

STATUS OF SCIENCE LABORATORIES IN THE SECONDARY SCHOOLS OF BHADRAK DISTRICT

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Abstract

The main reasons for failure in examination of a large number of students are their limited understanding of concepts in mathematics and science. To addressing this issue the investment in this regard is needed for improving school Libraries, Laboratory and workshops to promote experimental culture in schools. Realising the importance of science the Science laboratory has large importance in school. The present study based on the "Status of Science Laboratories in Secondary school". The study was carried out to investigate the status of Science Laboratories in Secondary schools of Bhadrak district. Descriptive survey method was used in this study. All the secondary schools of Bhadrak district was regarded as population of the study and 10 schools selected as sample by using random sampling method. Observation schedule, Questionnaire and Interview schedule were used by the investigator as Tools. The collected data was analysed by using frequencies and percentages. Besides quantitative analysis, method of qualitative analysis was also used in the study by investigator.

The information obtained by the investigator revealed that majority of schools had not proper Science Laboratory facilities and Most of the schools were using half of the laboratory room for teaching and other half for practical work by which Teachers had less interest in science teaching.

Keywords: Status, Laboratory, Secondary school, Interview schedule, Examination



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Introduction

Needs and requirements of developing countries are obviously different from those of developed countries. The main problems of the developing countries are to provide basic necessities of life to their people. For eradicating of such problem best talented children were encouraged and guided to pursue their studies in the field of science. Its main purpose was to create experts in the field of agriculture, industry and defence. Thus it was clearly understood

that application of science and technology is the key factor in the modernised and industrialisation which would result in the improvement in quality of life.

In today's world, the role of science and technology is indispensable. We need Science and Technology in every sphere of our life like to treat diseases such as cancer or even to book a cab or train/flight ticket. One of the most important aspects of Science and Technology is that it has solution to the difficult of the difficult problems. But the knowledge of science is incomplete without its practical aspect. To provide the practical knowledge in the field of science various facilities must provide in schools, among these facilities Science Laboratories is one of them. Science Laboratories were introduced in the late 1800s, the goal of high school science education have changed. Today, High school science education aims to provide scientific for all as part of a liberal education and to prepare students for further study, work and citizenship. A laboratory is a facility that provides controlled conditions in which scientific or technological research, experiments, and measurement may be performed. Learning by doing is one of the cardinal processes of teaching science. The achievements of modern science are mainly due to applications of the experimental method. Hence Science Laboratories in school plays an important role to the student as well as to the teacher to gain proper knowledge in science.

Rationale of the Study

In India, as in the other developing countries there have been attempts at changing both the nature and practise of science as part of general education. Science has established itself as the most worthwhile subject in the school curriculum, and introduced as a compulsory subject at primary and secondary levels. It satisfies the principle of "Learning by doing" and instead of these. It has been observed that many students are either securing poor marks or getting marks less than pass mark in science examination. The researcher feels that the failure may be due to poor quality of teaching science. The quality of teaching science depends upon many factors out of which laboratory facilities plays an important role in teaching-learning situation, which in turn may help students improving their achievement in sciences.

The researcher also feels that students getting theoretical knowledge only. They are not able to use their theoretical knowledge of science in practical situations. The failure may be due to lack of development of application ability, skills of experiments and

scientific attitudes, which depends upon the availability of laboratory works is must necessary for science teaching.

The investigator was a student of science, he faced some problems in his studies. He felt that laboratory work influences the achievements. Hence the researcher has tried to study the laboratory facilities in science available in secondary school.

Realising the importance of science and need of its inclusion in the school curriculum, the investigator is interested to study the status of science Laboratories in the Secondary School. Though some studies have been conducted in the area of science Teaching, hardly any study have been conducted in Status of Science Laboratories at Secondary School stages. Keeping in view the absence of sufficient studies the present study is both desirable & unique.

Review of Related Literature

The objective of the study conducted by **Rao and Gupta (1990)** : was (i) To the deficiencies and inadequate in existing laboratory facilities. The major finding was : (i) It was observed from the study that out of total no of school 105 were reported to have science laboratories. Almost all school 96.7 percent in urban area and 92 percent in rural area had science laboratories .

The objective of the study conducted by **Begum (1990)** was : (i) To examine the difficulty level and suitability level of all lessons and exercise included in the new science syllabus as perceived by science teachers, The major finding was (i) More than 60 percent of the teachers found the content in the recent syllabus, new as well as overloaded ,

The objective of the study conducted by **Mohanty (2010)** was : (i) To ascertain the infrastructural facilities available in rural secondary schools for imparting science education. The major finding is (i) 80 percent science teacher prepared science lesson by reading reference books, collecting teaching aids.

Objectives of the Study

1. To study the status of science laboratories at Secondary stage with regards to ;
 - Availability of Science Laboratories
 - Type of science lab
 - Conditions of science lab

- Availability of equipment
2. To study the problems faced by teachers teaching science during laboratory activities.
 3. To study the challenges faced by the Head Of The Institution for proper functioning of the laboratory .

Method

In the present study Descriptive Survey Method was used.

Population and Sample

The population of the present study was consists of 301 secondary schools of Bhadrak District, teachers teaching science ,Head of Institution and Students . Out of total number of secondary school of Dhamanagar block of Bhadrak district of Odisha affiliated to Board of Secondary Education, Odisha 10 schools will be taken by using random sampling method and teachers teaching science will be selected using purposive sampling method .

Tools Used

The data were collected with the help of the following tools developed by the investigator.

- Observation schedule
- Questionnaire for teacher teaching science
- Questionnaire for students
- Interview schedule for Head of the Institution

Development of Questionnaire

The questionnaire of science teachers consisted of items relating to science teaching ,science laboratory, present condition of laboratory, furniture availabl,other facilities available, equipments, training programme, storage facilities, and other problems in conducting laboratories' activities, etc.

The questionnaire for the students consisted of items relating to present condition of laboratory, furniture availabl,other facilities available, equipments, training programme, storage facilities, and other problems in conducting laboratories' activities, etc.

The Interview Schedule

Interview schedule is basically a list containing structurd questions that have been prepared to serve asa guide for interviewers, researchers and investigators in collecting

informations or data about a specific topic or issues. In other words, an interview schedule is a plan or guideline for investigators.

Here, the interview schedule for HOIs consisted of items relating to the condition of science lab, provisions for science lab, funding for science labs, how laboratory activities are undertaken, and teacher and students' attitude towards lab activities.

Observation Schedule

The observation schedule consisted of items relating to science teaching in secondary school, specifically on the availability of furniture, fixtures, equipments, instruments, and other facilities in science laboratories and the condition of science laboratories.

Analysis and Interpretation of Data

The collected data were analysed using frequencies and percentages. Besides quantitative analysis, the method of qualitative analysis was also used in the study by the investigator.

The questionnaires were administered to 10 science teachers and 50 students, the interview schedule was administered to 10 heads of institutions so as to collect information relating to the status of science laboratories in secondary schools.

The information collected was tabulated under different heads. The analysis and interpretation of data are presented under .

1. Availability of Science Laboratory

The availability of science laboratories in secondary schools of Bhadrak district is presented in table-1

Table -1

Science laborator	Student		Teacher		Head of the institution	
School	Yes	No	Yes	No	Yes	No
Science Laboratory	80	20	80	20	80	20

The availability of science laboratory in secondary schools is represented in table-1. From the table, it was concluded that 80 percent of schools had laboratory facilities, whereas 20 percent of schools had no laboratory facilities.

2.Types of Science Laboratory

The types of laboratory available in secondary schools are presented in table-2

Table-2

DESCRIPTION	Student	Teacher	Head of the Institution
Separate Science Laboratory	60	60	60
Laboratory-cum-science classroom	40	40	40

Table-2 indicate that 60 percent schools had separate laboratory facility where as 40 percent schools has laboratory cum science classroom .Mostly the urban and govt schools had such separate laboratory facility. But in rural and aided schools had no such separate laboratory facilities for science teaching.

3.Condition of Science Laboratory

The condition of science laboratory in secondary schools of Dhamanagar Block is presented in table 3

The table 3 indicate that 80 percent of science laboratory had sufficient natural light and ventilation facilities for demonstrating laboratory work .but the remaining 20 percent schools has no such facilities. in 10 percent schools are not supplied with electricity for doing practical work but remaining 90 percent schools had proper electricity supply. If we consider water supply ,40 percent schools had not adequate water supply facilities but 60 percent had proper water supply facilities and 70 percent schools hadn't any drainage system for waste .

More than 60 percent schools hadn't any gas connection for conducting laboratory work.70 percent schools had proper veranda but 80 percent schools had not any safety measures for conducting laboratory work..But the main concern was in 65 percent schools there isn't any storage facilities for keeping apparatus equipments and chemicals for conducting laboratory work.

It may concluded form above observation that the laboratory condition of secondary schools in Dhamanagar block were very poor. Maximum schools had not the adequate facilities for conducting laboratory work .Specially in urban govt schools had the proper required facilities as per RMSA-2009 guidelines.

Table- 3

Sl	Description	Student		Teacher	
		Yes	no	yes	no
1	Sufficient natural light	80	20	70	30
2	Electricity	90	10	90	10
3	Water supply	60	40	60	40
4	Drainage system	30	70	40	60
5	Gas connection	40	60	40	60
6	Available of veranda	70	30	70	30
7	Safety measures	20	80	20	80
8	Storage facility	35	65	30	70

4.Availability of Equipment

The data relating to availability of equipment for conducting laboratory work in dhamanagr block is presented in Table 4

Table 4. refers that maximum school had lack of laboratory equipment in their science laboratory. More than 40 percent school hadn't reagents and chemicals for doing experiment. Some schools were lack of microscope aquarium, slides, charts ,maps, models and biological specimen in their laboratory. Above 50 percent school had not adequate ICT facilities in their laboratory for providing concrete knowledge to students .more than 40 percent schools had not sufficient apparatus for providing individual work in lab.

It may be concluded from these result that maximum rural schools were shortage of reagent, microscope, apparatus, slides ,maps, charts etc for conducting laboratory works.

Table no-4

Sl no	Equipment	Student		Teacher	
		Yes	No	Yes	No
1	Having Reagent	60	40	70	30
2	Microscope	70	30	70	30
3	Aquarium	40	60	40	60
4	Charts,Maps,Models	70	30	70	30
5	Slides	70	30	60	40
6	Biological Specimen	50	50	60	40
7	Ict Facility	50	50	60	40
8	Sufficient Appratus	60	40	60	40

It may be concluded from these result that maximum rural schools were shortage of reagent, microscope, apparatus, slides ,maps, charts etc for conducting laboratory works.

5. Conduction of Laboratory Work

The works conducted in science laboratories in secondary schools of demonstrate the practical work. There were no scope for individual work. In dhamanagar blocks maximum school maintained their record regularly.

Table-5

Sl	Description	Teacher		Head of the Institution	
		Yes	no	yes	no
1	Howmany Periods Alloted For Laboratory Work In A Week	4	5	4	-5
2	Howmany Students Can Work Together	15	20	15	20
3	Scope For Individual Work	70	30	70	30
4	Maintaiance Of Record	80	20	80	20

It may be concluded that there were not enough scope for individuals in conducting laboratory work since not sufficient period allotted and not sufficient space and apparatus available.

Main Findings

The followings are revealed after carefully investigation of the problem due analysis as the data and their interpretation .

1. Majority of the schools (80 percent) had separate laboratory. But 20 percent schools hadn't any separate science laboratory facilities.
2. From the first objective laboratory facilities available in the secondary schools of Bhadrak district are inadequate for secondary school as per RMSA-2009.
3. Most of the school are devoid the laboratory facilities and the school which have laboratory facilities are of laboratory cum science classroom type. Some school have a separate science laboratory.
4. Science laboratory facilities available in the school are not sufficiently equipped as per RMSA2009 guideline .
5. Most of the schools are using half of the laboratory room for teaching and other half for practical work.
6. Majority of schools hadn't proper facilities for water supply, sinks and gas connection in the science laboratory .

7. There are little facilities for slides, charts, models and biological specimen in their science laboratory .
8. Schools don't have adequate facilities for demonstration table , students working table, shelves, almirah , etc
9. More than 60 percent of science teacher stated the problem such as : ICT based classroom/ laboratory were not equipped, it wasn't possible to conduct experiment in class, lack of space for storage apparatus , periods allotted aren't adequate and separate science laboratory room weren't available in schools
10. Due to lesser laboratory facilities, the teacher show disinterest in keeping the apparatus in preservation and working condition.
11. More than 30 percent schools the laboratory apparatus and equipment are unused

Educational Implications

1. There should be a separate science laboratory room for conducting science practical in all the secondary schools to inculcate scientific attitude in the pupils .
2. The laboratory room should be properly equipped and well furnished with supply of electricity, water connection, gas connection, biological chart , model ,specimens to open the gate of interest and develop love of science .
3. To develop scientific skill and attitude among the students there should be provision to do the practical work individually.
4. Each school should be provided with adequate laboratory grant from the state as well as central government.
5. The grant should be spent for building the laboratory, purchasing the equipment, repairing the laboratory and equipment, repairing the laboratory and equipment.
6. Adequate and sufficient science teachers should be appointed in secondary schools along with a laboratory assistant for teaching science experimentation and practical examinations .
7. The pupils should be encouraged to take part in various laboratory activities to develop social intellectual , psychological and educational values .

Conclusion

A well equipped science laboratory should be the primary requisite of every secondary schools. If the laboratory facilities aren't there in a school ,no students can develop by their own and our nation will remain under developed in the field of science and technology , so investigator has suggested that the government should give more financial support and provide all type of assistance to the science laboratories.

Suggestion for Further Research

Since the subject of status of science laboratory in secondary school is relatively a barren field , there is scope of a diverse type of research to be done . A few topics are suggested below;

- A comparative study can be on the availability and use of apparatus in English and Oriya medium school.
- A comparison of status of science laboratory in urban and rural secondary schools may be attempted .
- A research can be conducted on the use of scientific apparatus in teaching physical science.
- Comparatively study can be conducted on the result of H.S.E examination of the schools having laboratory facilities and school having no laboratory facilities
- The study can be extended for all high schools of Bhadrak districts.

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