

# Laboratory Method as a Strategy to Develop Interest, Active Participation and Attention towards Learning

Dr. Prasenjit Pal

Research Scholar, Department of Education, Rabindra Bharati University, Kolkata, West Bengal (India)

## ARTICLE DETAILS

### Article History

Published Online: 13 March 2019

### Keywords

Interest towards Learning, Active Participation, Attention towards Learning.

### \*Corresponding Author

Email: prasenjit.pal75[at]gmail.com

## ABSTRACT

Science education in school cannot achieve its objectives if there is no interest and attention towards learning and lack of active participation in learning environment. In order to obtain objectives of science education and to develop interest, active participation and attention towards learning a suitable strategy of teaching learning should be designed. Present article tried to examine the relative effectiveness of laboratory method and conventional method of teaching science at upper primary school level in the development of interest, active participation and attention towards learning. The subjects of the study were 350 students (200 boys and 150 girls) of class VI of 6 different schools of Malda district selected randomly. The subjects were assigned to two groups. The experimental group was taught by laboratory method and control group was taught by conventional method. Simultaneously a group of 26 teachers were selected randomly from those schools for observing the two groups of students. An opinionnaire was given to them. The responses of the teachers were used to know the relative effectiveness of the laboratory method and conventional method. To know the relative effectiveness researcher uses  $\chi^2$  test. The analysis conducted produces significant result. The result shows that laboratory method is proved as more effective method in the development of scientific process skills.

## 1. Introduction

Educationist like Toplis argued in his study about teaching- learning through laboratory method. According to him laboratory work is important for interest, and attention towards learning. It gives an opportunity to actively participate in teaching- learning. This study aimed at investigating the roles of the laboratory in enhancement of interest in learning science, in development of ability to participate in active learning; in development of attention towards learning in science. Different studies conducted by the various researchers have explored laboratory methods of teaching-learning. They found laboratory as one and only crucial part of science teaching-learning. The nature and practice of science education cannot be fulfilled without having a good laboratory in school and proper implementation of laboratory method in science classroom with development of interest, attention and active learning as its goals.

## 2. Objectives of the study

This study is aimed to explore the relative effectiveness of laboratory method and conventional method of teaching science at upper primary school level in development of interest, active participation and attention towards learning.

## 3. Research question

1. Does the use of laboratory in science teaching improve interest in science among the students of primary school?
2. Does the use of laboratory in science teaching develop the ability to participate in active learning among the primary school students?

3. Does the use of laboratory in science teaching increases attention towards learning among the primary school students?

## 4. Hypothesis

- H<sub>01</sub>:** There is no significant relationship between the opinion of teachers on control group and experimental group regarding the improvement in interest in science.
- H<sub>02</sub>:** There is no significant relationship between the opinion of teachers on control group and experimental group regarding the development of the ability to participate in active learning.
- H<sub>03</sub>:** There is no significant relationship between the opinion of teachers on control group and experimental group regarding the increases in attention towards learning.

## 5. Operational definition of the terms

1. **Conventional method of teaching science-** The methods of teaching employed by the teachers in class room other than inquiry based teaching, activity based teaching and laboratory based teaching is considered as conventional method of teaching.
2. **Laboratory method of teaching science-** Laboratory method is a way of using systematically the science processes skills and methods of thinking through inquiry, activity and exploration.
3. **Interest in science-** Interest in science may be referred to acquired motivation towards science originating from inner need structures of students.
4. **Ability to participate in active learning-** It implies active participation of individual in research.
5. **Attention towards learning-** The action of taking special care to something.

Two groups randomized matched subject post-test true experimental design was used in the present study. In this method subjects were assigned to two groups through technique of matching with respect to extraneous variables. Then experimental group were taught by laboratory method and control group were taught by conventional method. After that a post test or achievement test of science was administered on both the groups. Simultaneously a group of 26 teachers were selected randomly from those schools for observing the two groups of students. An opinionnaire was given to them. The responses of the teachers were then subjected to some statistical analysis to know the relative effectiveness of the laboratory method and conventional method.

**6. Population of the study**

The target population of present research is all the students of class VI of West Bengal studying in upper primary level of education. The accessible population of present research is all the students of class VI of Malda districts of West Bengal studying in upper primary level of education.

**7. Samples**

The researcher selected 6 schools randomly from the schools of Malda Districts. The random selection of 6 schools was done by using lottery method. 350 students of Class VI including 200 boys and 150 girls were selected randomly from the students of Class VI studying in those schools using random number table. Then 350 subjects were assigned to two groups containing 175 subjects in each group through technique of matching with respect to achievement scores obtained in previous examination. Then 175 subjects of experimental group was taught by laboratory method and 175 subjects of control group was taught by conventional method using different lesson transcript on same unit. After that a post test or achievement test was administered on both the groups. Simultaneously a group of 26 teachers were selected randomly from those schools for observing the two groups of students. An opinionnaire was given to them. The responses of the teachers were then subjected to some statistical analysis to

know the relative effectiveness of the laboratory method and conventional method.

**8. Tools**

Four tools were used in the study. Researcher used different lesson plan for different group but on the same unit. All the tools were constructed and standardized by researcher. The achievement test prepared by the researcher consisted 25 items with a reliability coefficients of .93 and high face validity, content and item validity, internal and external validity. An opinionnaire or Likert type attitude scale consisting 26 items (13 items for opinion of control class and 13 items for opinion of experimental class) were prepared and standardised by researcher. Among 26 items 24 items are positive statements and 2 items are negative statements. The subjects were asked to give their responses in maximum extent (MAX), a moderate extent (MOD), Unknown (U), little extent (LIT), No (N) scale. The scale has a reliability coefficient of .98 and high levels of validity. The tools are as follows

1. Lesson transcript for control group.
2. Lesson transcript for experimental group.
3. Achievement test for the students
4. Opinionnaire for the observing teacher.

**9. Data analysis**

A group of 26 teachers were selected randomly from those schools for observing the two groups of students. They were oriented and trained properly for this activity. An opinionnaire or attitude scale developed by the researcher was given to them. The responses of the teachers were then subjected to some statistical analysis. The data obtained from administration of the opinionnaire were tabulated for presentation, analysis and interpretation. The researcher analysed the data obtained on the variables with the help of chi-square test.

The response of the observing teacher on their opinion for control group and experimental group regarding the improvement in interest in science are summarized in the following table.

**Table -1**  
**Opinion for control group and experimental group regarding the improvement in interest in science**

			Responses			Total
			MAX	MOD	U/LIT/NO	
Group	Control	Count	10	6	10	26
		Expected Count	15.0	4.5	6.5	26.0
		% within Group	38.5%	23.1%	38.5%	100.0%
	Experimental	Count	20	3	3	26
		Expected Count	15.0	4.5	6.5	26.0
		% within Group	76.9%	11.5%	11.5%	100.0%
Total		Count	30	9	13	52
		Expected Count	30.0	9.0	13.0	52.0
		% within Group	57.7%	17.3%	25.0%	100.0%

It is evident from the percentages data that only 38.5 % observing teacher thoughts that conventional method develops ability to form hypotheses to a maximum extent and 76.9 % observing teacher thoughts that laboratory method improved interest in science to a maximum extent. Therefore there exist

difference in opinion on control group and experimental group regarding the improvement in interest in science. To know whether this difference is significant the researcher conducted a chi square test. This is shown in the following table-

**Table -2**  
**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.103 <sup>a</sup>	2	.017
N of Valid Cases	52		

The result obtained from the chi-square test could be summarized in API format as  $\chi^2(2, N=52) = 8.103$ . The critical Chi-Square value at .05 level of significance is  $\chi^2_c(2, N=52) = 5.991$ . As  $\chi^2 > \chi^2_c$  the null hypothesis is rejected and it can be inferred that there is significant relationship between the opinion of teachers on control group and experimental group regarding the improvement in interest in science Experimental

group is more likely to develop reflective thinking then control group (76.9 % to 38.5%).

The response of the observing teacher on their opinion for control group and experimental group regarding the development of the ability to participate in active learning are summarized in the following table.

**Table - 3**

**Opinion for control group and experimental group regarding the development of the ability to participate in active learning**

			Responses			Total
			MAX	MOD	U/LIT/NO	
Group	Control	Count	6	8	12	26
		Expected Count	15.0	4.5	6.5	26.0
		% within Group	23.1%	30.8%	46.2%	100.0%
Experimental	Experimental	Count	24	1	1	26
		Expected Count	15.0	4.5	6.5	26.0
		% within Group	92.3%	3.8%	3.8%	100.0%
Total	Total	Count	30	9	13	52
		Expected Count	30.0	9.0	13.0	52.0
		% within Group	57.7%	17.3%	25.0%	100.0%

It is evident from the percentages data that only 23.1 % observing teacher thoughts that conventional method develops ability to form hypotheses to a maximum extent and 92.3 % observing teacher thoughts that laboratory method developed the ability to participate in active learning to a maximum extent.

Therefore there exist difference in opinion on control group and experimental group regarding the development of the ability to participate in active learning. To know whether this difference is significant the researcher conducted a chi square test. This is shown in the following table-

**Table - 4**  
**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.552 <sup>a</sup>	2	.000
N of Valid Cases	52		

The result obtained from the chi-square test could be summarized in API format as  $\chi^2(2, N=52) = 25.552$ . The critical Chi-Square value at .05 level of significance is  $\chi^2_c(2, N=52) = 5.991$ . As  $\chi^2 > \chi^2_c$  the null hypothesis is rejected and it can be inferred that there is significant relationship between the

opinion of teachers on control group and experimental group regarding the development of the ability to participate in active learning. Experimental group is more likely to develop reflective thinking then control group (92.3 % to 23.1%).

The response of the observing teacher on their opinion for control group and experimental group regarding the increases

in attention towards learning are summarized in the following table.

**Table -5**  
**Opinion for control group and experimental group regarding the increases in attention towards learning**

			Responses			Total
			MAX	MOD	U/LIT/NO	
Group	Control	Count	2	9	15	26
		Expected Count	12.0	5.7	8.3	26.0
		% within Group	7.7%	34.6%	57.7%	100.0%
	Experimental	Count	21	2	1	24
		Expected Count	11.0	5.3	7.7	24.0
		% within Group	87.5%	8.3%	4.2%	100.0%
Total	Count	23	11	16	50	
	Expected Count	23.0	11.0	16.0	50.0	
	% within Group	46.0%	22.0%	32.0%	100.0%	

It is evident from the percentages data that only 7.7 % observing teacher thoughts that conventional method has increased attention towards learning to a maximum extent and 87.5 % observing teacher thoughts that laboratory method has increased attention towards learning to a maximum extent.

Therefore there exist difference in opinion on control group and experimental group regarding the increase in attention towards learning. To know whether this difference is significant the researcher conducted a chi square test. This is shown in the following table-

**Table -6**  
**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.372 <sup>a</sup>	2	.000
N of Valid Cases	50		

The result obtained from the chi-square test could be summarized in API format as  $\chi^2 (2, N=52) = 32.372$ . The critical Chi-Square value at .05 level of significance is  $\chi^2_c (2, N=52) = 5.991$ . As  $\chi^2 > \chi^2_c$  the null hypothesis is rejected and it can be inferred that there is significant relationship between the opinion of teachers on control group and experimental group regarding the increases in attention towards learning. Experimental group is more likely to increases attention towards learning then control group (87.5 % to 7.7%).

**10. Conclusion**

The result obtained shows that there is significant relationship between the opinion of teachers on control group

and experimental group regarding the improvement in interest in science, the development of the ability to participate in active learning and the increases in attention towards learning. The opinion of the observing teachers revealed that experimental group seemed to develop interest in science, ability to participate in active learning and attention towards learning among the students at maximum extent then control group. As the experimental group is taught by laboratory method and control group by conventional method it can be concluded that laboratory method is more effective then conventional method in the development of interest in science, ability to participate in active learning and attention towards learning among the students.

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