

An Appraisal of Biological Science Teaching Strategies at the Secondary School Level in Bhubaneswar

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Abstract

The present study conducted aims at appraising biological science teaching strategies at the secondary school level in Bhubaneswar. The investigator has followed a survey research design to collect information related to the problem. The present investigation is concerned with all the science teachers in the secondary schools recognized by the Board of Secondary Education (BSE, Odisha) constituted the population of the study. It was found from the study that most of the teachers were competent to teach science in the secondary schools as they possess the requisite academic as well as professional qualification. Still, the state of teaching science in the secondary schools of Odisha is not encouraging due to certain problems, which can be overcome by the combined effort of the parents, teachers, headmasters, community and Government. Proper supervision in the field of education enhances the quality of education. But it is found that such reinforcement is not encouraging in our State.

Keyword: Appraisal, Teaching Strategies, Biological Science, Secondary School Students

Introduction

Teaching science in schools is the means of inculcating desirable behavior and scientific attitude within the students. The teachers have the responsibility of making the child a man of science for which they have to think and adopt the appropriate method of teaching taking into account the capabilities of the students, the topic to be learnt and availability of the facilities in the locality. Method of teaching is the style of presentation of contents in the classrooms. Teaching is an art and there are also some born teachers. But, those teachers who have no inherent tendency of carrying out such a task have to acquire the skill. Hence, all teachers must be acquainted with the various methods of teaching devised from time to time. It is to be noted that, not any particular method of teaching is particularly confined to any topic to be taught. The teacher has to select the suitability of the method as per his own capacity, pupils' capacity and availability of the resources. For doing something to learn, requires some materials and those materials are called Aids to Teaching or Learning. Aids to teaching-learning process may be living or non-living objects which are related to the subject matter of the teaching-learning process. With regard to use of teaching aids, illustrative books and models were not given importance till seventeenth century. The Romans and Greeks used to convey thought and information through words, pictures, symbols, etc. The Kothari Commission (1964-1966) recommended, "The supply of teaching aids to every school is essential for the improvement of the quality of teaching. It would indeed bring about an educational

revolution in the country.”

Objectives of the study: The proposed study is focused to:

1. To study science teachers’ perception about different strategies employed for teaching biological science to secondary school students.
2. To ascertain the appropriateness of practiced teaching strategies for teaching biological science at the secondary school level.

Research questions

The proposed study supports to address the following research questions:

1. What are the perceptions of science teacher’ about different strategies of teaching biological science at the secondary school level?
2. How far are the teaching strategies employed for teaching biological science at the secondary school level appropriate?

Methodology

Design of the study: The study will involve a phenomenological qualitative research design.

Population: Teachers teaching biological science at the secondary school level in Bhubaneswar.

Sample: Teachers teaching biological science in 5 sample schools were taken.

Sampling technique: Purposive random sampling technique will be used for the study.

Tools and techniques: Questionnaire for the science teachers. :Information blank for the science teachers.

Data analysis: The collected data will be analyzed with the help of percentage analysis and thick qualitative description and thematic analysis of data.

Result and Discussion

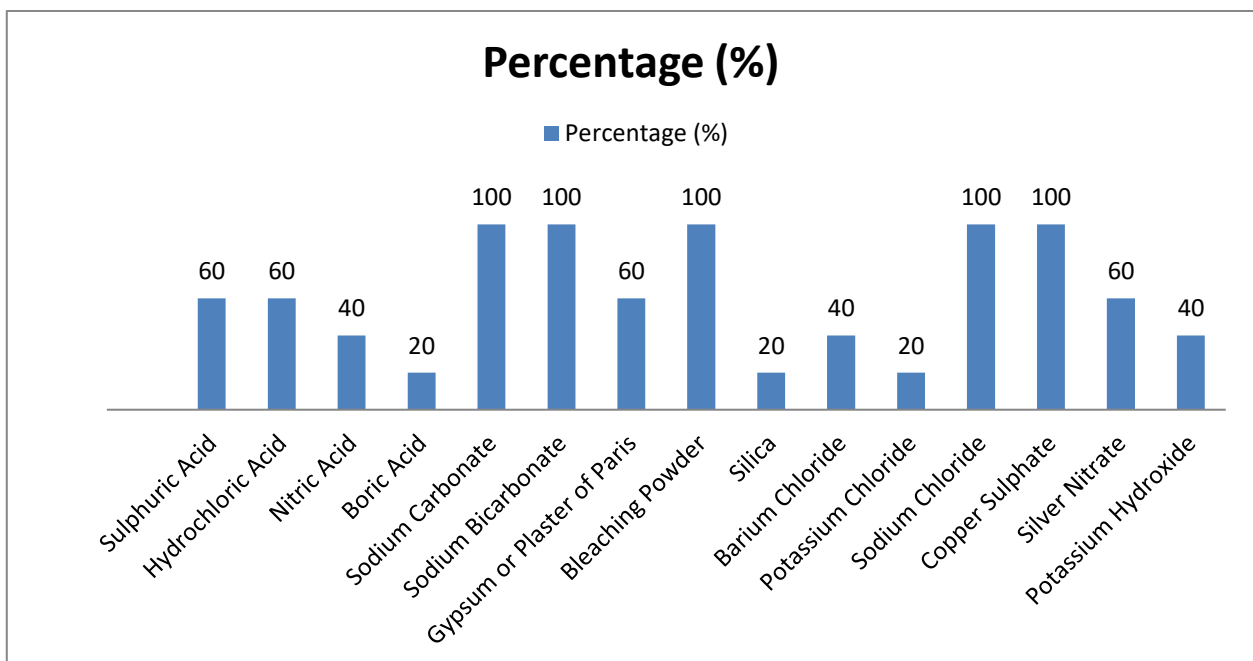


TABLE -1: CHEMICALS AVAILABLE IN SCHOOLS

From the above table, it is found that three schools had sulphuric acid and three schools had hydrochloric acid whereas two schools had nitric acid and only one school had boric acid for practical purpose. Sodium carbonate and Sodium bi-carbonate was present in all five schools gypsum or plaster of paris were available in three schools and bleaching powder was made available in all five schools. Silica was kept in only one school whereas barium chloride was present only in two schools. Potassium chloride was reported to have been available in only one of school whereas sodium chloride and copper sulphate was used in all five schools. Silver nitrate was available in three schools whereas only two schools had potassium hydroxide for practical purpose.

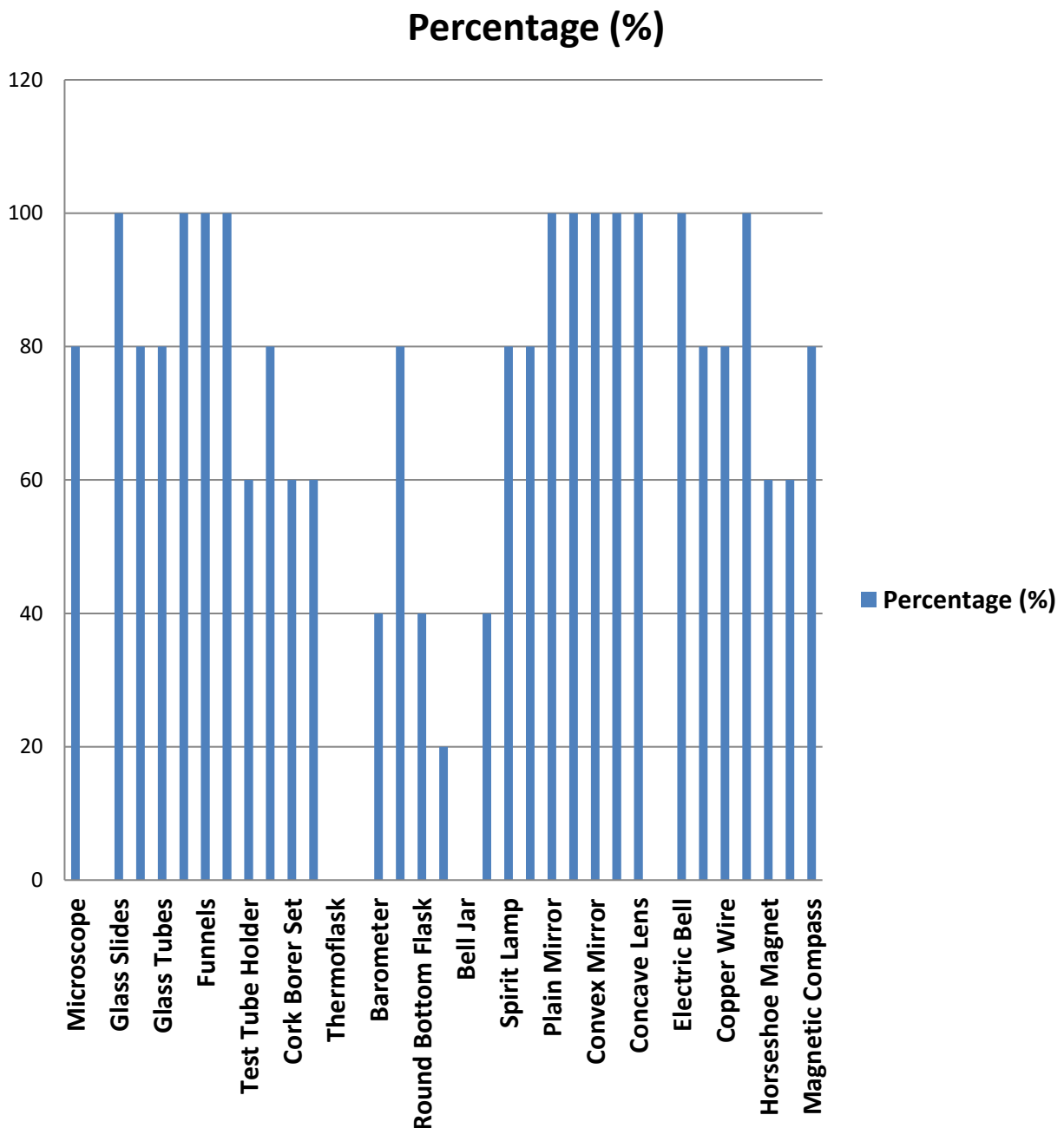


TABLE -2: APPARATUS AVAILABLE IN SCHOOLS

From the above table, it was found that the most important instrument for teaching microbiology section of biological science, microscope was available in four of the sample schools whereas an important instrument for teaching physics, telescope was not available in any of the sample schools.

Glass slides, glass rods and glass tubes were available in as many as five, four and four of sample schools respectively. Beakers, funnels and test tubes were available in all the sample schools. Some of the schools had test tubes but not the test tube holders. Four schools had kept cork but cork borer set was found in three schools only. An important instrument for measuring temperature, thermometer was available in three schools only which must be kept in all schools. Thermoflask and lactometer for laboratory use was not found in any of the schools. Two schools had kept barometer and physical balance was kept in four schools. Only two schools had kept round bottom flask whereas flat bottom flask was found in only one of the schools. Bell jar was unavailable in every sample schools. Tripod stand was available in two schools. Spirit lamp and spring balance were found in four schools whereas plain mirror, concave mirror, convex lens, concave lens, electric bell and bar magnet were found in all the sample school. Similarly, immersion heater was absent in all schools. Stove and copper wires were present in four schools. Magnetic needle, horseshoe magnet and magnetic compass were present in three and four schools respectively. From this data, it is evident that not all of the schools had all the facilities for teaching science.

Availability of Garden

Garden is a vital necessity in imparting biological knowledge to the students. Different aspects and scientific concepts of plants can be advantageously explained to the students by instant demonstration through the components available in the garden. Each school had a garden which promoted the feeling of creating a connection to food and make students think about where their food comes from and what it takes to grow it. It supports better nutrition in students and can incorporate lessons on healthy eating. This real world, hands-on learning has proven to be very popular with students and schools.

Biological Science Museum

Though biological science museum plays a vital role in teaching biology, none of the sample schools was having a biological science museum as ascertained from the sample teachers.

Methods of teaching

Use of Text Book in Biological Science (Science and Technology Book) :The sample teachers have furnished information regarding use of science and technology book prescribed for Class IX and Class X. The teachers have further stated that they use the textbooks in occasions like:

- To know the biological science curriculum.
- Reference for class room teaching.
- Preparation for classroom teaching.
- During discussion of exercises in the class room.
- During asking questions to the students in the class room.

Home Task

About 90 percent of the sample teachers expressed that home task in biological science was assigned to students and checked by the teachers regularly.

Engagement of Students in Scientific Hobbies

It was ascertained that teachers of sample schools engaged the students in different activities on scientific hobbies as follows:

- Joining science club.
- Reading science magazines.
- Drawing diagrams.
- Visiting gardens.
- Visiting research laboratories.
- Preparation of projects and models.
- Healthcare.
- Writing articles.
- Collection of paper cutting, flowers and study its morphological characters for science wall magazine.
- Preparation of teaching aids.
- Doing biological experiments.
- Gardening.
- Plantation of trees.

Application of Appropriate Method(s) by the Teachers

A list of fourteen methods of teaching science was given and the respondent teachers were requested to tick-mark against the methods followed by them. Their responses by percentage are shown in table-3.

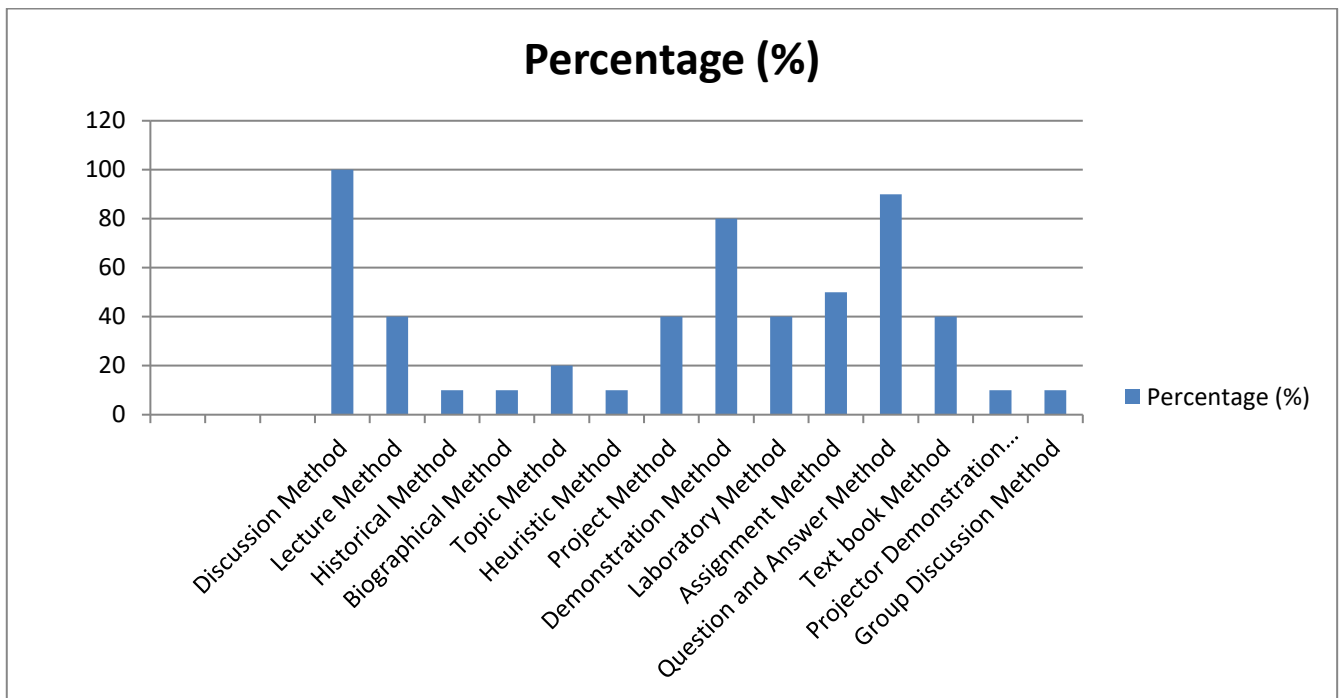


TABLE-3: METHOD(S) USED DURING TEACHING

From the above table, it is found that discussion method was followed by cent percent teachers. About 90 percent of teachers followed the question and answer method of teaching while 80 percent of teachers

adopted demonstration method in the classroom as and when it was possible for them within their limited infrastructure. Assignment was done by 50 percent teachers whereas 40 percent teachers taught by the project method, laboratory method, lecture method as per suitability of the topic. About 40 percent teachers taught through textbooks directly. About 20 percent teachers followed the topic method and 10 percent adopted the biographical method, historical method, heuristic method, group discussion and projector demonstration when it was required for teaching science.

Co-curricular activities

Various co-curricular activities need to be carried out for inculcating and strengthening scientific attitude among the students. Data regarding such activities are given in the table below:

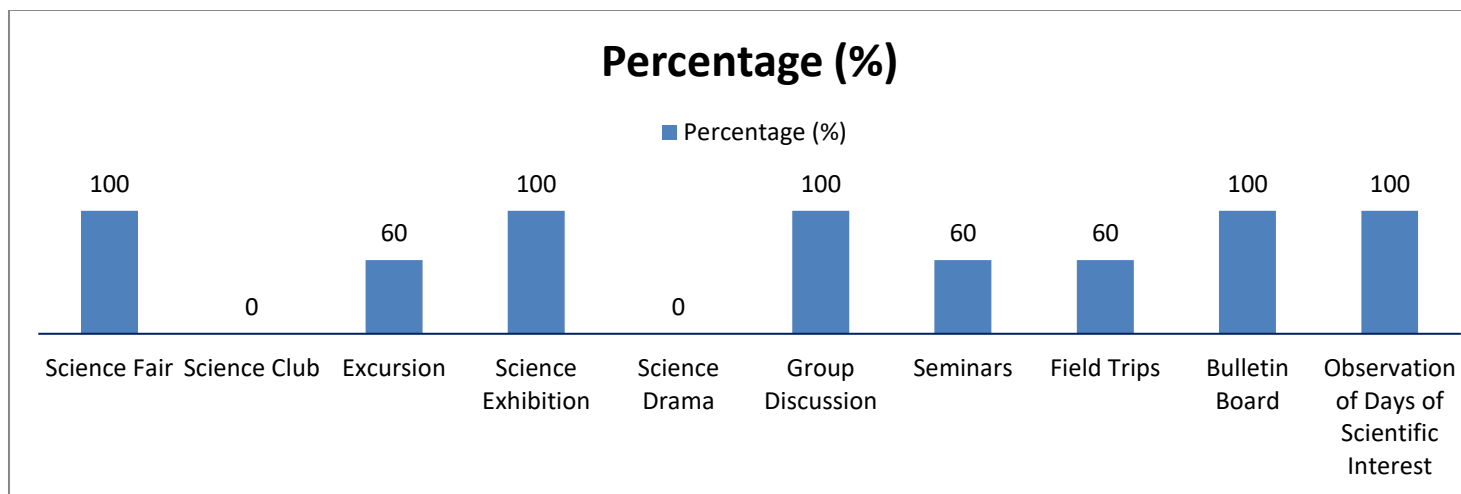


TABLE-4: CO-CURRICULAR ACTIVITIES IN SCHOOLS

From Table 4, it was found that all the five schools carry out science fairs whereas no school had a science club and three schools organize excursion for their school students. All five schools organize science exhibition whereas no schools were interested on organization of science drama. All the five schools reported that they conduct group discussion among their children and three schools carried out seminars in their schools. Field trips were organized by only three schools. It is found that all five schools maintained bulletin board and took interest in observation of days of scientific interest.

Conclusion

A significant numbers of students pursue different science disciplines including biology in higher study. It is therefore imperative to ensure effective and systematic biological science education at secondary level as it will help the students in latter life. Besides, other conditions like availability of laboratory, store room, equipments, teaching aids, chemicals, specimens, books, etc. facilitate effective learning. For imparting quality biological science education, it is essential to provide adequate numbers of qualified and trained biology teachers. Keeping in view the new textbooks, the teachers need to be well oriented on the topics in the textbooks and be aware of up-to-date development in biological science. It is felt that in-service training is urgently required to ensure professional competency of the existing biological science teachers.

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