Research Paper

Volume : 2 | Issue : 10 | October 2013 • ISSN No 2277 - 8179

Effect of Constructivist Approach on Academic Achievement of Seventh Grade Learners in Mathematics

Education

KEYWORDS : Constructist Approach, Academic Achievement, Mathematics.

Prof. Hemant Lata — Head and Dean, Faculty of Education, M.D.University, Rohtak, Haryana, India

Leena Sharma — Research Scholar, Department of Education, M.D.University, Rohtak, Haryana, India

1. INTRODUCTION

Constructivism was approached by an Italian philosopher 'Giambattista vico' and he regarded knowledge purely as a by-product of human construction. According to him 'the known is the made'. It holds sharply different views about the nature of knowledge from behaviourism and cognitivism as they believe knowledge is static, absolute and final function of learning is to gain knowledge but Constructivism rejects static, passive or fixed view of knowledge. Formalization of the theory of Constructivism was generally attributed to Jean Piaget. He also supported the views of John Dewey, Lev Vygotsky and Jerom Bruner.

According to Joseph Novak, 'Constructivism is that human construct that meaning to their ideas and experiences as a result of an effort to understand and make sense of them.'

According to Bruner, 'Constructivism is the learning theory in which learning is seen as an active process in which learner construct new ideas or concepts based upon their current and past knowledge.'

Learners do not come to class as empty vessels waiting to be filled rather they are active organism seeking meaning. The classroom experiences are interpreted in the context of preconceived notions that may be at variance from the established Mathematical facts. Information may be imposed to the students but understanding cannot be. It must come from 'within'.

Constructivism is an approach to teaching and learning based on the notion that humans construct or build meaning in to their Ideas and experiences as a result of effort to understand or make sense of that. It provides the real and flexible environment for learning and facilities dynamic assessment.

Constructivism considers learner as an active entity and having complex and multidimensional thoughts.

1.1 Idea of Constructivism

- It is centered on the idea that human knowledge and learning is actively constructed by the learner and not passively received from environment.
- It believes knowledge is created by the experiencing individual on the basis of prior knowledge.
- It constructs with the passive transmission of information from one individual to another in which reception is key and not the construction. It emphasize on learning by doing and problem solving method.

1.2 Constructivism and Learning

- According to Constructivism learning is the process of knowledge construction.
- The learner tends to reformulate their constructs by connecting them to new experiences by using cognitive process such as comparison, analysis and synthesis.
- Knowledge involve mental constructs that are constructed from past experiences whether these constructs are valid, truthful or incomplete is not important and this may differ from individual to individual.

1.3 Principles of Constructivism

- **Learner is active entity**

Knowledge is not passively received by the learner but actively built by him and this knowledge cannot be transmitted from one learner to another. Their understanding can change to accommodate new experiences.

- Organization of learning experiences on the basis of previous knowledge

The function o cognition is adaption and to organize the learning experiences of the world. This construction is self construction and may not be always correct.

1.4 Nature of learner

- Learner is unique individual with unique needs.
- Learner has complex and multidimensional thoughts.
- Learner has social interaction with knowledgeable members of society.
- Learner is facilitated and guided by the instructor.
- Learner is controller and mediator of learning.

1.5 Nature of Learning Process

- Learning is an active process.
- Learning is a social process.

1.6 Nature of Constructivist Learning Environment

- In a real and flexible environment, it is easy to construct meaning based on conceptual understanding.
- The learning environment should encourage group interactions.
- The learning environment should facilitate the dynamic interaction between task, instructor and learner.
- It should facilitate dynamic assessment.

1.7 Role of Constructivist Teacher

- He/ She should accept and encourage students' autonomy and initiative.
- He/ She should use a variety of materials and encourage the students to use them.
- He/ She should encourage the students to engage in dialogue with teacher and with one another.
- He/ She should encourage students to ask question to each other.

1.8 Constructivist Learning Strategies

- Productive learning strategy
- Make the learner responsible for learning

1.9 Importance of Mathematics

The word "Mathematics" is derived from the Greek Word "Mathemata" which means things that are learned. It deals with the study of symbols, numbers and shapes but when we consider mathematics in broader sense it does not merely means calculations and solving arithmetic problem, but it is much more than that.According to Kothari Commission, 'Mathematics and science should be taught on a compulsory basis to all pupils as a part of general education during the first ten years of schooling

1.10 Academic Achievement

Achievement is general mental ability, language achievement, automization of basic arithmetic facts and memory capacity in a given period of time. Academic achievement is the actual accomplishment of an individual in the examination and other tests based on subject matter and content. Academic Achievement is an important aspect to the students who engaged in process of education since it depends on the degree of effectiveness for maximum/minimum performance.

1.11 Objectives of the Study

- To develop an Achievement test on selected units of Mathematics.

- To develop a teaching programme based on "Constructivist Approach".
- To study the level of Achievement after the Experimental treatment.
- To compare the effectiveness of Constructivist Approach over the Conventional Approach of teaching.

1.12 Hypothesis
There is no significant difference in the Achievement of the students when taught Mathematics with and without use of Constructivist Approach.

2. Methodology
2.1 Sample
In the present study, one school was selected randomly. There were five sections of 7th class from which the sample was selected on the basis of their marks in half yearly examination; those who received less than average were selected randomly and constituted the sample.60 students were randomly selected as sample. Out of which two groups were made of 30 students each. One group was called control group and no treatment was given to control group.Another group of 30 students was known as experimental group where teaching through constructivist approach was done.

2.2 Tools for data collection
Keeping in view the nature and need of the present study **SELF DEVELOPED TOOL – ACHIEVEMENT TEST** was used for data-collection. The following steps were followed for developing the test:-

a. Planning
The achievement test was planned with the objective of measuring Achievement in Mathematics. Planning of the test taken in to account the purpose of the test, identification and defining the intended learning outcomes, preparing the test specifications and constructing relevant test items.

b. Objectives
Since the major concern here was to test the academic achievement, accordingly, it was decided to test the three major areas of cognitive domain, i.e. knowledge, understanding and application and one aspect i.e. skill from psychomotor domain.

c. Preparation
50 multiple choice questions with wide range of difficulty were constructed in conformity with blue print. First draft was given to experts and items having 80% unanimity were selected. Then the second draft of 40 multiple choice questions were given to students and those items were improved with respect to language if required. Finally 40 items constituted the final form of Achievement test along with the scoring key.

2.3 Experimental Procedure
(i) Pre Test- The first stage involved the formation of two groups experimental and control group and administration of achievement test in mathematics.

(ii) **Treatment-** At second stage, the experimental group was taught through Constructivist Approach. Control group was taught the same topics through traditional teaching strategy. The teaching-learning process was carried out for a period of one week.

(iii)Post-Test- The third stage i.e. after the experimental treatment involve the administration of post-test i.e. achievement test.

2.4 Statistical Treatment
The data collected was statistically analyzed using the following techniques:-

1. Descriptive statistics such as means and SDs were worked out on the score of Achievement test.
2. Inferential Statistical techniques such as t-test was employed for testing significance of the difference between the experimental and control the group on the basis of pre-test, post-test and gain scores.

3. Analysis and Result
3.1 Pre-Test comparison of the Experimental and Control Group
The comparison of the experimental and the control group by the Achievement test scores is as follows:

The difference between a control and experimental groups on means scores in pre-test was not found to be significant.

't' – value for difference in the pre-test mean achievement scores of Experimental and control group.

Table-3.1

Test	Group	N	M	S.D.	't' ratio	Level of significance
Pre-test	Experimental	30	10.4	2.34	0.21	Not Significant
	Control	30	7.9	1.95		

The insignificance indicates that the two groups in pre-test were almost equal in their level of knowledge before introducing any treatment.

3.2 Post-Test Comparison of Experimental and Control Group
The differences between the mean post-test scores of the experimental and control group as provided below:

Table-3.2

Test	Group	N	M	S.D.	't' ratio	Level of significance
Post-test	Experimental	30	27.54	4.73	15.98	Significant (at 0.01)
	Control	30	8.32	1.99		

It indicates very clearly that mean scores of the experimental group improved more than that of control group. This indicates further a significant increase in the level of Achievement after giving them the treatment. T he treatment had been found to have a positive effect on Academic Achievement of experimental group over the control group counter parts that were denied the constructivist treatment.On the basis of results obtained from the analysis of the data, hypothesis of the study is **rejected**.

4. Conclusion
The result shows that the post test achievement go significantly in favour of providing remedial teaching, as the students gained a lot after the remedial teaching. Evidently, calculated t-values of level of achievement between pre-test and post-test of experimental group have been found to be significant.

The study also provides the teacher an empirical support for using Constructivist Approach in class room.

REFERENCE

Appelton, Ken (1993). Using theory to guide practice: Teaching Mathematics, Constructivis perspective : Vol.(93) | Best, J.W. (1977). Research in Education. New Delhi : Prentice Hall of India. | Cooper, H.M. (1989). Homework, While Plains Longman, New York. | Cronbach, L.J.(1954). Educational Psychology. New York. Harcourt Brace & World. | David, D.R.(1951). The Teaching of Mathematics, Landon: addision Weselyh Press. | Deighton, Lee C. (1971). The Encyclopedia of Education, Vol.4, Macmillan. | Good, C.V.(1945). Dictionary of Education (Ed.) New York: McGraw-Hill Book Company Inc.