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## Effectiveness of Project Based Learning Programme in Science

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### Abstract

In this study researcher tried to study the effectiveness of project based learning programme in the subject of science. Project based learning programme was developed for students of std.IX. Sample was selected using Random sampling technique. 80 students of std. IX were taken as sample. Then, 80 students were divided into experimental group and controlled group by Random sampling technique. This research was conducted by the researcher using experimental research method. For that Achievement test was developed by the researcher. F Test was used as analysis technique for analysing the collected data. Result shows that project based learning programme is more effective than the traditional method in science. Effect of interaction between teaching method and gender is not found on their educational achievements in science.

**Key word:** Project Based Learning Programme , Science, Effectiveness , Experimental  
Research method

## INTRODUCTION

Education plays an important role in human's life. During vedic times, education was imparted in ashrams. With the passage of time, the methods of imparting education also began to change. Formal education started to gain importance in place of non formal education. Students began to receive education within the classrooms in the school. First, students were taught by chalk and talk method. Looking at the history of reforms in education, it is observed that many committees and commissions have made many recommendations for reforms in education. The national education policy was also formulated in 1986 with the aim of reforming education.

Along with the technological development, technology also began to involve in education. Then multimedia equipments like tape recorders, CD-DVD, over head projectors entered in the education field and started to be used. In this modern time, with new inventions computer got its place in the teaching and the teacher started using various computer software in his teaching. During corona times, technology had proved to be an important medium for

acquiring education. Education was being imparted through multiple mediums such as zoom, google meet, Microsoft teams etc.

The main purpose of education is the overall development of the students. To reach this overarching aim various subjects are taught through various methods and mediums.

A teacher is a good researcher. He/she constantly thinks about how to teach effectively. A single subject can be taught through many different teaching methods. It is also very important to know which method is more effective for teaching any subject. In present time students are showing more interest in studying science because science is the subject that makes students curious and connects them with technology. It is necessary for teachers to know which method is more effective for teaching science. The research was conducted by the researcher to find out how effective project based learning programme is utilized for teaching science.

## RATIONALE OF STUDY

If we symbolize human as a stone then we can say that education is a hammer. With the help of it we can carve a

stone into precious idol. Education gives better life and perspective to humans. Education teaches humans about how to deal with any circumstances effectively. 21<sup>st</sup> century is known as the scientific century. Each and every students of 21<sup>st</sup> century like science as an innovative subject which can quench their thirst of curiosity. As a teacher and researcher we have to think how to fulfil students' curiosity towards science.

Many researches were conducted in subject of science. Researchers tried to find out which teaching method would be good to teach science.

Ergul ,N.R., Kargin , E.K.(2014) studied on “ The effect of project based learning on students' science success”. For this study, project based learning method was applied for a unit of 6<sup>th</sup> grade science subject named ‘electricity in life’. 92 students of 6<sup>th</sup> grade were taken as sample for research. Result of this research was in favor of the project based learning.

Cakici , Y., Turkmen , N.(2016) studied on “ An investigation of the effect of project based learning approach on children's achievement and attitude in science”. The aim of this study was to examine effect of project-based learning activities of the 5<sup>th</sup> grade children's science

subject achievement and their attitudes towards science. Result of this study showed that achievement of student in the subject of science was improved by project based activities but students' attitudes towards science subject did not change by this method.

In this research, researcher wants to find out effectiveness of project based learning programme in science.

## **OBJECTIVES**

Following objectives were decided for research

1. By taking pretest scores as covariate, to study the effectiveness of project-based learning programme and traditional method on mean score of posttest of students in science subject.
2. By taking pretest scores as covariate, to study the effect of interaction between teaching method and gender of the students on mean score of posttest of students in science subject.

## **HYPOTHESIS**

H<sub>01</sub> By taking pretest score as covariate , there will be no significant difference between the mean score of posttest of

experimental group and controlled group.

Ho<sub>2</sub> By taking pretest score as covariate, there will be no significant effect of the interaction between teaching method and gender of the students on mean score of posttest of students in science subject.

### **SIGNIFICANCE OF THE STUDY**

Science plays a key role to strengthen human's life. Science is an important subject in education. It is not limited to four walls of classrooms; it is far beyond what one imagined. Science is correlated with many other subjects. It helps

### **VARIABLES**

No.	Name of variable	
1	Independent variable	Teaching methods (1) Traditional method (2) Project Based Learning programme
2	Dependent variable	Score of post test
3	Covariate	Score of pre test
4	Moderator variable	Gender

### **SAMPLING**

#### **POPULATION**

For this study, students of std-9 of Navsari district were considered as a population.

#### **SAMPLE**

to solve many mysteries of nature. Science is a great contributor behind technological spread in different fields. Considering the importance of science, it is taught through various methods in schools. This research was conducted to check the effectiveness of project-based learning programme in science.

### **DELIMITATION OF THE STUDY**

- (1) This study was to delimit students of secondary school only.
- (2) This study was to delimit students of std IX only.
- (3) This study was conducted on students of Gujarati medium only.

One school from the Navsari district was selected by Random sampling technique. 80 students from this school, which were selected as sample by Random sampling technique. First chits were made by the researcher to divide 80 students into

experimental group and controlled group. Then, chits were picked up by the students. By use of this Random sampling technique

students were divided into experimental group and controlled group

**Table 1.1**

**Sample of the study**

Groups	Boys	Girls	Total
Experimental Group	20	20	40
Controlled Group	20	20	40
<b>Total</b>			<b>80</b>

**TOOLS**

1. Project based learning programme was developed by researcher.
2. Achievement test made by researcher was used as pretest and posttest.

In this research, researcher studied the effectiveness of teaching method in the subject of science thus it is experimental research. For this research, researcher selected **Randomized two groups pretest posttest design** which is given below:

**RESEARCH DESIGN**

Groups	Pretest	Treatment	Posttest
Experimental group $E_R$	$T_{1E}$	X	$T_{2E}$
Control group $C_R$	$T_{1C}$		$T_{2C}$

**DATA COLLECTION**

For this study researcher divided students into two groups by random sampling technique. One group was controlled group and another group was experimental group. In first step, researcher

took pretest of both groups. Then controlled group was taught by traditional method and experimental group was taught by project-based learning programme. Then post test was given to both groups.

**Table 1.2**  
**Details time line of the Experiment**

No.	Details	Time
1.	Divide students in groups	20 minute
2.	Pre test	45 minute
3.	Project-1 Improvement in crop yields	1 Hour
4.	Project-2 Crop variety improvement	1 Hour
5.	Project-3 Crop production management	1 Hour
6.	Project-4 Irrigation	1 Hour
7.	Project-5 Cropping patterns	1 Hour
8.	Project-6 Crop protection management	1 Hour
9.	Project-7 Animal husbandry	1 Hour
10.	Project-8 Poultry farming	1 Hour
11.	Project-9 Fish production	1 Hour
12.	Project-10 Bee - keeping	1 Hour
13.	Presentation of Project report	4 Hour
14.	Post test	45 minute
15.	Total hours	15 Hours 50 minute

### DATA ANALYSIS

In this research pretest scores were considered as covariate. So, ANCOVA was used for data analysis.

### Hypothesis 1

By taking pretest score as covariate, there will be no significant difference between the mean score of posttest of the experimental group and controlled group.

**Table-1**

**Analysis of post test score of experimental group and controlled group**

ANCOVA	df	Mean Square	F-VALUE (Calculated)	F-VALUE (Table)	Significant level
Between the groups (Experimental Group and Controlled Group)	1	2364.85	106.61	F <sub>.05</sub> = 3.96 F <sub>.01</sub> = 6.96	significant at 0.01 level
Within groups	77	22.18			
TOTAL	78				

The analysis of covariance was conducted to study the difference between the mean score of post test of experimental group and controlled group. By the data analysis mean square of between the groups was found 2364.85 and mean square of within the groups was found 22.18. By the analysis, found F value 106.61 was significant at 0.01 level. So the null hypothesis was rejected. This shows that there was significant difference between the

mean score of post test of experimental group and controlled group. Project based learning programme was more effective than traditional method.

**Hypothesis 2**

By taking pretest score as covariate, there will be no significant effect of the interaction between teaching method and gender of the students on their educational achievement in science.



**Table 2**  
**Analysis of post test score of students with reference to Gender and it interaction with teaching method**

ANCOVA	df	Mean Square	F-VALUE (Calculated)	F-VALUE (Table)	Significant level
Teaching method	1	2423.33	111.85	F <sub>.05</sub> = 3.96 F <sub>.01</sub> = 6.96	significant at 0.01 level
Gender	1	8.89	0.410	F <sub>.05</sub> = 3.96 F <sub>.01</sub> = 6.96	Not significant at 0.05 level
Teaching method*Gender	1	76.78	3.54	F <sub>.05</sub> = 3.96 F <sub>.01</sub> = 6.96	Not significant at 0.05 level
Within groups	75	21.66			
Total	78				

By the data analysis F value for interaction of teaching method and gender was found 3.54. It was not significant at 0.05 level. Hence, the null hypothesis is not be rejected. So, we can say that the effect of the interaction between teaching method and gender on mean score of posttests of students in science subject is not significant.

## **MAJOR FINDINGS OF THE STUDY**

1. Project based learning programme is more effective than traditional method in science subject.
3. Effect of interaction between teaching method and gender is not found on mean score of posttest of students in science subject.

## CONCLUSION

There are various methods for teaching science like chalk and talk method, group dynamics, group discussion, demonstration method, synthetic method etc. We can classify these methods into teacher centric methods and student centric methods. But each and every method has its own importance. Project based learning is a student centric teaching method. It is a method from which we give chance to students to analyze and solve problems on their own with the help of teachers and society.

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