



Effect of Constructivist Approach on Achievement in English in Relation to Cognitive Styles Among Secondary School Students

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ABSTRACT

The present study investigates the effect of constructivist approach on achievement in English in relation to cognitive styles among secondary school students. The study consisted of 100 students of 9th class randomly drawn from the schools of Amritsar district. Data was collected with the help of self made achievement test, Standard Progressive Matrices (SPM) (Raven, Raven & Court, 1958) and Cognitive Style Inventory (CSI) (Jha, 2001). The data obtained was analyzed statistically with the help of Mean, SD, t-ratio and ANOVA to arrive at the following conclusions: (i) The achievement of group taught through constructivism strategy was higher than that of the group taught through conventional method. (ii) There exists significant difference in achievement of secondary school students with different cognitive styles. (iii) There exists a significant interaction effect of teaching strategies and cognitive styles on achievement in English. Teaching strategy is not a one sided process.

KEYWORDS

constructivist approach, cognitive styles, achievement, secondary school students.

Education is the control agency in shaping the future of the individual and nation. It is the centre of the knowledge based society where human being is the creator, preserver and destroyer. Education is a motive force due to which a man pursues knowledge relentlessly whatever may be his field and teachers are the main source of motivation. The aim of the conventional method of teaching is to expose all students to an identical knowledge, and to develop same interest. In the eyes of a reformer, traditional teacher-centered methods focus on rote learning and memorization, on the other hand, the constructivist perspective focuses on how learners construct their own understanding.

Constructivism

Constructivism is basically a theory, based on observation and scientific study about how people learn. It says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences (Bereiter, 1994). In the most general sense, it usually means encouraging students to use active techniques (experiments, real-world problem solving) to create more knowledge and then to reflect on and talk about what they are doing and how their understanding is changing. The teacher makes sure he/she understands the students' preexisting conceptions, and guides the activity to address them and then build on them (Oliver, 2000).

According to Bruning, "The term constructivism more often emphasizes the learning contribution to meaning and learning through both individual and social activity".

According to Naylor and Keogh, "Constructivism represents an approach embedded with the central principle that learner can only make sense of new situations in terms of their existing understanding".

Mechanisms in Constructivism

According to Jean Piaget (1980), the three mechanisms used in constructivism are:

- i. *Assimilation* - fitting a new experience into an existing mental structure (schema).

- ii. *Accommodation* - revising an existing schema because of new experience.
- iii. *Equilibrium* - seeking cognitive stability through assimilation and accommodation.

Activities encouraged in constructivist classrooms are:

Research projects: Students research a topic and can present their findings to the class.

Field trips: This allows students to put the concepts and ideas discussed in class in a real-world context. Field trips would often be followed by class discussions.

Films: These provide visual context and thus bring another sense into the learning experience.

Class discussions: This technique is used in all of the methods described above. It is one of the most important distinctions of constructivist teaching methods.

Experimentation: students individually perform an experiment and then come together as a class to discuss the results (Constructivist teaching methods, 2016).

Cognitive Styles

Cognitive style constitutes another dimension of the information processing variable. Cognitive style is a hypothetical construct that has been developed to explain the process of mediation between stimuli and responses. The term cognitive style refers to the characteristics or ways in which individuals conceptualize the environment" (Goldstein & Blackman, 1978). The term cognitive style and learning style are generally used without much distinction. The construct of cognitive styles was originally proposed by thinking and problem solving.

Coop and Sigel (1971) equated cognitive style with modes of behavior rather than mediating processes. They used the term cognitive style to denote consistencies in individual modes of functioning in a variety of behavioral situations.

Riding and Rayner (1998) defined the cognitive style as comprising fixed characteristics relating to methods of information processing and organization.

Dimensions of Cognitive Style as given in the Manual for Cognitive Style Inventory by Jha (2001):

There are following five cognitive styles:

i. Systematic Style: An individual who typically operates with a systematic style uses a well defined step-by-step approach when solving a problem; looks for an overall method or pragmatic approach; and makes an overall plan for solving the problem.

ii. Intuitive Style: The individual, whose style is intuitive, uses an unpredictable ordering of analytical steps when solving a problem relies on experience patterns characterized unverb-alised areas or hunches and explores and abandon alternatives quickly.

iii. Integrated Style: A person with an integrated style is able to change styles quickly and easily. The result of this “rapid fire” ability is that it appears to generate energy and a proac-tive approach to problem-solving.

iv. Undifferentiated Style: A person with such a style ap-pears not be distinguish or differentiate between the two style extremes; i.e. systematic and intuitive, and therefore; appears not to display a style. Undifferentiated individual tend to be withdrawn, passive and reflective and often look to others for problem-solving strategies.

v. Split-Style: An individual with split style shows fairly equal degrees of systematic and intuitive specialization. They re-spond to problem-solving by selecting the most appropriate style.

Significance of the Study

In this age of technology, there is a paradigm shift in our schools from traditional methods of teaching to the innovative techniques of teaching. As English is a foreign language, therefore, new meth-ods are required to teach English effectively in the class. Constructivism has the potential to cope up with the needs of individualized learning, co-operative learning and constructive approaches. In the classroom, Constructivism offers more flexibility in presentation and better management of instructional techniques. The future of man is stubbornly linked to English advances and the development of productive activities.

Thus, the study is being done as the investigators feel that the schools should develop a vision of how use of new techniques and technology can improve teaching learning process and make the pupils more informative and develop the various skills and abili-ties. To face the challenges of present and future, to compete with nations in the information age, every nation will have to enhance the quality of its educational system and use new approaches and teaching strategies.

Objectives:

1. To develop lesson plans based on constructivist based teaching strategy.
2. To develop lesson plans based on conventional method of teaching for selected topics of English.
3. To develop achievement test for selected topics of English.
4. To compare achievement in English of group taught through constructivist strategy and conventional method of teaching.
5. To compare the achievement in English of students with different cognitive styles.
6. To examine the interaction effect of teaching strategies and cognitive style on achievement in English.

Hypotheses:

1. The achievement of group taught through constructivist teaching strategy is significantly higher than that of the group taught through conventional method in English.
2. There exists no significant difference in the achievement of secondary school stu-dents in English with different cognitive styles.
3. There exists no significant interaction effect of teaching strategies and cognitive styles on achievement of secondary school students in English.

Sample

Sample of 100 students studying in 9th grade of different schools of Amritsar city affiliated to C.B.S.E were selected randomly for the purpose of study.

Equating the groups

Raven’s Standard Progressive Matrices was administered on 200 students to assess the low, average and high intelligence of the students. 100 students from average group were taken and divid-ed into two equal groups of 50 students each.

Table 1: Showing distribution of the sample

Sr. No.	Name of the School	Experimen-tal Group	Control Group	Total
1.	D.A.V Public School, Amritsar	25	25	50
2.	Khalsa International Pub-lic School, Amritsar	25	25	50

Design of the Study

The present study falls under the domain of experiment re-search as it studies the effect of constructivism instructional strategy on achievement of secondary school students in Eng-lish. A pre-test and post-test factorial design will be employed. The experimental group will be taught through constructivist strategy, whereas, control group will be taught same topics with conventional teaching strategy by the investigator.

Tools Used

1. Self made Achievement Test in English subject for class IX
2. Standard Progressive Matrices (SPM) (Raven, Raven & Court, 1958)
3. Cognitive style Inventory (CSI) (Jha, 2001)

Procedure

Firstly, Standard Progressive Matrices was administered for matching the intelligence of two groups. *Secondly*, Cognitive Style Inventory was administered for the classification of the students. *Thirdly*, achievement test as pre-test was adminis-tered to the students to experimental and control group. Stu-dents were given 45 minutes to complete the test. The an-swer sheets were scored to obtain the information regarding the previous knowledge of the students. *Fourthly*, treatment was given to the experimental group. The experimental group was taught through constructivist based teaching strategy. Lessons based on constructivist strategy in English on select-ed topics were delivered. The control group was taught same topics in conventional way. *Fifthly*, after the completion of all the lessons, same achievement test was administered as post-test to both experimental group and control group for same time limit. The answer sheets were scored with the help of scoring key. Experimental and control group scores were com-pared according to their pre-test and post-test scores. The dif-ference was called gain achievement scores.

Analysis, Interpretation and Discussion of the Result

The statistical techniques such as mean, standard deviation, t-test and ANOVA were used in the study. The results are giv-en in the following tables 2, 3, and 4.

Table 2: Showing Mean, S.D and t-value of constructivist teaching group and conventional group.

Group	N	Mean	S.D	t-value	Signif-icance level
Control group	50	2.98	1.95	6.60**	0.01
Experi-mental group	50	5.44	1.73		

** Significant at 0.01 level

Table 2 shows that the mean score and S.D of control group of secondary school students is 2.98 and 1.95 respectively and the mean score and S.D of experimental group of secondary school students is 5.44 and 1.73 respectively. The t-value testing the significance of mean difference between achievement of sec-ondary school students of control group (conventional strategy group) and experimental group (constructivism strategy group) came out to be 6.60, which is greater than the table values 1.96 and 2.58 at both 0.01 and 0.05 level of significance.

Therefore the hypotheses I stating, "The achievement of group taught through constructivism strategy is significantly higher than that of group taught through conventional method" is not rejected. Hence it can be concluded that the achievement of group taught through constructivism teaching strategy is significantly higher than that of group taught through conventional method.

Table 3: Showing t-values of different Cognitive style pairs

Cognitive Styles	Systematic	Intuitive	Integrated	Undifferentiated	Split
Systematic		1.174	1.951	8.52**	2.29*
Intuitive	1.17		0.007	4.02**	2.39*
Integrated	1.95	0.007		6.74**	4.17**
Undifferentiated	8.52**	4.02**	6.74**		11.56**
Split	2.29*	2.39*	4.17**	11.56**	

*Significant at .05 level
level

** Significant at .01 level

Table 3 shows t-values of different cognitive styles (Systematic, Intuitive, Integrate, Undifferentiated, Split) pair wise. The t-value of the systematic and undifferentiated style pair is 8.52 which is greater than table values 1.96 and 2.58 at 0.05 and 0.01 level of significance. Clearly, the t-value is significant, which infers that there is a significant difference in the mean gain scores of systematic and undifferentiated style pair.

The t-value of the systematic and split style pair is 2.29 which is greater than table value 1.96 at 0.05 level of significance. Clearly, the t-value is significant, which infers that there is a significant difference in the mean gain scores of systematic and split style pair.

The t-value of the intuitive and undifferentiated style pair is 4.02 which is greater than table values 1.96 and 2.58 at 0.05 and 0.01 level of significance. Clearly, the t-value is significant, which infers that there is a significant difference in the mean gain scores of intuitive and undifferentiated style pair.

The t-value of the integrated and undifferentiated style pair is 6.74 which is greater than table values 1.96 and 2.58 at 0.05 and 0.01 level of significance. Clearly, the t-value is significant, which infers that there is a significant difference in the mean gain scores of integrated and undifferentiated style pair.

The t-value of the split and undifferentiated style pair is 11.56 which is greater than table values 1.96 and 2.58 at 0.05 and 0.01 level of significance. Clearly, the t-value is significant, which infers that there is a significant difference in the mean gain scores of split and undifferentiated style pair.

The t-value of the intuitive and split style pair is 2.39 which is greater than table values 1.96 at 0.01 level of significance. Hence, the t-value is significant, which infers that there is a significant difference in the mean gain scores of intuitive and split style pair.

The t-value of the integrated and split style pair is 4.17 which is greater than table values 1.96 and 2.58 at 0.05 and 0.01 level of significance. Hence, the t-value is significant, which infers that there is a significant difference in the mean gain scores of integrated and split style pair.

Therefore the hypotheses II stating, "There exists no significant difference in the achievement of secondary school students in English with different cognitive styles." is partially rejected. The results reveal that achievement of secondary school students differ with respect to their cognitive styles in above mentioned seven cognitive style pairs.

Further table 3 shows that no significant difference exists in

achievement of Systematic and Intuitive pair, Systematic and Integrated pair and Intuitive and Integrated pair. The results reveal that achievement of secondary school students do not differ with respect to their cognitive style in the above mentioned three pairs.

Table 4: Shows ANOVA summary table depicting F-value of interaction effect of teaching strategies and cognitive styles

Source	Sum of Squares	d.f	Mean Square	F-Value
Teaching strategies(A)	102.59	1	102.59	105.63
Cognitive styles(B)	207.42	4	51.85	53.39
A X B	68.51	4	17.13	17.64*
Error Total	67.41 2257.00	90	.97	

*Significant at .05 level

Table 4 shows the ANOVA summary table depicting F-value of interaction effect of teaching strategies and cognitive styles on achievement of secondary school students in English. The calculated F-value is 17.64, which is greater than the table value 7.71 with d.f (1,4) at 0.05 level of significance and less than the table value 21.20 with d.f (1,4) at .01 level of significance. Therefore the hypotheses III "There exists no significant interaction effect of teaching strategies and cognitive styles on achievement in English" is rejected at .05 level of significance.

The results reveal that there is significant interaction effect of teaching strategies and cognitive styles on achievement in English.

Findings of the Study

The notable findings of the study are given below:

1. The achievement of group taught through constructivism strategy was higher than that of the group taught through conventional method. Since it is learner – centered approach, so it is more dynamic and helpful for students of 21st century.
2. There is significant difference in achievement of secondary school students with different cognitive styles. Since every individual has his own way to conceptualize and organize the knowledge imparted in a given environment, therefore difference in achievement of students with different cognitive styles is sought.
3. There exists a significant interaction effect of teaching strategies and cognitive styles on achievement in English. Teaching strategy is not a one sided process. It involves both the teacher and the learner. The difference in teaching strategies and the individual differences among the students in terms of cognitive styles affect the achievement of students.

Conclusion

In this age of technology, there is a paradigm shift in our schools from traditional methods of teaching to the innovative techniques of teaching to cater to the needs of individuals according to the differences that exist in them and lead them towards harmonious development. Therefore, co-operative learning and constructive approaches are being used instead of conventional methods to make the teaching learning process more interesting and effective. Since every individual has own way to conceptualize and organize the knowledge imparted in a given environment, their achievement in a particular subject differs accordingly. The role of teacher as well as learner is crucial in such an environment. Concluding, it can be said that the difference in teaching strategies and the individual differences among the students in terms of cognitive styles effects the achievement of students in English.

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