EFFECT OF ADVANCE ORGANISER MODEL AND CONCEPT ATTAINMENT MODEL ON ACHIEVEMENT IN PUNJABI IN RELATION TO STYLES OF LEARNING AND INTELLIGENCE

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ABSTRACT

The present study investigated the effect of advance organiser model and concept attainment modelon achievement on achievement in Punjabi in relation to Styles of Learning and Intelligence. The sample was taken from 9th grade students from four different schools of Abohar, affiliated to PSEB. Instructional material based on both models was prepared and implemented. Style of Learning and Thinking (SOLAT) by Venkataraman (1994) was administered to identify the styles of the students as left hemispheric and right hemispheric. Standard Progressive Matrices (SPM) by Raven, Raven & Court (2000) was administered to measure the intelligence levels of the student. Pre-test was conducted to determine the previous knowledge of the students. After giving the treatment post- test for all the students was conducted and achievement of students was assessed by calculating the difference between post-test and pre-test scores. A 2×2×3 analysis of variance was used to arrive at the following conclusions: (i) advance organiser model group was found to attain significantly higher achievement scores as compared to concept attainment model of teachinggroup, (ii) Achievement of students with left hemispheric preference was found significantly higher than that of right hemispheric group, (iii) Achievement of students having different levels of intelligence differed significantly, (iv) No significant interaction effect was found to exist among the three variables.

INTRODUCTION

Models of Teaching have an important place in language teaching. Joyce and Weil(1972) developed more than 20 models for achieving specific instructional goals and classified them into 4 families.Advance organiser model, formulated by Ausubel (1963), has also become one of the most researched in the information-processing family. It is designed to provide students with a cognitive structure for comprehending material presented through lectures,readings, and other media. Where in concept attainment, students figure out the attributes of a group or category that has already been formed by the teacher. To do so, students compare and contrast examples and non-examples.

OBJECTIVES

1. To compare the achievementof groups taught through advance organiser model and concept attainment model of teaching.
2. To study the achievement of students having different styles of learning and thinking.
3. To study the achievement of students having different levels of intelligence.
4. To examine the interaction effect between models' approach of teachingand styles of learning.
5. To examine the interaction effect between models' approach of teachingand intelligence.
6. To examine the interaction effect between styles of learning and intelligence.
7. To examine the interaction effect between models' approach of teaching, styles of learning and intelligence.

HYPOTHESES

H1 There exists no significant difference in means of achievementin Punjabi grammarbetween groups taught through

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advance organiser model andconcept attainment model.

H2 There exists no significant difference in means of achievementin Punjabi grammar scores of groups having different styles of learning and thinking.

H3 The achievementof groups having different intelligence levels will be significantly different from one another in Punjabigrammar.

H4 There exists no significant interaction effect of models of teaching and styles of learning and thinking.

H5 There exists no significant interactioneffect of models of teaching and intelligence.

H6 There exists no significant interaction effect of styles of learning and thinkingand intelligence.

H7 There exists no significant interaction effect amongmodels' approach of teaching, styles of learning and thinkingand intelligence.

METHODOLOGY OF THE STUDY

Various steps of research followed in the present study are as follows:

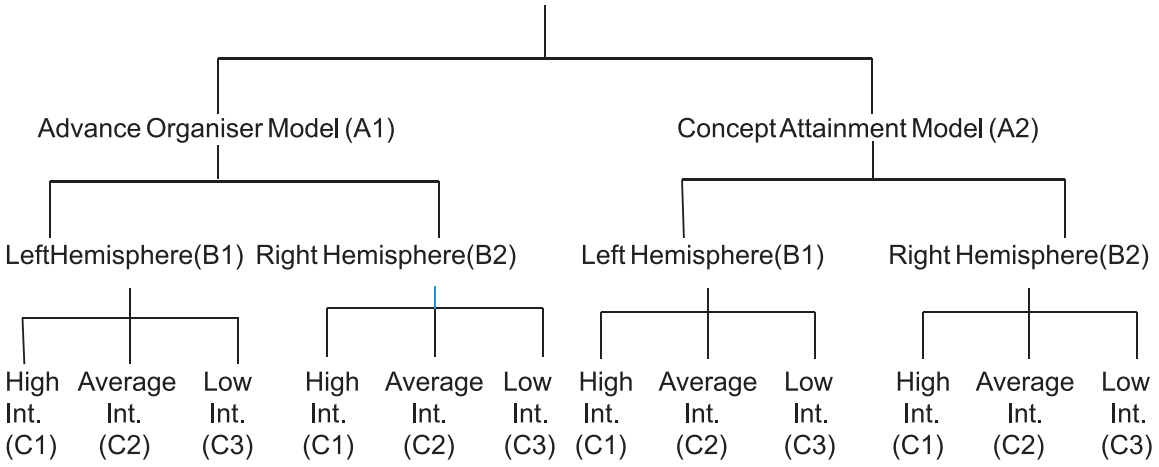
SAMPLE

The study was conducted on a randomly selected sample of240 students of 9th class, taken from four Government Schools of Abohartown ofPunjab. The schoolswere purposefully selected as there are only four government schools in Abohar.

DESIGN

For the purpose of the present investigation a pre-test and post-test factorial design was employed. In order to analyse the data a 2×2×3 analysis of variance was used for the three independent variables viz. instructional treatment, styles of learning and thinking and intelligence levels. The variable of teaching model was studied at two levels, namely advance organiser model and concept attainment model. The variable of styles of learning and thinking was studied at two levels, viz. left hemispheric preference and right hemispheric preference only. The main dependent variable was achievement gain which was calculated as the difference in post- test and pre-test scores for the subject. The schematic layout of factorial design is given in Figure 1.

Figure1: Schematic layout 2×2×3 factorial design Performance Gain



TOOLS USED

The following tools were used for data collection:

1. Style of Learning and Thinking (SOLAT) by Venkataraman (1994) to identify the styles of learning and thinking of the students.
2. Standard Progressive Matrices (SPM) 1988 by Ravens, to measure the intelligence of the students.
3. An Achievement Test on the segment of Punjabi grammar was developed by the investigator himself.
4. Instructional material was prepared on advance organiser model and concept attainment model of teaching by the investigator himself.

PROCEDURE

After the selection of the sample and allocation of students for the two instructional strategies, the experiment was conducted in four phases:

Firstly,the Styles of Learning and Thinking (SOLAT) test was administered in each school on the whole sample to categorize the students at two levels i.e. left and right hemispheric preference.

Secondly, Standard Progressive Matrices (SPM) 1988 by Ravens was administered on the subjects to measure the intelligence of the students. The grouping of intelligence levels was done to create the three levels i.e. high, average and low. Assuming the trait to be normal, the groups were made on the bases of percentage area under the norms for making three groups. As we know the three groups correspond to area under the normal curve 15.87 (High intelligence), 68.26 (Average intelligence) and 15.87 (Low intelligence) respectively. The percentage of cases was calculated for sub groups of sample in respect of number of cases in each group. For instance N=45 the number of cases for this group was calculated as 15.87×45/100=7.14 i.e. 07 for high intelligence, 31 for average intelligence and 07 for low intelligence.

Thirdly, Achievement Test on the segment of Punjabi grammar was administered as pre-test to the students of both the groups to obtained information regarding the previous knowledge of the students.

Fourthly, one group was taught by advance organiser model and second group was taught with concept attainment model. Five Punjabi grammar topics such as Prepositions, Conjunctions, Interjection, Punctuation and Orthography were taken from the syllabus of 9th class. These topics were taught to both groups in five periods each of 45 minutes duration.

Fifthly, after the completion of the course, the post- test was administered to the students. Time limit for the achievement test was 45 minutes. The collected data was scored with the help of scoring key and statistical treatment was given.

ANALYSIS AND INTERPRETATION OF THE RESULTS

Testing Ascertain Normality of the Sample

Before application of analysis of variance investigator employed Kolmogorov-Smirnov test to check the normality of the data. The results of the calculation has been summarised with reference to critical values (Ostle, B. 1966, App. 16, p. 560) in the Table 1.

Table 1: Results of Kolmogorov-Smirnov test on scores

Sr. no.	Sample	$\lvert C.po-C.pe \rvert_{max}$	Critical value	
			0 .05 level	0.01 level
1.	Whole Sample of Pre-Test	0.0741	0.0878	0.1052
2.	Post-Test Scores of Advance Organiser Model Group	0.0906	0.1242	0.1488
3.	Post-Test Scores of Concept Attainment ModelGroup	0.0723	0.1242	0.1488

Table Values: $C_{po}-C_{pe}|_{max.(0.05)}$ $|C_{po}-C_{pe}|_{max.(0.01)}$

$$=\frac{1.36}{\sqrt{N}}=\frac{1.36}{\sqrt{240}}=0.0878 \qquad =\frac{1.63}{\sqrt{N}}=\frac{1.63}{\sqrt{240}}=0.1052$$

$$=\frac{1.36}{\sqrt{N}}=\frac{1.36}{\sqrt{120}}=0.1242=\frac{1.63}{\sqrt{N}}=\frac{1.63}{\sqrt{120}}=0.1488$$

It observed from the Table 2 that none of the |C.po-C.pe |max calculated value exceeded the respective critical value. It indicates that normality is maintained and it makes the data eligible for application of analysis of variance.

ANALYSIS OF VARIANCE OF ACHIEVEMENT SCORES

The data was analysed to determine the nature of the distribution of scores by employing mean and standard deviation. The means and standard deviations of different sub groups have been presented in Table 2.

Table 2: Means and SDs of achievement scores for the different sub groups

Variable		Advance Organiser Model			Concept Attainment Model		
		N	M	SD	N	M	SD
Right Hemisphere	High Intelligence	7	28.86	3.76	7	25.29	5.53
	Average Intelligence	31	24.19	5.09	28	22.04	5.08
	Low Intelligence	7	22.86	3.13	7	20.86	3.98
Left Hemisphere	High Intelligenec	12	24.67	4.70	12	21.17	7.04
	Average Intelligence	51	22.24	5.29	54	19.78	4.58
	Low Intelligence	12	21.50	2.35	12	17.58	2.27
Total		120	23.33	5.01	120	20.61	5.06

Source: Field Study, 2014

It may be observed from the Table 3 that the mean scores of various groups differ. But the

significance of variation was to be proved statistically. To probe deeper analysis of variance was employed to the data. The sum of squares, degree of freedom, mean of sum of squares and the F-ratio have been presented in Table 3.

Table 3: Summary of analysis of variance of 2×2×3 factorial designs

Source of variance	df	Sum of squares	Mean square variance	F-ratio
Models (A)	1	25.8234	25.8234	13.1563**
Styles of Learning and Thinking (B)	1	24.5293	24.5293	12.4970**
Intelligence (C)	2	38.5360	19.2680	9.8165**
A×B	1	0.3834	0.3834	0.1953
A×C	2	0.7549	0.3775	0.1923
B×C	2	2.5383	1.2691	0.6466
A×B×C	2	0.5587	0.2794	0.1423
SS within conditions	228	447.5217	1.9628	

**** Significant at the .01 level**
(Critical value 3.88 at 0.05 and 6.75 at 0.01 level, df 1/228)
(Critical value 3.04 at 0.05 and 4.70 at 0.01 level, df 2/228)

Model's Approach of Teaching (A)

It may be observed from the Table 3 that the F-ratio for difference in mean scores of Advance Organiser Model Groupand Concept Attainment Model Groupgroup is 13.1563, which in comparison to the table value is found to be significant at the 0.01 level of significance. It shows that the groups were different beyond the contribution of chance. Hence, the hypothesis H1 i.e. There exists no significant difference in means of achievement in Punjabi grammar between groups taught through advance organiser model and concept attainment model, is rejected.

Styles of Learning and Thinking (B)

It may be seen from the Table 3 that the F-ratio for difference of mean of the two groups on Styles of Learning and Thinking types is 12.4970, which in comparison to the table value is found to be significant at the 0.01 level of significance. It implies that two style's groups differ in respect of achievement scores. Hence, the hypothesis H2:There exists no significant difference in means of achievementin Punjabi grammar scores of groups having different styles of learning and thinking, is rejected. This is further confirmed through the mean of the left hemisphere group which is higher than that of right hemisphere group.

Intelligence (C)

It may be observed from the Table 3 that the F-ratio for difference in mean gain scores of intelligence levels is 9.8165, which is found to be significant at 0.01level of significance. It shows that the groups were different beyond doubt of operating chance factor. Hence, the hypothesis H3: The achievementof groups having different intelligence levels will be significantly different from one another in Punjabigrammar, is accepted.The result indicates that three intelligence levels differ significantly in respect of achievement scoresirrespective of models of teaching and styles of learning and thinking.

In order to probe deeper, the F-ratio was followed by t-test. The values of the t-ratio for the different combinations have been given in the following Table 4.

Table 4: t-ratio for different combinations of three intelligence levels

	High Intelligence M=24.45 N=38	Average Intelligence M=21.75 N=164	Low Intelligence M=20.39 N=38
High Intelligence M=24.45 N=38	------	2.55**	3.63**
Average Intelligence M=21.76 N=164	------	------	2.00**
Low Intelligence M=20.39 N=38	------	------	------

**** Significant at 0.01 level**

It may be observed from the Table 4 that the t-ratio for the difference in means of high intelligence and average intelligence groups is 2.55, which in comparison to the table value (t0.05=1.97; df =200, t0.01=2.60; df=200) is found to be significant at 0.01 level of significance. Hence, the hypothesis of significant difference is accepted in case of high intelligence and average intelligence. The result indicates that the achievement of high and average intelligence groups was significantly different when measured for gain scores.

It may be observed from the Table 4 that the t-ratio for the difference in gain means of high intelligence and low intelligence groups is 3.63, which in comparison to the table value (t0.05=1.996; df =74, t0.01=2.656; df=74), is found to be significant at 0.01 level of significance. Hence, the hypothesis of significant difference is accepted in case of high intelligence and low intelligence.

It is also clear from the Table 4 that the t-ratio for the difference in gain means of average intelligence and low intelligence groups is found 2.00, which in comparison to the table value (t0.05=1.97; df =200, t0.01=2.60; df=200 is found to be significant at 0.01 level of significance. Hence, the hypothesis of significant difference is accepted in case of average intelligence and low intelligence. The average intelligence groups performed significantly better than that of low intelligence groups on achievement test in respect of gain scores.

Interaction between Model of Teaching and Styles of Learning and Thinking (A×B)

It may be seen from the Table 3 that the F-ratio for interaction between model of teaching and styles of learning and thinking is 0.1953, which is found to benot significant even at 0.05 level of significance. It indicates that the variable of models of teaching did not interact with the styles of learning and thinking types to yield significant difference in respect of achievement scores. Hence, the null hypothesis H4: There exists no significant interaction effect of models of teaching and styles of learning and thinking, is accepted.

Interaction between Model of Teaching and Intelligence (A×C)

It may be observed fromthe Table 3 that the F-ratio for interaction between model of teaching and cognitive style is 0.1923, which is found to be not significant even at 0.05 level of significance. It indicates that the variable of models of teaching did not interact with the levels of intelligence to yield significant difference in respect of gain scores. Hence, the null hypothesis H5: There exists no significant interaction effect of models of teaching and intelligence, is accepted.

Interaction between Styles of Learning and Thinking and Intelligence Levels (B×C)

It may be seen from the Table 3 that the F-ratio for interaction between styles of learning and thinking and intelligence is 0.6466, which is found to be not significant even at 0.05 level of significance. Hence, the null hypothesis H6: There exists no significant interaction effect of styles of learning

and thinking and intelligence, is accepted. The result indicates that styles of learning and thinking did not interact with the intelligence levels to yield significant difference in achievement.

Interaction among Models of Teaching, Styles of Learning and Thinking and Intelligence Levels (A×B×C)

It may be observed from the Table 3 that the F-ratio for interaction among model of teaching, cognitive style and intelligence is 0.1423, which is found to be not significant even at 0.05 level of significance. It indicates that the models of teaching, styles of learning and thinking and intelligence levels do not interact significantly to one another in respect of achievement scores. Hence, the null hypothesis H7: There exists no significant interaction effect among models' approach of teaching, styles of learning and thinking and intelligence, is accepted.

FINDINGS OF THE STUDY

(i) The achievement of the group through advance organiser model was found to be significantly higher than that of the group taught through concept attainment model of teaching.

(ii) The achievement of left hemisphere group was significantly higher than that of right hemisphere groups.

(iii) The achievement of students based on high, average and low levels of intelligence differed significantly.

(iv) The achievement of high intelligence groups was significantly higher than that of the average and low intelligence groups and the achievement of average intelligence groups was significantly higher than that of the low intelligence groups.

(v) The interaction effect of models of teaching and styles of learning and thinking in respect of achievement scores was not significant.

(vi) The interaction effect of the models of teaching and intelligence levels on achievement scores was not significant.

(vii) The groups with different styles of learning and thinking did not interact significantly with high, average and low levels of intelligence on achievement scores.

(viii) The interaction effect among the models of teaching, styles of learning and thinking and levels of intelligence was not significant on achievement scores.

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