

A Study of Students' Attitude towards Physics Practical at Senior Secondary Level

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Abstract- The paper attempts to study the attitude of students towards physics practical at senior secondary level in government senior secondary schools of Udaipur city which had science stream. It also attempts to compare the attitude of boys and girls. 80 senior secondary students (40 girls and 40 boys) were taken as sample of study. Data collection tool was an opinionnaire (questionnaire). The data was analyzed by using mean, percentage, standard deviation and t- test.

I. INTRODUCTION

Today we are living in the age of science and technology. Scientific inventions and discoveries have revolutionized our lives.

Science is nothing but knowledge so obtained by observation, reading, experimentation and realization. Knowledge so obtained is systematic and channeled. A careful analysis of the history of the progress of science reveals that theory and experiment forms the foundation of growth and development of science.

National Curriculum framework 2005 (N C F) gives the criterion for an ideal science curriculum for different stages viz. primary, upper primary, secondary and higher secondary.

Primary level:

At this stage the basic objective of science teaching is to arouse curiosity and exploring the world around using cognitive and psychomotor skills. At this stage science and social science should be integrated as environment studies.

Upper Primary Level:

N C F 2005 suggests child at this stage should be engaged in learning principles of science through familiar experiences working with hands to design simple technological units and modules.

Secondary Level:

At this stage the students must be engaged in learning science as a composite discipline. Systematic experimentation as a tool to discover / verify theoretical principles.

Senior Secondary Level

At this stage science should be introduced as a separate discipline with emphasis on experiments / technology and problem solving. The student may be given free option to choose the subject of their own interest. The curriculum load should be rationalized to avoid steep gradient between the secondary and senior secondary levels. Core topics of a discipline should be carefully identified and treated with appropriate rigor and depth.

The chief aim of physics is to discover the law which governs certain phenomenon or to verify a given law which has been derived from a theory.

Physics, like religion is a search for truth. Hence to a student physics should be as sacred and as pious as the place of worship to a devotee. In fact this study enables young minds to equip themselves for something higher and noble as search for truth and unrevealing the mysteries of nature. Demonstration of experiment is important for understanding the principles of physics. However, performing experiments by one's own hand is far more important because it involves learning by doing. It is necessary to emphasize that for a systematic and scientific training of young minds, a genuine laboratory practice is a must. According to educational psychologists the attitude of the student plays an important role in his systematic and scientific training. Science is a great human expertise. Open mindedness, curiosity, collection of data, demand for verification and proofs statistical reasoning, suspended judgments, acceptance of warranted conclusion and willingness to change over opinion in the light of new evidence are the ferments which characterize the scientific enterprise.

It is a general observation that the students and teachers have to spend large amount of time in physics laboratory performing experiments. Practical work brings in behavior changes in the students. The scientific temperament, curiosity, interest and creativity form the basis of this change. Practical attempts to provide a body of knowledge through procedures that are demonstrated objective but today they are often done in a subjective context.

Today the students perform experiments for the sake of marks. The researcher herself is a teacher and student of physics. She has taught for more than 8 years at senior secondary level in public schools of Udaipur. On the basis of her observation she felt the need to work upon the same and following research questions aroused in her mind:

II. RESEARCH QUESTIONS

- 1 What is the status of physics practical at the senior secondary level?
- 2 What are the problems faced by the students at senior secondary level regarding:
 - Physical resources
 - Human resources
 - Procedure
- 3 What is the attitude of students towards practical work?

With this background and the urge to know the answers of the above questions the need to work upon this area was felt.

III. STATEMENT OF THE PROBLEM

A study of students' attitude towards physics practical at senior secondary level.

Objectives

- 1 To study the attitude of girls towards practical work at senior secondary level.
- 2 To study the attitude of boys towards practical work at senior secondary level.
- 3 To compare the attitude of boys and girls towards physics practical work.
- 4 To study the status of practical work carried out at senior secondary level.
- 5 To find out the gaps between the prescribed and present practical work done.

Hypotheses

The researcher had relatively no idea regarding the outcomes of this research. Thus null hypotheses was designed

- 1 There is no significant difference in the attitude of boys and girls at senior secondary level.
- 2 There is no significant gap between the prescribed and present practical done at senior secondary level.

Significance of study

The researcher has stern belief that for effective physics teaching / learning proper theoretical and experimentation facilities should be provided to the students by the administrators, curriculum framework personnel's and teachers

The present research work may determine whether the present status is enough to develop a sense of enquiry, spirit of enthusiasm to investigate and to create favorable conditions for efficient teaching learning experience.

The study may also focus on the problems faced by students of the state board at senior secondary level.

Delimitation

Considering the time and resources availability the study was restricted to government senior secondary schools of Udaipur city only.

Sample

The unit of sample had students. All the four government senior secondary schools of Udaipur city which had science stream were included in the study. Among these 2 were girls school and 2 were boys school. The sample includes 80 students (20 from each school). The sample was chosen by random sample method.

Method

Keeping in mind the nature of the problem descriptive survey method was suited for the study.

Tool

The tools used were

Questionnaire for students

Statistical technique

The statistical techniques employed were mean, percentage, standard deviation and t-test.

IV. RELATED STUDIES

The following are some of the related studies conducted in India from 2001 to 2010

1. Khriesamhalie Pienyu, 2005, University of Nagaland, Kohima. "A study of the status and development of science education at high and higher secondary school level in Nagaland since its statehood".

This research tried to trace the historical development of science education at school level in Nagaland. It also tried to find relevancy of curriculum in science education at school level, assess school infrastructure and lab to assess science education in state.

2. Henige, Kimberly Ann(2005): "Students attitude related responses to inquiry learning in undergraduate kinesiology laboratory instruction."

The objective was to determine whether the student attitudes are impacted when teaching method shift from traditional to an investigative high inquiry level approach. The tickler scale survey was administered to students before and after five week period.

Most students reported enjoying the higher level of inquiry more while most students felt they learned more during low inquiry level activities. In general the effect of high inquiry was not negative and in fact was found to have some desirable effects on students.

3. Cook, Melissa Rene (2005) : "Examined students attitude toward science and scientific literacy in non science major, interdisciplinary course."

This inductive qualitative study examined students' attitudes towards science and their scientific literacy in a course designed on science education for new civil engagement and responsibility ideals.

A biology concepts exam showed a significant increase in scores from pre test to post test on biological concepts i.e. scientific literacy. The study revealed no significant change in confidence and interest.

4. Khan, Z. (1996): "Attitude of class XII students towards chemistry curriculum."

The above study was conducted in order to determine students attitude towards chemistry curriculum and to compare the attitude of Rajasthan state board students with central schools. The findings revealed that the students of both schools had favorable attitude towards curriculum. The attitude of students from central school had high positive attitude towards teachers and teaching aids.

5. Sharma A.K., 2002. "Status and use of chemistry laboratory at senior secondary level."

The study examined the status of chemistry lab of government and private senior secondary school. It was also conducted to know the use of labs and to compare the status of labs of these schools."

V. DATA ANALYSIS

The data gathered through questionnaire have been analyzed and interpreted from various angles.

Students' attitude towards physics practical work:

In this study the attitude of senior secondary students towards physics practical work was to be determined. The study is interpreted in terms of percentage. The students attitude is classified into various categories namely negative, positive and average. The attitude in positive and negative category is further categorized into 3 sub categories namely high, good and low. Thus attitude range is divided into 7 categories, 3 above average range and 3 below average range. The range is 0 to 108.

The categories are as follows:

- 0-71 negative attitude range
- 72 average
- 73-83 low positive attitude range
- 84-95 good positive attitude range
- 96-108 high positive attitude range

The table illustrates the classification of students high positive attitude range according to their attitudes.

Table no. 1
% of students in different attitude categories

Category	Range	No.of students	%
high positive attitude	96-108	50	62.5
Good positive attitude	84-95	22	27.5
Low positive attitude	73-83	8	10
Average	72	0	-
Negative attitude	0-71	0	-

The table makes clear that the number of students with negative attitude towards practical work is zero. The students having high positive attitude is maximum and it is 62.5% of the sample. 27.5% of students have good positive attitude where as only 10% of students have low positive attitude.

The following table presents classification of boys and girls in different attitude ranges.

Table No.2
Classification of Boys and Girls in different attitude ranges.

category	Attitude range	Girls no.	%	Boys no.	%
High positive attitude	96-108	32	80	18	45
Good positive attitude	84-95	6	15	16	40
Low	73-83	2	5	6	15

positive attitude					
Average	72	-	-	-	-
Negative attitude	0-71	-	-	-	-

The above table reveals girls have high positive attitude than boys .it also makes very clear that no boy or girl lie in average or negative attitude category.

The attitude of boys and girls are compared in the following table on the basis of mean, standard deviation and t score.

Table No. 3

S no.	category	No.	Mean	S.D.	t-value
1	Girls	40	99.35	6.81	4.22
2	Boys	40	92.55	7.58	

From the above table it is clear mean attitude score of girls is 99.35 which is quite higher than the mean attitude scores of boys i.e. 92.55.

It was hypothesized that there is no significant difference in the attitude of boys and girls towards practical work at senior secondary level in the government schools. The t-scores from the standard table on 0.01 and 0.05 level are 2.64 and 1.99 resp. It means that the t-score calculated from the data i.e. 4.55 is greater than t table value. Therefore the above hypothesis is rejected.

VI. CONCLUSION

Hence it can be concluded that there is significant difference in the attitude of boys and girls towards practical work at senior secondary level and that the attitude of girls is significantly more positive than that of boys.

Interpretation

The major findings of the study can be interpreted as:

The value of mean of girls school were higher than those of boys schools. This means the present status of practical working and attitude of girls school is far better than that in boys school. This is due to better physical conditions of the labs, efficient teaching staff and good positive attitude of students. The study revealed that the physical condition of girl school was better than the rest of the schools. The teachers were efficient to make optimum use of the limited resources.

Educational Implications and Suggestions

For Teachers: The teachers should make optimum use of apparatus as the study shows there is lack of adequate apparatus in government schools. Basic training should be given to the teachers to repair non working apparatus to avoid inconvenience to students.

For students: As the number of working apparatus are not adequate, the students work in groups hence learn co operative team spirit. The study involves learning by doing. Hence the students can co relate theory with practical.

For the administration: They can use the study in guiding the teachers to use different strategies to make the subject

interesting. They can administer the status of physics lab from time to time to visualize the condition of the materials and apparatus. To provide new technology based literature, research journals periodically.

For curriculum developers: They can introduce more topics which can be taught by experimental method. More weight age should be laid on learning by doing philosophy by emphasizing more on project work and seminars.

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