

Effectiveness of Constructivist Approach for Enhancing Achievement in Chemistry among 9th Std Students

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Abstract: The study is focused to find out the effectiveness of constructivist approach for enhancing achievement in chemistry among 9th std students. The investigator used randomized pre-test/post-test design in which the samples are randomly assigned subjects to experimental and control group. The samples of the present study are consisting of 60 Standard IX students of Sindhi Hindu High school in Narayanagar at Salem District. Out of 60 students, 30 students were chosen randomly for Experimental group and 30 students for Control group. The achievement test was prepared, standardized by the investigator and administered to the samples in the pre test and post test. The main findings of the study are; there is significant difference in the post test scores of control and experimental group. The achievement scores of the samples in the experimental group are better than the control group and it proved that constructivist approach is an effective teaching strategy than the chalk and talk method for the achievement in Chemistry.

Keywords: constructivist approach, achievement in Chemistry.

1. INTRODUCTION

Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. Science refers to a system of acquiring knowledge through observation and experimentation to describe and explain natural phenomena. Chemistry is one of the core subjects of science and it has the composition, structure, properties, and reactions of matter, especially of atomic and molecular systems. The main aim of the science education is to make a meaningful understanding of Science theories, concepts, equations, laws, principles etc. Teaching Science focuses on providing students with opportunities to get an experience and to develop their cognition. Learning is the product of self-organization and reorganization of existing ideas. This learning is possible through different approach, strategies and methods.

2. NEED AND SIGNIFICANCE OF THE STUDY

The constructivism provides a perspective on teaching and learning science in classrooms, with a view to improving the effectiveness of science teaching in enhancing students' learning. The core view of constructivists on learning science suggests that students construct their knowledge strongly influenced by social environments. They learn science through a process of constructing, interpreting and modifying their own representations of reality based on their experiences. Therefore, constructivists acknowledge social dimension of learning such as the classroom and learning community whereby students make meaning of the world through both personal and social processes. (Driver et al, 1994; Kearney, 2004)

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Generally, in the school system of Science teaching is based on Chalk and talk method. This method does not bring the fruitful result among the students in the chemistry achievement. In this juncture, standard IX students find difficult and misconception in understanding the atomic structure since it has particles of atomic structure, electrons, neutrons and protons. In order to nullify the misconception of understanding the particles of atomic structure placed in the orbital (An atomic orbital is a mathematical function that describes the wave-like behavior of either one electron or a pair of electrons in an atom) the investigator finds the constructivist approach is the suitable method of teaching to enhance the achievement in chemistry.

Objectives of the Study

- ❖ To find out the level of achievement in Chemistry between control group and experimental group in the pre test.
- ❖ To prepare a lesson plan to teach atomic structure for the samples in the control group
- ❖ To prepare a constructivist approach lesson plan to teach atomic structure for experimental group
- ❖ To find out the level of achievement in Chemistry between control group and experimental group in the post test.
- ❖ To find the significant difference in the mean scores of achievement in Chemistry between control group and experimental group in the post test.

Hypothesis of the Study

1. There is significant difference in the mean scores of achievement in Chemistry between control and experimental group in the pretest.
2. There is significant difference in the mean scores of achievement in chemistry between pre test and post scores of the samples in the control group.
3. There is significant difference in the mean scores of achievement in chemistry between pre test and post of the samples in the experimental group.
4. There is significant difference in the mean scores of achievement in Chemistry between control and experimental group in the post test

3. METHODOLOGY OF THE STUDY

Non Randomized Control Group, Pre-Test and Post- Test Design

The researcher used Non-Randomized Control Group Pretest-Posttest Design for the present study.

Table No-1 Non-Randomized Control Group Pretest-Posttest Design

Group	Pre-Test	Independent Variable	Post Test
Experimental group	T1	Constructivist approach	T2
Control group	T1	Chalk and Talk Method	T2

The samples are selected from Sindhi Hindu High school in Narayanagar at Salem District. There are four sections in IX standard. Only two sections were selected purposively. IX - A section is the control group and IX standard B section is the experimental group. Both the groups had no previous experience of learning chemistry through Constructivist approach.

Achievement Test

The achievement test was prepared by the investigator by consulting with school subject handling teachers. It consists of 50 statements based on the instructional objectives of knowledge, understanding, application and skill with four alternatives. There is only one correct answer for each of the items. As far as the scoring procedure is concerned the correct answer is awarded '1' and incorrect answer is '0'. So the maximum mark is 50 and the minimum is '0'.

Statistical Techniques used for the Study: Mean, SD, and Paired sample t test are used.

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Hypothesis-1: There is significant difference in the mean scores of achievement in Chemistry between control and experimental group in the pretest.

Table 2: t test showing the difference in the mean scores of achievement in Chemistry in pre test between control and experimental group

Pre test	Group	N	Mean	Standard deviation	t value	P value	Result
	Control	30	52.06	6.36			
	Experimental	30	51.01	6.42			

The above table reveals that the difference in the mean scores of achievement in Chemistry between control and experimental group. The calculated P value 0.58 is greater than 0.05 and it is not significant at 5 % level. Hence, the formulated hypothesis “There is significant difference in the mean scores of achievement in Chemistry between control and experimental group in the pre test.” is **not accepted**. It is found that the samples in the control and experimental group are equivalent.

Hypothesis -2: There is significant difference in the mean scores of achievement in chemistry between pretest and post of the samples in the control group

Table-3 Paired sample t test showing the difference in the mean scores of achievement in Chemistry between pre-test and post-test of control group students

Control group	Test	N	Mean	Standard deviation	t value	P value	Result
	Pre test	30	52.06	6.36			
	Post test	30	71.94	4.97			

The above table reveals that the differences in the mean scores of achievement in Chemistry between pre-test and post-test of control group students. The calculated P value 0.00 is less than 0.01 and it is significant at 1 % level. Hence the formulated hypothesis “There is significant difference in the mean scores of achievement in chemistry between pre test and post of the samples in the control group” is **accepted**. The mean scores of the samples in the post test increased reasonable manner when compare to pretest.

Hypothesis -3: There is significant difference in the mean scores of achievement in chemistry between pre test and post test of the samples in the experimental group.

Table-4 Paired sample t test showing the difference in the mean scores of achievement in Chemistry between pre-test and post-test of the samples in the experiment group

Experimental group	Test	N	Mean	Standard deviation	t value	P value	Result
	Pre test	30	51.01	8.16			
	Post test	30	78.21	7.54			

The above table reveals that the differences in the mean scores of achievement in Chemistry between pre-test and post-test of the samples in the experimental group. The calculated P value 0.00 is less than 0.01 and it is significant at 1 % level. Hence the formulated hypothesis “There is significant difference in the mean scores of achievement in chemistry between

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pretest and post of the samples in the experimental group” is **accepted**. It is found that the mean scores of achievement in Chemistry of the samples in experimental group increased in a remarkable manner when compare to pretest.

Hypothesis-4: There is significant difference in the mean scores of achievement in Chemistry between control and experimental group in the post test.

Table-5. Paired sample t test showing the difference in the mean scores of achievement in Chemistry of the samples in the post test between control and experimental group.

	Group	N	Mean	Standard deviation	t value	P value	Result
Post test	Control	30	71.94	4.97	5.89	0.00*	Sig
	Experimental	30	78.21	7.54			

The above table reveals that the differences in the post test mean scores of achievement in Chemistry between controlled and experimental group. The calculated P value 0.00 is less than 0.01 and it is significant at 1 % level. Hence, the formulated hypothesis “There is significant difference in the mean scores of achievement in Chemistry between control and experimental group in the post test.” is **accepted**. It is found that the samples in the experimental group have better achievements in Chemistry than the control group in the post test.

4. FINDINGS OF THE STUDY

1. There is no significant difference in the mean scores of achievement in Chemistry between control and experimental group in the pretest.
2. There is significant difference in the mean scores of achievement in chemistry between pre test and post scores of the samples in the control group
3. There is significant difference in the mean scores of achievement in chemistry between pre test and post of the samples in the experimental group.
4. There is significant difference in the mean scores of achievement in Chemistry between control and experimental group in the post test.

5. DISCUSSION OF THE STUDY

The samples in the control and experimental group do not differ in their mean scores of achievement in Chemistry in the pre test. It shows that the samples are equivalent in both control and experimental group. The samples of the control group were taught in the chalk and talk method the mean scores in the post test increased in a reasonable manner when compare to pre test. It is found that the mean scores of achievement in Chemistry of the samples in experimental group increased in a remarkable manner when compare to pre test. It is due to the application of constructivist approach in teaching Chemistry. In the post test analysis between control and experimental group the samples in the experimental group have better achievements in Chemistry than the control group. It is obviously proved that the effectiveness of constructivist approach in teaching Chemistry. Hence, the constructive approach influences in the learning of chemistry and enhanced the achievement in Chemistry.

6. EDUCATIONAL IMPLICATION OF THE STUDY

The study helps the teachers to understand and implement the constructive approach in teaching chemistry and to help the students to have mastery level of learning. Teachers may get awareness of using the different methods, approaches, strategies to teach chemistry subject in an interesting manner. The teachers will realize the chalk and talk method will not bring the expected or fruitful result in the achievement of chemistry.

7. CONCLUSION

The study proved that the constructive approach influences in the learning and achievement of chemistry among the standard IX students. When the students wanted to have a mastery level of learning, the chalk and talk method alone will not be useful. There are other approaches, strategies to be adopted by the teacher to enhance the learning and attainment especially in Chemistry. This can be done through a constructivist approach of teaching. Hence, the study suggests the science teachers to adopt and implement a constructivist approach in teaching Chemistry.

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