a building specially built for teaching practical terms. Farombi (2001) said that “seeing is believing” as the effect of using laboratory in teaching and learning of science and other related disciplines as students seems to understand and recall what they see than 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, Ogunniyi (2008) said there is a general consensus among science educators that the laboratory occupies a central position in science instruction. It could 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, inferencing 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.

Laboratory helps to provide a forum wherein the learner is given the exercise to subjects, his beliefs, ideas, statement, theoretical preposition etc. to some forms of experiment test. To maintain and arouse the statement acquisition in science process skills involving laboratory works, the teachers should be effectively involved in order to transfer knowledge and fact to learners for a good performance in any examination.

However, there are growing evidence listed below that teachers do not exhibit behavior when they are complementary to achieve the stated objective.

They include method of teaching practical works inadequacy or absence of well-equipped laboratories high enrolment of the students’ inadequacy of resources for teaching and learning practical works quantity and quality of teachers. In terms of student acquisition into science process skills Gana (2007) have shown that schools with well-equipped laboratory have better skills in science than those that have ill equipped laboratories. He also form out among other things that (a) out of 80 percent of the old students that accepted having laboratories, none had a well-equipped laboratory and (b) 40 percent of the school had no laboratory at all; while the remaining 60 percent had rooms labeled “laboratory” without adequate apparatus. He concluded that teaching

### *Conceptual Framework of Laboratory Facilities and Teaching of Science in Secondary*

of science practical by teachers would be difficult and that students learning experiment would be limited.

#### **Objective of the Study**

The objectives of the study were to:

1. determine the availability of laboratory facilities in secondary schools.
2. determine how functional the available laboratory facilities are.

#### **The Research questions**

To guide the study, two research questions were asked

1. How available are the laboratory facilities in secondary schools?
2. How functional are the available laboratory facilities in secondary schools?

#### **Research Method**

The study adopted a cross sectional survey design. The population of the study comprised all science teachers from twenty (20) public secondary schools in the study area. One teacher was selected from each school. In all, the data used for research were collected by the use of checklist and questionnaire titled availability and functional science laboratory facilities (AFSLF). This was a checklist of laboratory facilities for teaching science subjects in secondary schools. The researcher went to schools for administration of questionnaire with the permission by the principal of sampled schools. The questionnaire were submitted to the researcher within the period of 24 hours as agreed between the schools authority and the researcher.

To test how reliable the instrument was a pilot study was conducted using 20 science teachers from the public secondary schools in NsitIbom Local Government Area. The instrument was given to the teachers to fill and the data extracted from the completed questionnaire were put to test using Crobach's Alpha reliability test to measure the interval consistency of the responses. A reliability co-efficient of 0.78 which is a strong correlation was obtained. This proved that the instrument was good enough for the study. The data collected were analyzed using simple percentage and table to answer the research questions

## **Result and Discussion**

### **Checklist and simple percentage table for availability and functionality of laboratory facilities**

S/N	ITEMS	AVAILABILITY	%	FUNCTIONALITY	%
1	Reagent bottles	100	10%	25	25%
2	Reagent rocks	50	50%	20	40%
3	Thermometer	20	20%	10	50%
4	Pipette	200	200%	120	60%
5	Burette	250	250%	110	44%
6	Conical flask	200	200%	100	54%
7	Retort stand	100	100%	70	70%
8	Tripod stand	100	100%	60	60%
9	Filter paper	200	200%	110	55%
10	Sieve	13	13%	8	62%
11	Fume cupboard	1	1%	1	100%
12	Oven	2	2%	1	50%
13	Stabilizer	2	2%	1	50%
14	Overhead projector	1	1%	1	100%
15	Weighing balance	4	4%	2	50%
16	Centrifuge	30	30%	28	93%
17	Metre rule	150	100%	145	97%
18	Water bath	30	30%	11	37%
19	Gas	2	2%	1	50%
20	Stop watch	40	40%	20	50%
21	Safely tank	2	2%	1	50%
22	Beaker	125	125%	120	96%
23	Glass jar	111	111%	70	63%
24	Fire extinguisher	6	6%	6	100%
25	Sand pale	4	4%	4	100%

The two research questions were answered using the checklist. They are;

1. How available are the laboratory facilities in secondary schools.
2. How functional are the laboratory facilities in secondary schools

From item 1 to 25, they were available laboratory facilities for the teaching of science in secondary school. All the laboratory facilities were available. In research question two even though there were available laboratory facilities there were some that were not functional. Apart from a fume cupboard and overhead projector, other laboratory faculties available were not functional.

### **Conclusion**

The observation of the study revealed that the available laboratory facilities, most of them were not functional which affect the teaching of science in secondary schools. Based on this it is a general belief that without well functional equipped laboratory facilities teaching of science or academic achievement of students is zero.

### **Recommendations**

The following recommendations were proffered

1. Government should provide facilities which will encourage teaching of science in secondary school.
2. The available laboratory facilities should be checked and maintained by the laboratory

### **References**

- Farombi O. (2001). *Relationship of students in science to curriculum school and students' Factor*. IDM Publisher, Kaduna.
- Gana V. (2009). Students' Interest in Biology on their out of school experience : *Journal of Biology Education* 40 (3) 124 – 129.
- Nwosu W. (2008). Assessing the Competence of Science Teachers. *Journal of Science Education*.(64) 3, 279 – 309.
- Wilson U. (2007). *Science Out of the Classroom Journal of Biological Education*, 37 (20) 56 – 57.