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The effect of constructivist 7-E model in teaching geography at secondary school level

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Abstract
Learning is an interaction between the learner and the learning experience. In this learner-centered learning, students engage in an active role in their learning. Constructivism is the model which emphasizes the fact that learners construct or build their own understanding. For this purpose, there are several Constructivist models were formulated. One of the important Constructivist models 7-E Learning model. In this study an attempt has been made to understand the effectiveness of Constructivist 7-E Learning model of teaching in the class room learning. The Experimental method of research was adopted for the present study. The Statistical technique of uncorrelated mean of two tailed test were used. The Major finding of the study is that the Constructivist 7-E model is more effective than the traditional method of teaching Geography at Secondary School level.

Keywords: Constructivism, 7-E model, geography

Introduction
Education is one of the potent instruments to cope with the greatest challenges of the century and it is the teacher's noble mission to reveal the intellectual and creative potential of every pupil as for as possible and to make every one competent to meet the present day problem. The improvement in the quality of education largely depends on the quality of instruction imparted in the classroom. The quality of education has to be enhanced for fostering all round development of the individual. To achieve the educational objective in the class room teaching process the constructivist teaching-learning process is more significant. The basic idea of constructive is that the learner must construct knowledge; the teacher cannot supply it (Bringuier, 1980). The Constructivist paradigm is advocated by Jean Piaget (1981) and Burner (1990), stress that whatever gets in to the mind has to be constructed by the individual through knowledge discovery.
According to constructivist approach, learning is an instruction between the learner and the learning environment. During this interaction, prior knowledge is used as a basic to interpret and construct new understanding. In a Constructivist setting, the students have autonomy for their own learning, opportunities for peer collaboration and support, occasion for learner – generated problems that derive the curriculum, time for self-observations and evaluation and outlets for reflections. One of the important model for Constructivist learning is 7-E Learning model. The Constructivist classroom for studying Geography at Secondary school level presents the learner to train and develop good citizens who are able to solve various social, economic and political problems of the country.

Theoretical Overview
Formalization of the theory of Constructivism is generally attributed to Jean Piaget, who articulated mechanisms by which knowledge is internalized by learners. This theory describes how learning happens, regardless of whether learners are using their experiences to understand a lecture of following instructions. Constructivism implies that real learning occurs when student investigate a concept, find information, discuss it and create something with it. It is an approach in which the learner is building an internal illustration of knowledge, a personal interpretation of experience. It is active, constructive, cumulative, goal directed, diagnostic and reflective (Simons, 1993). The theory of Constructivism states that learning is nonlinear, recursive, continuous, complex and relational. It focuses on the learner and each learner's perceptions and motivation.

Learning Cycle

The learning cycle is a methodology that provides students with experiences in generating both declarative and procedural knowledge and is grounded in Piaget's theory of Cognitive development (Lawson, 1988). The learning cycle rests on constructivism as its theoretical foundation. Atkins and Karpius developed a three-stage model. The Biological Science Curriculum Study programme uses a five step learning cycle called 5-E model. The modified version of 5-E model is 7-E learning cycle.

7-E Learning Model

7-E learning cycle is a template for planning and getting the most out of the enquiry activities. The phases in the 7-E learning are Elicit, Engage, Explore, Explain, Elaborate, Evaluate and Extend. The purpose of the first phase, elicit, is to assess student's knowledge of the content. The engage phase is intended to motive students and to capture their interest in the topic. The third phase is exploration phase where teacher provides students with opportunities for experience to construct their own understanding of the concept. The purpose of the explain phase is to allow opportunities for students to verbalizing the concept. The fifth phase is elaboration phase where the students can apply the content to other situations. The sixth phase is evaluation phase. The purpose of this phase is to assess student's understanding of the content. The last phase is extend phase. This phase challenges student understands to apply what they have learned.

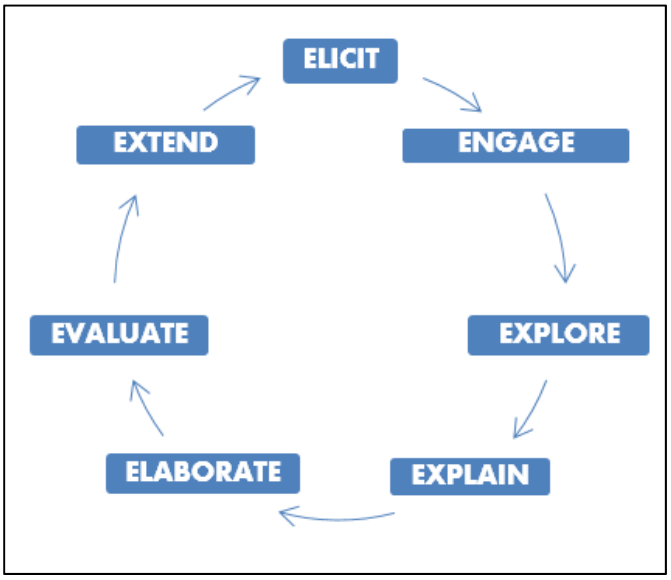

Fig 1: Diagrammatical Representation of 7-E Learning Cycle

Variables in the Study

Variables selected for the study are the following:

- Independent variables
- Constructivist method of Teaching
- Traditional Method of Teaching
- Dependent Variable
- Achievement in Geography

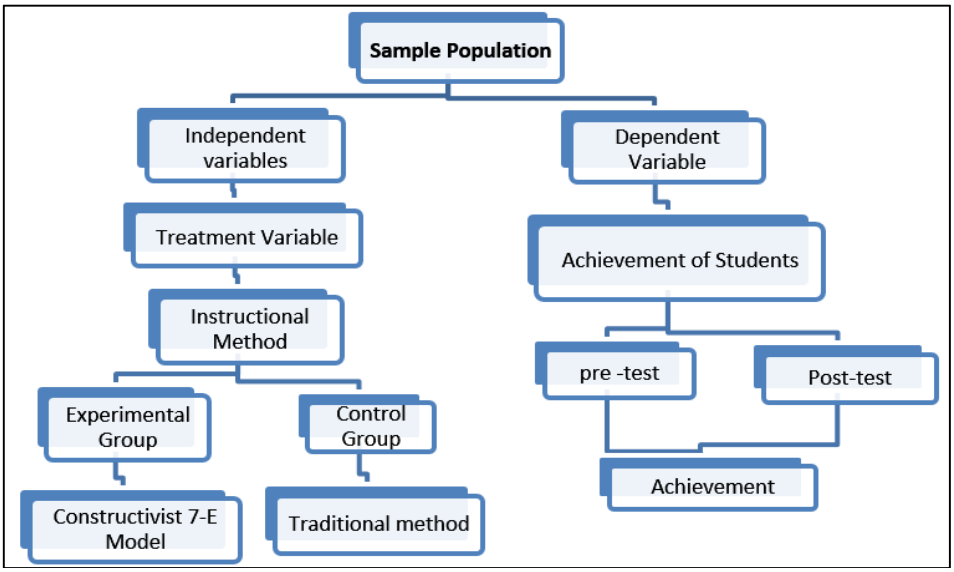

Fig 2: Schemata of the Variable for the Study

Objectives of the Study

Objectives of the study were as follows:

1. To prepare and validate lesson transcripts based on Constructivist 7-E Learning model
2. To compare the effectiveness of teaching through the Constructivist model and Traditional Method
3. To find whether there is significant difference in the means of scores of pre-test and post-test in Geography

Hypothesis of the Study

1. There is a significant difference between the means of scores on achievement test in Geography taught by Constructivist 7-E Learning model and Traditional Method among the students of experimental and control group
2. There is a significant difference between the means of scores of pre-test and post-test of experimental group in Geography

Methodology in Brief

The Experimental method of research was adopted for the present study. The design selected for the study was pre-test and post-test nonequivalent two group design. The methodology of the present study was described under the following heads: Tools, Sample and Statistical Technique.

➢ **Tools to be used**

- Lesson Transcript based on Constructivist 7-E Learning Model of teaching and Traditional method of teaching
- Pre-test and posttest in Geography
- Socio-Economic Status Scale

➢ **Sample of the Study**

The present study was conducted on two divisions of standard IX at A.K.J.M School, Kanjirappally. One group was selected as experimental group and the other as control group.

➢ **Statistical Technique**

- Descriptive Statistics: Mean and Standard Deviation were computed for bringing out various characteristics of the data and for summarizing and interpreting the salient features of data. Correlation coefficient is used for finding the relationship between scores on test.
- Inferential Statistics: the two tailed test was employed to test the significant difference between the cores of the two groups.

Analysis of Data

Analysis of Data with respect to Achievement in Geography

Scores obtained by administering the posttest were subjected to a test of significance of difference between correlated means of groups matched for mean and Standard Deviation using two tailed test. The investigator equated the two groups with regard to the pre-test scores and the Socio-Economic Status Score (SES). The result of the analysis and interpretation has been presented under the following heading:

Comparison of the effectiveness of teaching through the Constructivist 7-E Learning Model and the Traditional Method

In the present study, one group was taught through using Constructivist 7-E Learning Model of teaching and the other using Traditional Method. The scores obtained by administering an achievement test immediately after the experiment were subjected to test of significance of difference between correlated means of groups which was matched for mean and standard deviation using a two tailed test. The levels of significance were fixed at 0.01 and 0.05 levels.

For the comparison of the Constructivist 7-E Learning Model and the Traditional Method investigator formulated the following null hypothesis. Correlation between matching variables SES and post test scores as a whole was found to be r = .048.

H0: there is no significant difference between the means of scores of achievement test in Geography taught by Constructivist 7-E Learning Model and the Traditional Method among the students of experimental and control group.

The data and result of test of significance are given in the table below

Groups	No. of Students	Mean	S.D	rxy	C.R	Level of significance
Experimental	30	34.13	5.55	.048	7.192	Significant at 0.01 level
Control	30	24.96	4.246			

From the above table, it is observed that the critical ratio of 7.192 is significant at 0.01 levels. Therefore it can be interpreted that there is significant difference between the means of scores of achievement test in Geography taught by Constructivist 7-E Learning Model and the Traditional Method.

Hence the critical ratio 7.192 is greater than theoretical value 2.58. The null hypothesis titled there is no significant difference between the means of score of achievement test in Geography taught by Constructivist 7-E Learning Model and the Traditional Method is rejected.

In the light of the above result it can be concluded that there is significant difference in the means scores of post test in Geography among experimental and control groups. It is observed that the mean of scores at post level of the experimental group was higher than the mean of scores of the students of the control group. It indicates that the higher men of the experimental group are because of the treatment given using Constructivist 7-E Learning model.

Comparison of the Pre-test and post test scores in Geography

The scores obtained by administering an achievement test immediately after experiment were subjected to test of significant of difference between correlated means. Correlation between initial and final test scores were found to be r = .55. The level of significant is fixed at 0.01 and 0.05 levels. For the comparison of the pre test and post test scores in Geography investigator formulated the following null hypothesis.

H0: There is no significant difference between the means of scores of pre test and post test scores of experimental group in Geography.

The data and results of test of significance are given in the table below

Groups	No. of Students	Mean	S.D	rxy	C.R	Level of significance
Post-test	30	34.13	6.754			Significant at
Pre-test	30	17.43	3.623	.55	10.93	0.01 level

From the table it is observed that the critical ratio 10.93 is significant at 0.01 and 0.05 level. Therefore it can be interpreted that there is significant difference between the means of scores of pretest and post test scores in Geography among the experimental and control group.

Hence the critical ratio 10.93 is greater than the theoretical value 2.58 the null hypothesis titled there is no significant difference between the means of scores of pre test and post test of experimental group in Geography is not accepted.

In the light of the above result it can be concluded that there is significant differences in the mean scores of pre test and post test of experimental group in Geography.

Tenability of Hypothesis

1. The first hypothesis is that there is a significant difference between the means of scores on achievement test in Geography taught by Constructivist 7-E Learning model and Traditional Method among the students of experimental and control group. This hypothesis is fully substantiated as the obtained‘t’ value (7.19) is significant at 0.05 level. Therefore the null hypothesis titled “there is no significant difference between the means of scores on achievement test in Geography taught by Constructivist 7-E Learning model and Traditional Method” is not accepted.
2. The second hypothesis is that there is a significant difference between the means of scores of pre-test and post-test of experimental group in Geography. This hypothesis is fully substantiated as the obtained “t” value (10.93) is significant at 0.01 level. Therefore the null hypothesis titled “there is no significant difference between the means of scores of pre-test and post-test in Geography” is not accepted.

Major Findings of the Study

Major findings of the study are given below:

1. The analysis of post test scores using the technique of test of significance of difference between groups matched for mean and standard deviation revealed that the ‘t’ value obtained(t = 7.192) is significant at 0.05 level. The mean scores of experimental group (M_1 = 34.13) and control group (M_2 = 24.96) helped the researcher to state that the experimental group is in an advantageous position with respect to achievement in Geography as a whole.
2. The analysis of the pre-test and post-test scores of experimental group using the technique of test of significance of difference between means revealed that the ‘t’ value obtained (t = 10.93) is significant at 0.01 level. The mean scores of post test (M_1 = 34.13) and pre test (M_2 = 17.43) helped the researcher to state that post test score is higher than the pre test scores in Geography.

Conclusion

The major findings of the study reveal that Constructivist Method of teaching is more effective than Traditional method of teaching. This method developed a reciprocal relationship between teaching and learning and also resulted in an intrinsic self-development, competence, collective and individual development of students through collaboration. Suggestion for the improvement of the classroom learning is that it provides an opportunity to implement the Constructivist Method of teaching in classroom instruction.

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