

Constructivist Pedagogy – A Paradigm Shift in the field of Education

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What is learning? Learning is an active process of creating meaning from different experiences. 'How do students learn best?' We will get several answers to this question from various stakeholders of the field of education. But keeping in mind 'child-centric education', the common answer which will be focused upon more will be constructivism. Many educators too believe that the best way to learn is by having students construct their own knowledge instead of having someone construct it for them. In other words, students will learn best by trying to make sense of something on their own with the teacher as a guide to help them along the way.

As its name may imply, *constructivism* emphasizes the *building* (i.e., constructing) that occurs in people's minds when they learn. One of the primary goals of using constructivist teaching is that students learn how to learn by giving them the training to take initiative for their own learning experiences. Constructivist learning experiences include reflective thinking and an authentic activities, including student collaboration and consideration of multiple perspectives, and student access to content area experts who can model domain-specific skills. Constructivist-oriented teachers mediate between student prior knowledge and their lived worlds, creating learning environments that will help them increasingly develop complex understandings and skills.

Achievement of students depends on interest in the subject, level of motivation and teaching-learning techniques. In the subject like science pupil cannot learn by passive listening to the facts in science but he/she wants to perform the experiments to find out the truth on his/her own. In today's developing world we need to develop the scientific attitude to the maximum extent which requires objective and critical thinking. Constructivist teaching-learning plays a great role in fostering critical thinking and creates active and motivated learners. Constructivism affects the three major parts of the whole concept of education which are curriculum, instruction and assessment which gives the answer to our question, 'Why constructivism is a need of hour?'

STATEMENT OF THE PROBLEM - 'A Study of the Effectiveness of Constructivist Pedagogy on Scientific Attitude and Achievement of Students in Science.'

AIM OF THE STUDY - To study the effect of Constructivist approach for teaching certain scientific concepts on the scientific attitude and achievement of students.

OPERATIONAL DEFINITIONS OF VARIABLES

- **Scientific Attitude:** It is nothing but a settled opinion about scientific way of thinking. In this study scientific attitude refers to the way the students perceive science, their overall perception regarding science as well as their preferences and ways of thinking.
- **Achievement in Science:** It is the scores obtained by the students in the achievement test given by the researcher.
- **Effectiveness of Constructivist Pedagogy:** It refers to the quality of producing desired effect of constructivist pedagogy on scientific attitude and achievement of students in science.

OBJECTIVES OF THE STUDY

1. To compare the scientific attitude of boys and girls of experimental group before exposing them to Constructivist approach for learning certain scientific concepts.

2. To compare the scientific attitude of boys and girls of experimental group after exposing them to Constructivist approach for learning certain scientific concepts.
3. To compare the scientific attitude of experimental group before and after exposure to Constructivist approach for learning certain scientific concepts.

HYPOTHESIS OF THE STUDY

1. There is no significant difference in the scientific attitude of boys and girls of experimental group before exposing them to Constructivist approach for learning certain scientific concepts.
2. There is no significant difference in the scientific attitude of boys and girls of experimental group after exposing them to Constructivist approach for learning certain scientific concepts.
3. There is no significant difference in the scientific attitude of experimental group before and after exposure to Constructivist approach for learning certain scientific concepts.

METHODOLOGY OF THE STUDY - Experimental method was used to gauge the effectiveness of Constructivist Pedagogy on scientific attitude and achievement of students in science. In the present study, the quasi-experimental design (The pre-test – post-test non equivalent groups design) was used.

SAMPLE OF THE STUDY - The researcher selected VIII standard students for the present study which were then divided in experimental and control group. Total 42 students were selected to conduct this study consisting 24 boys and 18 girls. Out of those 21 students were taken for experimental group and rest of the 21 students were taken for control group. Each experimental and control group consisted of 12 boys and 9 girls.

TOOLS USED IN THE STUDY - Following tools are used in the present study which are developed by the researcher.

- **Scientific Attitude Scale:** Scientific Attitude Scale is a numerical rating scale consisting of total 28 items which were prepared in order to get the information about the level of scientific attitude of VIII standard science students of state board of Maharashtra.
- **Achievement Test in Science:** Achievement Test in Science was prepared to know the achievement of VIII standard students of state board of Maharashtra and was consisting of total 34 items.

TECHNIQUES OF DATA ANALYSIS - The methods of analysis used for the present study are:

Descriptive analysis

1. Measures of central tendency which include mean, median and mode
2. Measures of dispersion, which includes standard deviation
3. Measures of Divergence from Normality which includes skewness and kurtosis
4. Measures of Probability which includes Fiduciary Limits
5. Graphical representation in the form of line diagram, and pie-chart

Inferential analysis

1. t-test

TESTING OF HYPOTHESIS

Hypothesis 1- There is no significant difference in the scientific attitude of boys and girls of experimental group before exposing them to Constructivist approach for learning certain scientific concepts.

The statistical technique to test this hypothesis was t test.

Relevant statistics of the scores of the Scientific Attitude of Boys and Girls of Experimental Group before exposing them to Constructivist Approach for learning certain scientific concepts

| Variable | Experimental Group (Pre-Test Scores) | N | Df | Mean | SD | Table Evaluation | | t Value | I.o.s | |
|---------------------|--------------------------------------|----|----|--------|--------|------------------|------|---------|-------|-----|
| | | | | | | .05 | .01 | | .05 | .01 |
| Scientific Attitude | Boys | 12 | 19 | 97.17 | 13.650 | 2.09 | 2.86 | 0.746 | NS | NS |
| | Girls | 9 | | 102.22 | 16.544 | | | | | |

From the table it can be seen that for $df = 19$, the table value at .05 level of significance is 2.09 and at .01 level of significance it is 2.86. The obtained value of t is 0.746 which is less than both the tabulated values at both level of significance. Hence the null hypothesis is not rejected at both 0.05 and 0.01 level of significance.

Major Finding 1 - There is a no significant difference in the scientific attitude of boys and girls of experimental group before exposing them to Constructivist approach for learning certain scientific concepts.

Hypothesis 2 - There is no significant difference in the scientific attitude of boys and girls of experimental group after exposing them to Constructivist approach for learning certain scientific concepts.

The statistical technique to test this hypothesis was t test.

Relevant statistics of the scores of the Scientific Attitude of Boys and Girls of Experimental Group after exposing them to Constructivist Approach for learning certain scientific concepts

| Variable | Experimental Group (Post-Test Scores) | N | Df | Mean | SD | Table Evaluation | | t Value | I.o.s | |
|---------------------|---------------------------------------|----|----|--------|--------|------------------|------|---------|-------|-----|
| | | | | | | .05 | .01 | | .05 | .01 |
| Scientific Attitude | Boys | 12 | 19 | 119.33 | 15.150 | 2.09 | 2.86 | 1.392 | NS | NS |
| | Girls | 9 | | 126.22 | 6.942 | | | | | |

From the table it can be seen that for $df = 19$, the table value at .05 level of significance is 2.09 and at .01 level of significance it is 2.86. The obtained value of t is 1.392 which is less than both the tabulated values at both level of significance. Hence the null hypothesis is not rejected at both 0.05 and 0.01 level of significance.

Major Finding 2 - There is no significant difference in the scientific attitude of boys and girls of experimental group after exposing them to Constructivist approach for learning certain scientific concepts.

Hypothesis 3- There is no significant difference in the scientific attitude of experimental group before and after exposure to Constructivist approach for learning certain scientific concepts.

The statistical technique to test this hypothesis was t test.

Relevant statistics of the scores of the Scientific Attitude of Experimental Group before and after exposure to Constructivist Approach for learning certain scientific concepts

| Variable | Experimental Group | N | Df | Mean | SD | Table Evaluation | | t Value | I.o.s | |
|---------------------|--------------------|----|----|--------|--------|------------------|------|---------|-------|-----|
| | | | | | | .05 | .01 | | .05 | .01 |
| Scientific Attitude | Pre-Test Scores | 21 | 40 | 99.33 | 14.782 | 2.02 | 2.70 | 5.423 | S | S |
| | Post-Test Scores | 21 | | 122.29 | 12.558 | | | | | |

From the table it can be seen that for $df = 40$, the table value at .05 level of significance is 2.02 and at .01 level of significance it is 2.70. The obtained value of t is 5.423 which is more than both the tabulated values at both level of significance. Hence the null hypothesis is rejected at both 0.05 and 0.01 level of significance. **Major Finding 3** - There is a significant difference in the scientific attitude of experimental group before and after exposure to Constructivist approach for learning certain scientific concepts.

CONCLUSION OF THE STUDY

It was found that boys and girls had same attitude towards science before and after exposing them to constructivist approach, which means there were no gender discrepancies regarding attitude towards science. It was also found that there was markable increase in the scientific attitude of students when they exposed to the constructivist approach. Previously students were learning through traditional methods, but later they were exposed to constructivist techniques which gave intrinsic motivation and created interest among students about science which increased their attitude towards science. This may be due to innovative and interesting constructivist methods of teaching science by which students started looking at science subject with a newer and better perspective. Hence constructivist pedagogy proved to be an effective pedagogy in teaching-learning of science.

Science teachers have been concerned with development of scientific attitude and achievement of students in science. On daily basis students in our classrooms face many difficulties regarding learning and understanding the content matter in science. We cannot stay out of the business of dealing with these difficulties. Diversity among students is demanding for various new, innovative and constructivist teaching-learning strategies. The major findings of the study state that there is significant relationship between constructivist pedagogy and traditional pedagogy. Thus constructivist pedagogy has to be developed in order to develop scientific attitude and achievement of students in science. This method is not the only solution to the problems related to the field of education but still we can say that it can definitely deal with most of the problems in an effective way. Thus the time has come now to implement constructivist pedagogy in daily teaching-learning process to get desired outcome which can only be possible through the joint efforts of the Teachers, Principals, Management and Curriculum Framers.

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