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A COMPARATIVE STUDY: EFFECT OF CONSTRUCTIVIST APPROACH AND CONVENTIONAL APPROACH OF TEACHING ON THE ACADEMIC ACHIEVEMENT OF SCIENCE STUDENTS IN RELATION TO THEIR SOCIO ECONOMIC STATUS.

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ABSTRACT

Background: The constructivist thinking has been considered important to achieve the objectives of learning to live together, learning to learn, learning to know and learning to be. In the Constructivist classroom, the focus trend is shift from the teacher to students. The present study intends to compare the Effect of constructivist approach and conventional approach of teaching on the academic achievement of science students in relation to their socio economic status. **Method and Procedure:** The present study was experimental in nature. Quasi experimental research design was used to achieve the purpose of the present study. The study was designed on the basis of Non equivalent Pre test-Post test control group design. And Random sampling technique was uses to collect the data by using the following tools: (i) Verbal Intelligence test by R.K. Ojha and K.Ray Choudhury: To measure the mental ability of students to form the groups.(ii) Science Achievement test: To measure Academic achievement of the students in Science at different levels of testing i.e. pre test, post test and delayed post test.(iii) Lesson Plans based on Constructivist Paradigm: To achieve the objectives of Constructivist teaching based on Constructivist principles of teaching and

Major findings: The study revealed that there (i) there was no a significant difference between the mean Academic Achievement scores of the Upper class Socio economic status students of experimental and control group at Pre test level. However there was a significant difference Post test level at delayed post test level.(ii) There was no a significant difference between the mean Academic Achievement scores of the Middle class Socio economic status students of experimental and control group at pre test level. However there was a significant difference Post test level at delayed post test level. (iii) There was a significant difference between the mean Academic Achievement scores of the Lower class Socio economic status students of experimental and control group at Pretest level. However there was a significant difference Post test level at delayed post test level.

Conclusion: It is concluded that Constructivist approach of teaching is more encouraging when compared with Conventional Approach of teaching, it is being suggested that Constructivist Approach and its different techniques should be included in the curriculum at all the level of education. And moreover Constructivist Approach should be used in Science teaching and learning at the level of Elementary school, High school and College level to enhance their Academic achievement and understanding of the concept.

KEYWORDS: Constructivist approach, Conventional approach, Academic achievement, Science students, Socio Economic Status

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INTRODUCTION

Education is the most important medium in making a change in our life; it is through education that we learn to absorb the processes that define the art of being good human persons. Education is that great capacity builder that enables the frog in the well to leap out of its comfort zone somnolence and find an exciting open space where opportunities are around. The Indian education system is as old as the human civilization. Ancient Indian system was mainly concerned with vocational learning of parental crafts, manual work, physical exercise of yoga, disciplined life, truthfulness, self confidence, respecting elders, helping needy persons and love for nation etc. However Indian education system suffered a great drawback in the later period.

In comparison to global standard in Indian school education in science, under graduate/post graduate and research, level of quality in basic science is not very encouraging. Even in the different states of India uniformity is lacking in all aspects. In 1953 by the Secondary Education Commission to teach 'General Science' as a compulsory subject in high school. In 1956, First National Seminar on "Teaching of Science" was held at Tara Devi, Shimla, Himachal Pradesh. In spite of all efforts of our policy makers, national leaders and educationists, science education and science teaching learning process as a whole appears a bit gloomy even after sixty years of independence.

Science education imparted in the in Indian schools is not up to the mark because it is merely bookish and theoretical. There is more emphasis from conventional approaches in teaching and instruction Effective learning occurs when the students are actively involved in organizing and findings the relationships in the information they encounter rather than being the passive recipients of the teacher delivered quantum of knowledge. The young inquisitive minds may have questions about all sorts of things and these questions are being suppressed in a conventional classroom.

Academic achievement plays an important role in the success of teaching learning activities. It has always been a crucial area and the main centre of educational research. Achievement refers to the skills developed in the school subjects that are evaluated by the school authorities with the help of achievement tests that may be either standardized or teacher made. Academic achievement is the major concern of the educational policy makers of every country. To a great extent the achievement of the students affects their future success and performance,

Achievement is the case of the wider term educational growth which includes growth in all subjects. The importance of achievement lies on the fact that it sets an emotional tonic in one's life. In fact achievement refers to the pupil's knowledge attainment as skills developed with the help of achievement test in the form of examinations or tests. According to Crow and Crow (1963). "Achievement means the extent to which the learners are profiting from instruction in a given area of learning".

The quality of a school or educational system should, in real sense, be judged in terms of learner achievement, namely, how much and how well the learners have acquired the intended curriculum Input (Dove, 1991). With this framework of the concept of quality of education, it would be worth examining the effectiveness of school education. To what extent

the objectives of SSA have been realized? Which type of schools gained more as compared to other schools? What is the relative gain among the learners across their sex, caste and location? Study of this kind is quite essential in the context of universalisation of elementary education.

CONCEPT OF CONSTRUCTIVIST APPROACH AND CONVENTIONAL APPROACH

CONSTRUCTIVIST APPROACH: - Constructivist approach of learning is an interaction between the learner and learning environment. During this interaction, prior knowledge is used as a basis to interpret and construct new understanding. It is a democratic way of teaching and learning which emphasizes on the various approaches and aspects of teaching and learning such as active participation, problem solving, learning by doing, Cooperative learning, individual leaning, activity based teaching and learning. The basic idea behind the constructivist approach and constructivism is the learner is exposed to construct his own knowledge, experiences, ideas and concept based on his prior knowledge and experiences from his surroundings. Use of conversation, discussion, interaction with others and sharing ideas from an integral aspect for construction of knowledge. During this process the child learn many skills such as observing, hypothesizing, inferring etc. which leads to the development of scientific mind and positive attitude towards Science, which is the ultimate aim of Science teaching.

The meaning of Constructivism varies according to one's perspective. Constructivism is an epistemology, learning or meaning-making theory, that offers an explanation of the nature of knowledge and how human begins learn. In other words, learning occurs if a student can construct his or her knowledge and apply or generalize its meaning to new situations. The teacher act as a facilitator, co-learner, democratic leader, and a diagnostician.

CONVENTIONAL OR TRADITIONAL APPROACH: conventional approach of teaching is a teacher centered methods of teaching in which the students remains as the passive listeners. This approach mainly focuses on the traditional methods of teaching and learning such as dictation method, lecture method, textbook readings, recitation etc. In the Conventional approach of teaching and learning the learner has no freedom to share his ideas, experiences, information and to form new concepts. Hence, ultimately resulted into lower academic achievement and less understanding of the concept. As the learner is not exposed fails to express the inner capabilities.

OBJECTIVES OF THE STUDY

1. To Study and Compare the Effect of Constructivist Approach and Conventional Approach on the Academic Achievement of Science students in relation to:
   - i) Upper Class Socio –Economic Status
   - ii) Middle Class Socio –Economic Status
   - iii) Lower Class Socio –Economic Status

HYPOTHESES OF THE STUDY

1. There will be no significant difference on the Effectiveness of Constructivist Approach and Conventional Approach on the Academic achievement of:
   - i) Upper Class Socio –Economic Status students.

ii) Middle Class Socio –Economic Status students.

iii) Lower Class Socio –Economic Status students..

NEED AND IMPORTANCE OF THE STUDY

This present study will be able to put emphasis on the learner centered or activity method. The importance of the present study is to prepare students to become good adaptive learners i.e. students should be able to apply what they learn in school to the various unpredictable situations that they might encounter in the course of their work lives. Results of this study offer information about constructivist teaching approaches effectiveness in teaching science at the classroom levels and thus provide a vital guide for teachers, administrators, students, researchers as well as instructional system builders. Studies have proved that Constructivist approach is effective to enhance the academic performance, attitude and interest of the students by using various methods and strategies.

REVIEW OF THE RELATED LITERATURE

Mordechai Ben-Ari (1998) The findings of the study indicated that the Constructivism is a theory of learning which claims that student construct knowledge rather than merely receive and store knowledge transmitted by the teacher. Constructivism has been extremely influencing in science and mathematics education, but not in computer science education.

Thomas R. Lord (1999) This study elaborate that the students in the Constructivist classes performed significantly better on exams, related the course higher, and participated more in campus and regional environmental support efforts than the students in Conventional classes.

Rekha Aggrwal, Neeru Chawla (2005) The results of the study find out that the prepared instructional material is significantly effective for improving the 'Academic Learning outcomes' of the students at elementary level.

K.V. Sridevi (2007) The results of the study concluded that constructivist approach was found effective than the conventional methods of teaching in improving the achievement in science, perception of nature of science, science process skills, scientific attitude and attitude towards science among eighth standards students**.**

Saroj Pandey,(2007) In this study she developed a paper against the backdrop of National Curriculum Framework-2005, which envisages major paradigm shift from behaviorist approach to learning to constructivist approach that lays stress on the personal experiences of learner in the process of knowledge construction. The role teacher in this approach has shifted from the transmitter of knowledge to facilitator of knowledge. The NCF-2005 also emphasizes on education for peace, not as a part of value education as traditionally been integrated in schools. But as an independent value in itself.

V. Nimavathi, R. Gnanadevan (2008) the main findings of the study were:- i) There is no significant difference between the experimental and control group in the achievement of science at pre test level. (ii)There is significant difference between the experimental and control group in the achievement of science at post test level. The students learned with multimedia performed better than the students learned with conventional method. (iii)There is significant difference between the mean achievement score of the pre test and post test for the experimental group. This shows the effectiveness of multimedia programme.(iv)There is no

difference between the pre-test and the post-test in the achievement of the control group. This shows that the conventional method of teaching does not help in to score more marks in the post test.

Vandana Mehra , Rajinder Kaur gill (2009) This study was conducted to compare the effect of Graphic Organizer Instruction and traditional instructions on achievement in Social studies of class IX. (i)It was observed that the students taught through graphic Organizer Instruction exhibited better mean gain on achievement scores as compared to those taught through traditional Instruction. (ii) High Intelligence students attained better mean gain on achievement scores as compared to their low intelligence counterparts. (iii) Students attained better at knowledge level than at comprehension category of objectives.

Ambrose Hans G. Aggabao (2010) this study compared the effectiveness of three teaching approaches on achievement as well as retention of learning of students. Results of the study showed significant differences among mean gain scores on both achievement and retention measures. Radical constructivist approach showed significant advantage over the other two approaches, while the social constructivist approach showed better gain scores than the current, Conventional teaching approach.

Amit Gautam, A.K. Kulshrestha (2011) stated that Constructivist teaching is an effective way to teach as it encourages active and meaningful learning and promotes responsibility and autonomy besides achieving desirable educational goals of teaching and learning.

POPULATION

In the present study all the students of 6^{th} grade studying in all the schools of Himachal Pradesh constituted the population of the study.

SAMPLING PROCEDURE

Out of 12 districts of the State of Himachal Pradesh, District Solan was selected on the basis of random sampling. Further out of Five educational blocks in the District Solan, the Investigator has selected one Educational Block i.e. Nalagarh Educational Block on the basis of random sampling. After that in Nalagarh Educational Block, the Investigator had selected two schools out of 28 Schools.

SAMPLE: The sample of the study consists of total 77 students of class 6^{th} science subject taken from Govt. and Private school out of which 39 students were kept in experimental group and 38 students were kept in control group respectively.

DISTRIBUTION OF SAMPLE

GROUPS	SOCIO ECONOMIC STATUS		
	UPPER CLASS	MIDDLE CLASS	LOWER CLASS
EXPERIMENTAL GROUP	11	17	11
CONTROL GROUP	11	15	12
TOTAL	22	32	23

DESIGN OF THE STUDY

The present study was experimental in nature. Quasi experimental research design was used to achieve the purpose of the present study. The study was designed on the basis of Non equivalent Pretest-Posttest control group design.

TOOL USED AND DEVELOPED IN THE STUDY

1. Verbal Intelligence test by R.K. Ojha and K.Ray Choudhury: To measure the mental ability of students to form the groups.
2. Science Achievement test: To measure Academic achievement of the students in Science at different levels of testing i.e. pretest, posttest and delayed posttest.
3. Lesson Plans based on Constructivist Paradigm: To achieve the objectives of Constructivist teaching based on Constructivist principles of teaching and learning

PROCEDURAL DETAILS OF THE STUDY

PHASE-I DEVELOPMENTAL PHASE

PHASE-II TRY OUT OF LESSONS

PHASE-III IMPLEMENTATION PHASE

DEVELOPMENTAL PHASE:

At this stage, the investigator developed instructional material, including lesson plan, activity sheets, unit tests, tools namely Science Achievement test.

DEVELOPMENT OF THE LESSON PLAN BASED ON CONSTRUCTIVIST MODEL:

Planning and Learning Model: 5 Es: The 5 E's lesson planning model is the most often associated with Constructivist learning design. The 5E's approach included: 1.Engage, 2.Explore, 3.Explain, 4.Elaborate or extension, 5.Evaluate.

Phase-II

TRY OUT OF THE LESSONS: The instructional materials/lessons developed were tried out on students belonging to 6th grade science subject. By Getting feedback from the experts and subject teacher the investigator made modifications accordingly.

PHASE-III-IMPLEMENTATION

The experiment was conducted is the 5 phases given below:

Phase-1: Instructions for classroom climate.

Phase-2: Administration of pretest.

Phase-3: Instructional programme or treatment.

Phase-4: Administration of post test.

Phase-5: Administration of retention test.

STATISTICAL TECHNIQUES USED

Descriptive statistics, Independent–Samples T test: For compare the achievement scores of two groups. Paired –Samples T test: The paired samples T test procedures compare the means of two variables for a single group. SPSS (15.0) version was made use for the statistical analysis of data.

ANALYSIS AND INTERPRETATION OF DATA

Analysis and interpretation of data collected for study are important to draw out significant conclusions.

FINDINGS ON ACADEMIC ACHIEVEMENT SCORES OF EXPERIMENTAL AND CONTROL GROUP UPPER CLASS SOCIO ECONOMIC STATUS STUDENTS AT DIFFERENT LEVELS OF TESTING IN SCIENCE.

The Academic Achievement scores of experimental and control groups upper class Socio Economic Status students were compared at different levels of testing i.e. Pre test, Post test and Delayed Post-test in Science subject w.r.t. two methods of teaching as given below in the table 1.

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TABLE-1

MEAN, STANDARD DEVIATIONS OF THE SAMPLES PRE-TEST, POST-TEST AND DELAYED POST-TEST SCORES OF THE UPPER CLASS SOCIO ECONOMIC STATUS STUDENTS.

Test	Group	Method	N	Mean	SD	SEM
Pre test	Experimental	Constructivist Approach	11	50.27	11.80	3.56
	Control	Traditional Approach	11	55.09	15.23	4.59
Post test	Experimental	Constructivist Approach	11	85.00	10.40	3.13
	Control	Traditional Approach	11	66.45	14.69	4.42
Delayed post test	Experimental	Constructivist Approach	11	84.09	10.38	3.13
	Control	Traditional Approach	11	59.72	15.04	4.53

N=Number, SD=Standard Deviation, SEM-Std. Error of mean

It is evident from the Table-1 that at pre-test level there was no statistical significant differences in the mean scores and Standard deviation of the upper class SES students in experimental group i.e. Constructivist group (50.27, SD=11.80) and Control group i.e. Traditional group (55.09, SD=15.23), which suggests that upper class Socio Economic Status students had same entry level before the treatment.

At the Post test level there was statistical significant difference in the mean and Standard deviation of upper class Socio Economic Status students in experimental group i.e. Constructivist group (85.00, SD=10.40) and Control group i.e. Traditional group (66.45, SD=14.69) suggests that upper class Socio Economic Status students in constructivist group gained significantly after treatment with comparison of their colleagues in Traditional group, whose mean scores were slightly different from their means score at pre-test level (50.27, SD=11.80). At the **delayed Post test level** there was significant difference in the mean scores and Standard Deviation of the upper class Socio Economic Status students in experimental group i.e. Constructivist group (84.09, SD=10.38) and Control group i.e. Traditional group (59.72, SD=15.04) implying that upper class Socio Economic Status students in Constructivist group had more retention power of retaining the facts and information on selected Science Units taught to them as compared their colleagues in Traditional group.

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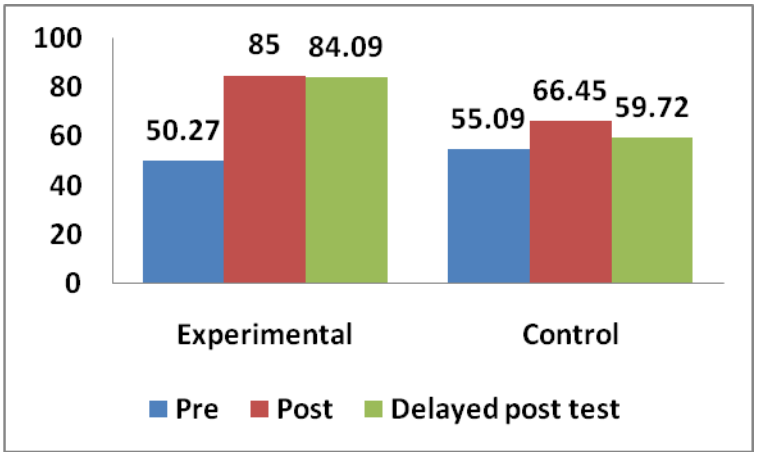
Figure 1.1 depicts the mean differences of Experimental and Control groups at Pre test, Post test and Delayed post test level.

FIGURE – 1.1

MEAN SCORE ACADEMIC ACHIEVEMENT OF UPPER CLASS SOCIO ECONOMIC STATUS STUDENTS IN SCIENCE OF EXPERIMENTAL AND CONTROL GROUP



COMPARISON ON ACADEMIC ACHIEVEMENT SCORES OF EXPERIMENTAL AND CONTROL GROUPS UPPER CLASS SES STUDENTS INDEPENDENT SAMPLES IN SCIENCE

The Experimental and control groups upper class Socio Economic Status students were compared at the independent sample t- test for equality of means at three levels of testing i.e. Pre test, Post test and Delayed Post test w. r. t two methods of teaching as shown below in the table 2

TABLE-2

SUMMARY TABLE FOR THE INDEPENDENT SAMPLES ON PRE TEST, POST TEST AND DELAYED POST TEST SCORES THE UPPER CLASS SOCIO ECONOMIC STATUS STUDENTS.

t-test for equality of means			
Tests	**t**	**df**	**Sig.(2-tailed)**
Pretest	**.-8.29**	**20**	**.417**
Posttest	**3.411**	**20**	**.003**
Delayed Posttest	**4.419**	**20**	**.000**

It can be noticed from the Table-2 the t-test values for the pre test, post test and delayed post test with respect to the two methods of teaching i.e. Constructivist Approach and traditional Approach. At the pre test level, the exact probability level is .417 which is greater than p value (p>.05).This implies that there was no significant difference in the mean scores of students in Constructivist group (50.27, SD=11.80) and students in Traditional Approach (55.09, SD=15.23). At the **Post test level**, the p value is .003 which is less than p value (p<.05).This implies that there was a significant difference in mean scores of the students exposed to Constructivist Approach (85.00, SD=10.40) and students in Traditional Approach (66.45, SD=14.69). At the **Delayed post test level** p value is .000 which is less than the p value (p<.05).Hence, there was significant difference in the mean scores between the Constructivist Approach (84.09, SD=10.38) and Traditional Approach (59.72, SD=15.04) Hence, the Hypotheses "There will be significant difference on the effectiveness of constructivist approach and conventional approach on the Academic Achievement of Upper class SES students" is accepted.

II. FINDINGS ON ACADEMIC ACHIEVEMENT SCORES OF EXPERIMENTAL AND CONTROL GROUP MIDDLE CLASS SOCIO ECONOMIC STATUS STUDENTS AT DIFFERENT LEVELS OF TESTING IN SCIENCE.

The Academic Achievement scores of experimental and control groups middle class students were compared at different levels of testing i.e. Pre test, Post test and Delayed post test in Science subject w.r.t. two methods of teaching as given below in the table 3.

TABLE-3

Mean, Standard Deviations of the Samples Pre-test, Post-test and Delayed post-test scores of the Middle class Socio Economic Status Students.

Test	Group	Method	N	Mean	SD	SEM
Pre test	**Experimental**	**Constructivist Approach**	**17**	**47.52**	**9.39**	**2.27**
	Control	**Traditional Approach**	**15**	**41.46**	**8.42**	**2.17**
Post test	**Experimental**	**Constructivist Approach**	**17**	**83.70**	**7.97**	**1.93**
	Control	**Traditional Approach**	**15**	**51.00**	**7.80**	**2.01**
Delayed post test	**Experimental**	**Constructivist Approach**	**17**	**82.94**	**8.86**	**2.14**
	Control	**Traditional Approach**	**15**	**44.53**	**7.71**	**1.99**

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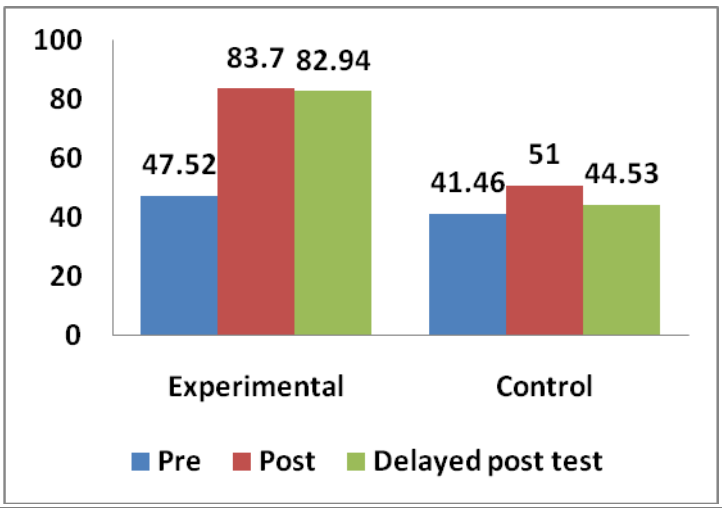
Table-3 indicates that at **pre -test** level there was no statistical significant differences in the mean scores and Standard deviation of the middle class SES students in experimental group i.e. Constructivist group (47.52,SD=9.39) and Control group i.e. Traditional group (41.46,SD=8.42),which suggests that Middle class Socio Economic Status students had same entry level before the treatment. At the **Post test level** there was statistical significant difference in the mean and Standard deviation of middle class Socio Economic Status students in experimental group i.e. Constructivist group (83.70, SD=7.97) and Control group i.e. Traditional group (51.00, SD=7.80) suggests that Low SES students in constructivist group gained significantly after treatment as compared to their colleagues in Traditional group, whose mean scores were slightly different from their means score at pre-test level (47.52, SD=9.39). At the **delayed post test** level there was significant difference in the mean scores and Standard Deviation of the Middle class Socio Economic Status students in experimental group i.e. Constructivist group (82.94, SD=8.86) and Control group i.e. Traditional group (44.53, SD=7.71) implying that Middle class Socio Economic Status students in Constructivist group retained the facts and information on selected Science Units taught more than their colleagues in Traditional group.

Figure 3.1 depicts the mean differences of experimental and Control groups at Pre test, Post test and Delayed post test level.

FIGURE – 3.1

MEAN SCORE ACADEMIC ACHIEVEMENT OF MIDDLE CLASS SOCIO ECONOMIC STATUS STUDENTS IN SCIENCE OF EXPERIMENTAL AND CONTROL GROUP



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COMPARISON ON ACADEMIC ACHIEVEMENT SCORES OF EXPERIMENTAL AND CONTROL GROUPS MIDDLE CLASS SES STUDENTS INDEPENDENT SAMPLES IN SCIENCE

The Experimental and control group middle class SES students were compared at the independent sample t test for equality of means at three levels of testing i.e. Pre test, Post test and delayed pos test w. r. t two methods of teaching as shown below in the table 4.

TABLE-4

SUMMARY TABLE FOR THE INDEPENDENT SAMPLES ON PRE TEST, POST TEST AND DELAYED POST TEST SCORES OF THE MIDDLE CLASS SOCIO ECONOMIC STATUS STUDENTS.

t-test for equality of means			
Tests	**t**	**df**	**Sig.(2-tailed)**
Pretest	**1.91**	**30**	**.066**
Posttest	**11.69**	**30**	**.000**
Delayed Posttest	**12.98**	**30**	**.000**

The t-test value for the pre test, post test and delayed post test is evident from the Table-4.16 with respect to the two methods of teaching i.e. Constructivist Approach and traditional Approach. At the pre test level, the exact probability level is .066 which is greater than p value (p>.05).This implies that there was no significant difference in the mean scores of students in Constructivist group (47.52, SD=9.39) and students in Traditional group (41.46, SD=8.42). At the post test level, the p value is .000 which is less than p value (p<.05).This implies that there was a significant difference in mean scores of the students exposed to Constructivist Approach (83.70, SD=7.97) and students in Traditional Approach (51.00, SD=7.80). At the Delayed post test level p value is also .000 which is less than the p value (p<.05).Hence, there was significant difference in the mean scores between the Constructivist Approach (82.94, SD=8.86) and Traditional Approach (44.53, SD=7.71). Hence, the Hypotheses. "There will be significant difference on the effectiveness of constructivist approach and conventional approach on the Academic Achievement of middle class SES students". is accepted.

III. FINDINGS ON ACADEMIC ACHIEVEMENT SCORES OF EXPERIMENTAL AND CONTROL GROUP LOWER CLASS SES STUDENTS AT DIFFERENT LEVELS OF TESTING IN SCIENCE.

The Academic Achievement scores of experimental and control groups lower class Socio Economic Status students were compared at different levels of testing i.e. Pre test, Post test and Delayed Post test in Science subject w.r.t. two methods of teaching as given in the table 5..

TABLE-5

MEAN, STANDARD DEVIATIONS OF THE SAMPLES PRE-TEST, POST-TEST AND DELAYED POST-TEST SCORES OF THE LOWER CLASS SOCIO ECONOMIC STATUS STUDENTS.

Test	Group	Method	N	Mean	SD	SEM
Pre test	Experimental	Constructivist Approach	11	31.72	13.48	4.06
	Control	Traditional Approach	12	40.33	12.82	3.70
Post test	Experimental	Constructivist Approach	11	63.63	14.63	4.41
	Control	Traditional Approach	12	52.66	11.82	3.41
Delayed post test	Experimental	Constructivist Approach	11	62.45	14.90	4.49
	Control	Traditional Approach	12	42.66	12.43	3.58

N=Number, SD=Standard Deviation, SEM-Std. Error of mean

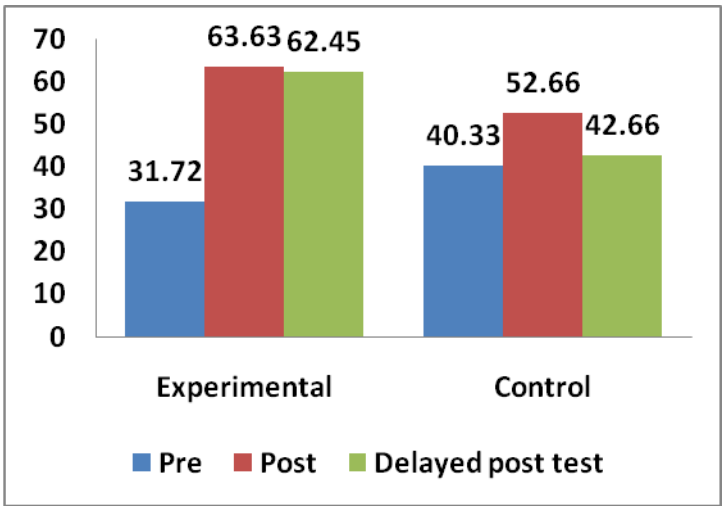
It may be observed from the Table-5 that at pre - test level there was no statistical significant differences in the mean scores and Standard deviation of the lower class Socio Economic Status students in experimental group i.e. Constructivist group (31.72, SD=13.48) and Control group i.e. Traditional group (40.33, SD=12.82) which suggests that lower class Socio Economic Status students had same entry level before the treatment. At the Post test level there was statistical significant difference in the mean and Standard deviation of lower class SES students in experimental group i.e. Constructivist group (63.63, SD=14.63) and Control group i.e. Traditional group (52.66,SD=11.82) suggests that lower class Socio Economic Status students in constructivist group gained significantly after treatment as compared to their colleagues in Traditional group, whose mean scores were slightly different from their mean scores at pre-test level (40.33,SD=12.82). At the delayed post test level there was significant difference in the mean scores and Standard Deviation of the lower class SES students in experimental group i.e. Constructivist group (62.45, SD=14.90) and Control group i.e. Traditional group (42.66, SD=12.43) implying that lower class Socio Economic Status

students in Constructivist group retained the facts and information on selected Science Units taught more than that of their colleagues in Traditional group.

Figure 5.1 depicts the mean differences of Experimental and Control groups at Pre test, Post test and Delayed Post test level.

FIGURE – 5.1

MEAN SCORE ACADEMIC ACHIEVEMENT OF LOWER CLASS SES STUDENTS IN SCIENCE OF EXPERIMENTAL AND CONTROL GROUP



COMPARISON ON ACADEMIC ACHIEVEMENT SCORES OF EXPERIMENTAL AND CONTROL GROUPS LOWER CLASS SES STUDENTS INDEPENDENT SAMPLES IN SCIENCE

The Experimental and control groups lower class Socio Economic Status students were compared at the independent sample t test for equality of means at three levels of testing i.e. Pre test, Post test and Delayed Post test w. r. t two methods of teaching as shown below in the table 6

TABLE-6

SUMMARY TABLE FOR THE INDEPENDENT SAMPLES ON PRE TEST, POST TEST AND DELAYED POST TEST SCORES OF LOWER CLASS SOCIO ECONOMIC STATUS STUDENTS.

t-test for equality of means			
Tests	**t**	**df**	**Sig.(2-tailed)**
Pretest	**-1.56**	**21**	**.132**
Posttest	**1.98**	**21**	**.060**
Delayed Posttest	**3.46**	**21**	**.002**

The t-test values for the Pre test, Post test and delayed Post test can be seen from the Table-6 with respect to the two methods of teaching i.e. Constructivist Approach and traditional Approach. At the Pre test level, the exact probability level is .132 which is greater than p value (p>.05).This implies that there was no significant difference in the mean scores of students in Constructivist group (31.72, SD=13.48) and students in Traditional group (40.33, SD=12.82) At the Post test level, the p value is .060 which is greater than p value (p>.05).This implies that there was no significant difference in mean scores of the students lower class Socio Economic Status exposed to Constructivist Approach method (63.63, SD=14.63) and students in Traditional Approach (52.66, SD=11.82). At the Delayed Post test level p value is also .002 which is less than the p value (p<.05).Hence, there was significant difference in the mean scores between the Constructivist Approach (62.45, SD=14.90) and Traditional Approach (42.66, SD=12.43). Hence, the Hypotheses "There will be significant difference on the effectiveness of constructivist approach and conventional approach on the Academic Achievement of lower class SES students" is retained.

CONCLUSIONS /FINDINGS

(i) There was no a significant difference between the mean Academic Achievement scores of the Upper class Socio economic status students of experimental and control group at Pre test level. However there was a significant difference Post test level at delayed post test level.(ii) There was no a significant difference between the mean Academic Achievement scores of the Middle class Socio economic status students of experimental and control group at pre test level. However there was a significant difference Post test level at delayed post test level. (iii) There was a significant difference between the mean Academic Achievement scores of the Lower class Socio economic status students of experimental and control group at Pretest level. However there was a significant difference Post test level at delayed post test level.

EDUCATIONAL IMPLICATIONS

(i) The results of the present study are indicative of the fact that instructional treatment has an impact on the learning outcomes of the students .The Students who were taught science by using constructivist approach attained better scores than the students who were taught with Conventional or traditional approach. Constructivist approach is more effective than the Conventional methods of teaching science to enhance the Academic Achievement in science.

(ii) The findings of the present study highlight the shift from teacher centered to learner centered classroom wherein the students are given full freedom to explore and discover the things on their own. The present study will be very useful to the teacher to creating the innovative classrooms situations wherein the students are meaning maker which is the ultimate aim of the learning. The role of teacher is just as guide and facilitator. (iii) The results of the this study, it is suggested that the teachers should provide suitable learning situations wherein the students get firsthand experience of handling the equipments, making the use of senses, explore and experiment and lastly, infer the results.

SUGGESTIONS FOR FURTHER RESEARCH

In the light of the results and findings of the study following suggestions are brought forth:-

(i) As the results of the Constructivist approach are more encouraging when compared with traditional teaching methods, Constructivist Approach and its different techniques should be included in the curriculum at all the level of education.(ii) Constructivist Approach should be used in Science teaching and learning at the level of Elementary school, High school and College level. (iii) The present study was conducted only a ten units of science syllabus prescribed by HPBSE. More studies may be conducted on larger portions of the total curriculum, in order to cross-validate the present findings. (iv) The Conferences, Seminars, Debates on Constructivism or Constructivist Teaching and learning should be introduced to the teachers at all the levels of education. (v) Similar studies should also be conducted on other subjects.

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