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Original Research Paper

Mathematics

EFFECTIVENESS OF COGNITIVE BASED TEACHING ON ACHIEVEMENT IN MATHEMATICS AMONG STUDENTS.

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ABSTRACT The research was undertaken to analyze" EFFECTIVENESS OF COGNITIVE BASED TEACHING ON ACHIEVEMENT IN MATHEMATICS AMONG STUDENTS. "The study was conducted on a sample of 60 students. The design selected was pre- test post-test non-equivalent group design. The constructivist instructional approach was used in the experimental group and the traditional approach was followed in the control group. An Achievement test was also prepared to test the effectiveness of each group under study. The technique of Analysis of Covariance (ANCOVA) was used to test the equivalency between groups. Mathematics teaching through cognitive based teaching was found to be more effective than the conventional method.

KEYWORDS : Cognitive based teaching, Sensation, Perception, Traditional Instruction, Academic Achievement,

INTRODUCTION

Mathematics is universally practiced and applied by human beings and it is being and becoming part of our life. The core process of teaching is the arrangement of the environment with in which the student can interact. This need led to a variety of approaches to design instruction along with teaching learning situation to achieve specific instructional objectives. The functional and structural guidelines to design instructional materials and environment came forward as models of teaching. It is a step by step procedure that leads to specific learning outcomes. Cognitive based teaching environments provide a structure of learning. Develops problem-solving skills, and stores memories which is the main principle of cognitive learning. Which will help our students to improve their learning on the conscious side. Which focuses on intrinsic and extrinsic factors and studies, how people acquire, perceive, remember and communicate information. By this approach, people get more information.it is the process based on observation and scientific study. It helps students to establish facts, build concepts and then generate explanations of theories. Which contain two factors, that are sensation and perception. This process helps in collaborative knowledge construction. sensation is the process of an environmental stimulus starting the series of events from one of our five senses to our brain in order to be recognized. Perception means looking into ones on self. Traditional instruction means general teaching method. Students are passive listeners. Teacher explain everything by lecture method. The term Academic achievement is the short term or long term educational goal.

SCOPE OF THE STUDY

1) It is expected that the finding of the study will help the curriculum planners to make needed changes in the content of Mathematics text book.
2) It will also help teachers to understand the effectiveness and necessity of the application of cognitive learning in the teaching of Mathematics.
3) The findings of the present study will help to find new frontiers to educational practices.

STATEMENT OF THE PROBLEM

The present study is an attempt to check the effectiveness of cognitive based teaching on achievement in mathematics among students.

HYPOTHESES

1) The achievement in Mathematics of the pupils taught through cognitive based learning will be significantly higher than that of those taught through the conventional method of teaching.
2) The achievement of Mathematics of the boys taught through cognitive based learning will be significantly higher than that of girls taught through the same method.

OBJECTIVES

1) To analyze the performance of the pupils before the conduct of the experiment.
2) To analyze the performance of the pupils after the conduct of the experiment.
3) To find the effect of cognitive based learning on student's achievement.
4) To compare the total achievement of pupils who were taught through cognitive based learning with that of pupils who were taught through the conventional method of teaching.

RESEARCH METHODOLOGY

Experimental method was selected for the present study. In that, the design selected was pre-test post-test non-equivalent group design. The study was conducted on a sample of 60 students. And both quantitative and qualitative data analysis techniques for the data collected. The data collected from the pre-test and post-test scores were analyzed by the above methods. The cognitive based learning was used in the experimental group and the traditional approach was followed in the control group. The equivalent group design would have been a very comprehensive design of the experiment. Technique of Analysis of Covariance (ANCOVA) was used to measure the equivalency between groups. Both the group were given pre-test and post-test. pre-test was administered to both control group and experimental group to identifying their initial cognitive level. Then, the post test was conducted to analyses the achievement score.

DATA ANALYSIS AND INTERPRETATION

1) Comparison of Achievement in Mathematics of Experimental and Control groups based on pre-test and post test scores using ANCOVA.

The data and result of the test of significance of the pretest of Experimental and control group

GROUP	N	MEAN	S D	CRITICAL RATIO
EXPERIMENTAL	30	6.23	2.54	2.95
CONTROL	30	4.26	2.62	

The critical ratio is significant at both levels.

Performance of pupils in Achievement test in Experimental and Control group after experiment

The data and result of the test of significance of the post test of experimental and control group

GROUP	N	MEAN	S D	CRITICAL RATIO
EXPERIMENTAL	30	16.23	3.65	4.04
CONTROL	30	11.9	4.61	

The critical ratio is significant.

Comparison of mean gain scores of students of experimental and control group

	GROUP	N	MEAN	S D	CRITICAL RATIO
GAIN SCORE	EXPERIMENTAL	30	10	2.42	2.99
	CONTROL	30	7.6	3.66	

The critical ratio is 2.99, which is significant at 0.05 level (1.96) and 0.01(2.58). It became necessary to analyze the data by using the statistical technique called ANCOVA in which the difference in the initial status of the 2 groups can be removed statistically so that they can be compared as though their initial status had been equated.

Genuiness of the differences in performance

COMPARISON OF ACHIEVEMENT OF MATHEMATICS OF EXPERIMENTAL AND CONTROL GROUPS BASED ON PRE-TEST AND POST -TEST SCORES USING ANCOVA.

Before proceeding ANCOVA, ANOVA was done.

RESULT OF ANALYSIS OF COVARIANCE OF PRE-TEST AND POST-TEST SCORES OF PUPILS IN THE EXPERIMENTAL AND CONTROL GROUP

SOURCES OF VARIANCE	DF	SSX	SSY	SSXY	SSYX	MSYX	SDYX	FYX	LEVEL OF SIGNIFICANCE
AMONG MEAN	1	58.02	281.7	127.83	68.57	68.57	3.25	6.49	P<0.01
WITHIN MEAN	57	399.23	1034.1	415.17	602.33	10.57			

The table value F is 4.03 at 0.05 level and 7.17 at 0.01 level of significance. The obtained FYX is greater than the table value; it is significant at 0.05 levels.

1) Comparison of the post-test scores of Girls and Boys in the Achievement in Mathematics when taught through Concept Mapping

Two sample t- tests were used for testing the equality of the post-test scores of boys and girls belonging to the experiment group.

THE DATA AND RESULT OF THE TEST OF SIGNIFICANCE OF THE POST-TEST SCORES OF BOYS AND GIRLS IN EXPERIMENTAL GROUP

GROUP	N	MEAN	SD	CRITICAL RATIO	TABLE VALUE		REMARK
GIRLS	15	10.67	2.23	1.58	0.05	0.01	NO SIGNIFICANT DIFFERENCE
					1.96	2.58	
BOYS	15	9.33	2.43				

The table value F is 4.03 at 0.05 level and 7.17 at 0.01 level of significance. The obtained F_{YX} is greater than the table value; it is significant at 0.05 levels.

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Arithmetic mean score of girls and boys in the experimental group is 10.67 and 9.33 respectively. The mean value signifies that there is slight significant difference between post test scores of girls and boys in the experimental group. S.D of girls is 2.23 and that of boys is 2.43. It shows that the values are not scattered very much. The obtained t value is 1.58 is not significant. The table value of t at 0.05 level is 1.96. So from the analysis of data, it may be concluded that there is no significant difference in the effectiveness of cognitive based learning in the achievement scores in Mathematics among girls and boys.

CONCLUSION

The present investigation concluded that, the Achievement in mathematics of pupils taught through cognitive based learning was significantly higher than that of those taught through conventional method of teaching, and Mathematics teaching through cognitive based learning has same effect on boys and girls. So cognitive based learning was found to be more effective than the Conventional method.

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