A study of constructivist approach on learning outcomes among IXth standard students

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Abstract- *The present investigation has carried out to study the effectiveness of constructivist approach on the learning outcome in science. The design used for the study is preexperimental design i.e. one-group pretest-posttest design. The purposive sampling technique was used to select the school for the study. The Swami Vivekananda Government Model School Block- Srinagar, Makarwali situated in Ajmer of Rajasthan state was selected for the study. A group of 33, ninth standard students were chosen as the sample for the study from class IX-B. The sample included 15 boys and 18 girls in total. The achievement test (knowledge, understanding, application and skill) in science was developed by the investigator and was administered before and after the treatment. The SPSS has used to analysis the data. The statistical techniques t test, mean score and mean gain score has used to see the significance of constructive approach and gender difference from the data. The finding of the study shows constructivist approach is found to be effective in improving the learning outcomes of student in science. And also, Constructivist approach found significantly effective for both male and female group in improving their learning outcomes in science.*

Key Word*:* Constructivist approach; Achievement in Science, Learning Outcome.

Introduction

Constructivism and Science Teaching

Constructivism is not a new concept. It is learning or meaning making theory. It suggests that individuals create their own understanding, based upon the interaction of what they already know and believe and the phenomena or ideas with which they come into contact. According to Crowther (1997), constructivism means that, “as we experience something new we internalize it through our past experiences or knowledge constructs that we have previously established." Constructivism bristles with philosophical questions: it explicitly assumes positions in the philosophy of science, the philosophy of mind, and the philosophy of education. It is at once a theory of science, of human learning and of teaching.

Constructivism according to Piaget (1971) is a system of explanations of how learners, as individuals adapt and refine knowledge. In his view learners actively restructure knowledge in highly individualized ways, basing fluid intellectual configurations on existing knowledge and formal instructional experiences. Piaget focused that the individual is the sole agent in the process of constructing and reconstructing meaning. Psychological constructivism is based on Jean Piaget's model of development of the individual. The process

focuses learning as a personal, individual, intellectual construction based on experiences of one in the world.

Learning by doing and forming ideas from exploration is the underlying theory behind constructivism. The child is viewed like a scientist who possesses insights, questions, problem solving strategies and new ideas that will be used in experimentation. The scientific process of puzzling, probing, testing is incorporated into the approach. The child develops his picture or understanding of the physical world through manipulation and seeing relationships between objects and learning centrally determined names and labels for the ideas, items and activities involved through experience. Key to the theory is fostering independence in the child, not dependence on adults so that activities, curriculum, environment are based on risk-taking, self-direction, guided or totally free discovery type experimentation through social interaction and problem solving. The teacher acts as a facilitator of the educational context. The teacher provides opportunities for observation, interaction of students with each other and with the teacher through questioning techniques, modifying the environment, and support during conflicts and planning and creating curriculum.

Need of the Study

Implementation of constructivist approach in the classroom is facing so many obstacles. It is because either teacher is not taking interest or they do not have competency towards his/her profession. Result of this the academic achievement of the student's in science is based on bookish knowledge and attitude towards science is just content specific. So, it is the need to provide constructivist instructional materials to students and change the attitude towards science from within book to go beyond textbook.

Statement of the Problem

Constructivism is a view of learning based on the belief that knowledge is not a thing that can be simply given to students by the teacher in the classroom. Rather, learners are the builders and creators of meaning and knowledge. The role of the teacher in classroom is as a facilitator. The students is an active participant who explore, construct the meaning, explain it and expand the knowledge with the help of question posed by the teacher. Constructivist approach is a learner- centered method of teaching. The present investigation is titled as "**A study of constructivist approach on learning outcomes among IXth standard students"**

Objective of the Study

With an insight into the philosophical, psychological and pedagogical bases of constructivism, the research undertaken aimed to study a few researches bearing question which through more light upon the constructivism as an approach of learning. These are reflected in the form of objectives given as follows-

- To develop Instructional material based on constructivist approach.
- To study the effect of Constructivist approach on learning outcomes of the students at secondary level in science subject.
- To study the effect of Constructivist approach on learning outcomes of the male and female students in science subject.

Hypotheses of the Study

The following research hypotheses were formulated in pursuance of the broad objective of the study-

H_1: The learning outcomes in science of post-test is significantly higher than pre-test.

H_0: There is no significant difference between male and female students in their mean gain of learning outcomes after the experimental intervention**.**

Design of the Study

The present investigation was carried out to study the effectiveness of constructivist approach on the achievement in science. The design used for the study is preexperimental design i.e. one-group pretest-posttest design. In this design the researcher have little or no control of extraneous variable. The one-group pretest–posttest design usually involves three steps:

- Administering a pretest measuring the dependent variable on sample
- Applying the experimental treatment *X* to the sample
- Administering a posttest, again measuring the dependent variable on sample

Differences attributed to application of the experimental treatment are then evaluated by comparing the pretest and posttest scores (Ary, D., et al. Introduction to Research in Education, page-303).

Design: One Group Pretest-Posttest Design		
Pretest	Independent	Posttest
Y_1	X	Y_2

Sampling Procedure

The purposive sampling technique was used to select the school for the study. The one school namely Swami Vivekananda Government Model School Block- Srinagar, Makadwali situated in Ajmer of Rajasthan state was selected for the study.

Sample For The Study

The group of 33, ninth slandered students were chosen as the sample of the study from class IX-B of Swami Vivekananda Government Model School Block- Srinagar, Makarwali situated in Ajmer of Rajasthan state. The sample included 15 boys and 18 girls in total.

Table 1:Sample for the study			
Sample	**Boys**	**Girls**	**Total**
One group pretest-posttest	15	18	33

Analysis and Interpretation of Data

The SPSS (25.0 version) was used for the statistical analysis of the data. In pursuance of second objective, to study the effect of Constructivist approach on Academic Achievement of the students at secondary level in science subject, the following hypotheses were formulated;

H_1: The learning outcomes in science of post-test is significantly higher than pre-test.

H_0: There is no significant difference between male and female students in their mean gain of learning outcomes after the experimental intervention**.**

To test the hypotheses H_1, paired sample t test was used. The result of t test for testing the hypothesis H_1 are summarized in the following table:

Table 2: Result of Paired Sample 't' Test

Test	N	Correlation	Mean	Std. Deviation	t value
Pretest	33	0.51	8.97	2.48	9.73*
Posttest			14.76	3.92	

* Significant at 0.05 level

It may be noted from the table 4.2 that the t value for pretest and posttest was found to be 9.73 which is significant at 0.05 level. Thus, a hypothesis H_1 is proved to be true, i.e. the constructivist approach is found to be effective in improving the learning outcomes.

To test the above hypothesis H_0, independent sample t test was used. The results of t test for testing the hypothesis are summarized in the following table:

Table 4.3: Result of Independent Sample 't' Test

	Gender	N	Mean	Std. Deviation	t value
Gain	**Male**	15	6.07	3.58	0.42*
	Female	18	5.56	3.36	

* Non-Significant at 0.05 level

It may be noted from the table 4.3 that the t value for male and female group was found to be 0.42 which is non-significant at 0.05 level. Thus, a hypothesis H_0 is proved to be true i.e. Constructivist approach was found equally effective for both male and female group in improving their learning outcomes.

Major Findings of the Study

- Constructivist approach was found effective in improving the learning outcome in science among ninth standard students. This is evident from the t value obtained for treatments.

- Constructivist approach was found equally effective for both girls and boys in improving their learning outcomes in science.

Educational Implications

The findings of the study will be significant in the following way

For Students

Through the processes of constructivism, the learners will integrate their new knowledge with the previous one, which in turn will assist them in building their current conceptions. Constructivism is centered on the belief that cognition is the result of "mental construction". Hence, it provides academic freedom to students. Students use their own learning strategies by adapting different approaches of constructivism. New knowledge is actively built, and then time is needed to build it.

For Teachers

It is a fact that teacher's performance is most crucial input in the field of education. The teacher can plan, develop and implement various students centered activities, so as to promote attitude towards chemistry. The better art of teaching can be achieved by adopting such innovative approaches of teaching. If learning is based on prior knowledge, then teachers must note that knowledge and provide learning environments that exploit inconsistencies between learners' current understandings and the new experiences before them. This challenges teachers; for they cannot assume that all children understand something in the same way. Further, children may need different experiences to advance to different levels of understanding. If students must apply their current understandings in new situations in order to build new knowledge, then teachers must engage students in learning, bringing students' current understandings to the forefront.

For Teacher Training Programme

From this study teacher candidates‟ conceptual understanding of content, constructivism, and constructivist pedagogy can be changed. And also teacher candidates can be empowered to plan an implementation of constructivist pedagogy in particular chemistry subject in classroom situations.

For The Text Book Writers

It will help text book writers to write text books in sequential order by keeping in mind the constructivist approach. Writers can make their books effective with using Constructivist view in planning the chapters.

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