EFFECT OF INSTRUCTIONS BASED ON CONCEPT ATTAINMENT MODEL ON MATHEMATICAL ACHIEVEMENT OF SEVENTH CLASS STUDENTS

Dr. Vikas Kumar

Abstract

Mathematics holds a unique place in Individual's life. It has now gained an added emphasis owing to technical and scientific revolution, which is taking place today. Mathematics is one of the core subjects of school curriculum. Although much effort is used in teaching Mathematics, evidence from numerous researches makes it clear that many students are not learning mathematics as they need or are expected to learn and many students encounter difficulties and perform poorly in both middle and high schools. Experience has shown that the majority of students normally fail in Mathematics at the end of class X. For effective teaching & meaningful learning in Mathematics at school level, there is a need of accepting new modes of instructions. It involves various models of instructions useful for teaching & learning. In this study researcher studied the effect of instructions based on concept attainment model on mathematical achievement of seventh class students. The study was designed on the lines of Non-equivalent Control Group Design. The sample of the study comprised 115 seventh class students. The students of Experimental Group were taught Mathematics with the Concept Attainment Model. Every day, 35 minutes' period was devoted for this purpose. This continued for 30 working days. The results of the study indicated that Concept Attainment Model was significantly superior to the Traditional Method in teaching mathematics and retention of mathematics learning.

Key Words : Concept Attainment Model, Mathematics Achievement and Seventh class Students

Mathematics has been recognized as one of the central strings of human intellectual activity through out the centuries. Mathematics is more than the finished product of arithmetic and geometry featured in school mathematics. Indeed, mathematics might better be described as the science of discovering patterns and defining order. In this complex world, importance of Mathematics cannot be neglected or overlooked. Without having elementary and preliminary knowledge of Mathematics, man can not lead his life successfully and smoothly. Mathematics develops mental capabilities such as - logical thinking, reasoning power, quantification, systematic examination of facts and analytical approach leading to discovery of solution of a problem. It disciplines the mind and helps to understand many natural phenomena. It also helps the child directly or indirectly in earning his livelihood. Mathematics is also necessary in every walk of life. In the last 25 years, there has been a vast increase in the number of fields to which Mathematics has been applied and accelerated. It is an essential factor in the preparation of leaders of science, industry, business and agriculture. So it is safe to say that every generation of young people has always needed Mathematics education because our social system depends upon Mathematics for successful functioning. Beside general importance, Mathematics has occupied an important place in school curriculum. Among all the subjects Mathematics holds a unique place. It has now gained an added emphasis owing to technical and scientific revolution, which is taking place today. Mathematics is one of the core subjects of school curriculum. It is one of the components of 3R'S. Mathematics has played an outstanding role in our life in recent years. In fact, it is difficult to find any phase of life which is not affected to some extent by Mathematics. Mathematics has developed a certain technique which is essentially a technique of discovery i.e. to say a change. Although much effort is used in teaching Mathematics, evidence from numerous researches makes it clear that many students are not learning mathematics as they need or are expected to learn and many students encounter difficulties and perform poorly in both middle and high school mathematics classrooms. Experience has shown that the majority of students normally fail in Mathematics at the end of class X (NCERT, 2005). Kajapeer (2001) probed the reason for failure and backwardness in the subject and found it as the existing gap between research in the subject and its classroom practices. For effective teaching & meaningful learning in Mathematics at school level, there is a need of accepting new modes of instructions. It involves various models of instructions useful for teaching & learning. For

D.A.N College of Education for women, Nawanshahr (Punjab)

better understanding the basic concepts in mathematics there is a need of acceptance of models of teaching in day to day teaching. In this concern Joyce et. al. (1985). has stated, "To provide an all round development we need to design suitable instructional strategies which helps our students grow emotionally, physically, socially and intellectually. There still exists a big gap between theoretical knowledge and actual teaching in class-room or schools. Models of teaching as strategies need to be incorporated in our teaching practice." A variety of teaching approaches have been evolved to design instruction. But which approach/Model of teaching is most appropriate having better impact, effective, efficient, interesting, can only be answered through research keeping each Model's instructional and nurturing effects in view. The Concept Attainment Model developed by Joyce and Weil (1985) is based on Bruner's Theory of Concept Attainment. It is an indirect instructional strategy that uses a structured enquiry process. The Concept Attainment Model is an inductive teaching strategy designed to help students of all ages learn concepts and practice analytical thinking skills. 'The Concept Attainment Model is designed to capture the essential features of concept learning while at the same time extending the thinking skills of students (Eggen and Kauchak, 1988). It is the search for and identification of attributes that can be used to distinguish examples of a given group or category from non-examples. Prabhu (1991) modified the concept attainment model and studied the effectiveness of modified c:oncep: attainment model (MCAM), the reception- oriented model (RCAM), and the selectionoriented model (SCAM) comparing with the traditional method of teaching on attainment of concepts in Geometry. The results showed that all the three variations on concept attainment model were more effective than the traditional method in teaching concepts in Geometry. Lekha (2000) studied the effect of concept attainment model (CAM) on achievement in mathematics at secondary level. The study revealed that CAM is more effective than TM in learning concepts in mathematics at secondary level.

Objectives:

 To compare the adjusted mean scores of Mathematical achievement of experimental and control group students by considering Pre-Mathematics achievement and intelligence as covariate. To compare the adjusted mean scores of retention in Mathematical of experimental and control group students by considering Mathematics achievement and intelligence as covariate.

Sample:

The sample of the study comprised 115 seventh class students. There were two sections of seventh class in Doaba Arya Sr. Sec. School and D.A.V Public School situated in Nawanshahr. One section from each school was randomly assigned to experimental group and another section from each school constituted control group. Doaba Arya Sr. Sec. School was affiliated to PSEB whereas D.A.V Public School was affiliated to CBSE. New Delhi. The Medium of Instruction was Punjabi and English.

Measures:

- Raven's Standard Progressive Matrices Test developed by Raven.
- Mathematics Achievement Test was prepared by the researcher.
- The instructional modules based on the Concept Attainment Model for selected Mathematical concepts were designed by investigator himself.

Method :

One section of Seventh class of Doaba Arya Sr.Sec. School and D.A.V Public School constituted the experimental group whereas another section of seventh class of these schools formed control group. The students of Experimental Group were taught Mathematics with the Concept Attainment Model. The rapport was established with the students. The students were explained the objectives of this study. To begin with, the Mathematics Achievement Test and Raven's Standard Progressive Matrices were administered. After this, they were taught through the Concept Attainment Model. Every day, 35 minutes' period was devoted for this purpose. This continued for 30 working days. At the end, the Achievement test was administered again on the students in the same way as done at the start of the experiment. On the other hand, the students of the Control Group were taught through Traditional Method. The same tools were administered on the Control Group students in the same way as done in the Experimental Group. To check the retention level the Achievement Test was re administered on both the groups after a span of two months.

Analysis:

The first objective was "to compare the adjusted mean scores of Mathematics achievement of experimental and control group students by considering PreMathematics achievement and intelligence as covariate". The data related to this objective was analysed with the help of Analysis of Covariance (ANCOVA). The results are given in the Table 1

Table 1 :

Summary of ANCOVA of mathematics achievement by considering Pre- mathematics achievement and intelligence as Covariate

Source of Variance	SSy.x	df	MSSy.x	Fy.x
Concept Attainment Model	159.908	1	159.908	69.013**
Error	286.403	111	2.790	
Total		114		

**Significant at 0.01 levels

From the Table 1, it can be seen that adjusted F-Value is 69.013, which is significant at 0.01 levels with df=1/114. It indicates that the adjusted mean scores of mathematical achievement of Concept Attainment Model and Traditional Method Groups differ significantly when Pretest scores on mathematical achievement and intelligence were considered as covariate. Thus, the null hypothesis that there is no significant difference in the adjusted mean scores of mathematical achievement of experimental and control group students by considering Pre-test scores on mathematical achievement and intelligence as covariate is rejected. Further, the adjusted mean score of mathematics achievement of Experimental Method Group was 17.82, which is significantly higher than that of Traditional Method Group whose adjusted mean score of mathematics achievement was 13.05. It reflects that Concept Attainment Model was found to be significantly superior to the Traditional Method in teaching mathematics when both groups were matched with respect to Pre- mathematics achievement and intelligence. It may, therefore, be concluded that the Concept Attainment Model was found to be superior to Traditional Method in teaching mathematics.

The second objective was "to compare the adjusted mean scores of retention in mathematics of experimental and control group students by considering mathematics achievement and intelligence as covariate". The data related to this objective was analyzed with the help of Analysis of Covariance (ANCOVA). The results are given in the Table 2

Table 2 :

Summary of ANCOVA of Retention by considering mathematics achievement and intelligence as Covariate

Source of Variance	SSy.x	df	MSSy.x	Fy.x
Concept Attainment Model	18.173	1	18.173	11.28**
Error	158.888	111	1.378	
Total		114		

**Significant at 0.01 levels

From the Table 2, it can be seen that adjusted F-Value is 11.28, which is significant at 0.01 levels with df=1/114. It indicates that the adjusted mean scores of retention in mathematics of Concept Attainment Model and Traditional Method Groups differ significantly when mathematical achievement and intelligence were considered as covariate. Thus, the null hypothesis, namely, "There is no significant difference in the adjusted mean scores of retention in mathematics of experimental and control group students by considering mathematical achievement and intelligence as covariate.", is rejected. Further, the adjusted mean score of retention in mathematics of Experimental Method Group was 15.14, which is significantly higher than that of Traditional Method Group whose adjusted mean score of retention in mathematics was 13.11. It reflects that Concept Attainment Model was found to be significantly superior to the Traditional Method in retention of mathematics learning when both groups were matched with respect to mathematics achievement and intelligence. It may, therefore, be concluded that the Concept Attainment Model was found to be superior to Traditional Method in retention of Geometry learning.

Discussion :

The results of the study indicated that Concept Attainment Model was found to be significantly superior to the Traditional Method in teaching mathematics and retention of mathematics learning .The result was found to be consistent with the findings of Prabhu (1991) and Lekha (2000). The probable reason behind this is that variety of activities were included while giving instructions with the Concept Attainment Model to capture the attention of the students. Individual attention was given to each and every child throughout the experiment. The use of various visual aids like photographs, maps, pictures served as good motivators for the students. On the other hand no such activities were performed in the traditional method. This resulted in the superiority of Concept Attainment Model over the traditional method in teaching mathematics to the students.

Implications:

Concept Attainment Model was found to be significantly superior to the Traditional Method in teaching mathematics and retention of mathematics learning. Concept Attainment Model provides a chance to analyze the students thinking process and to help them develop more effective strategies for thinking and concept attainment. This has an important implication for teaching mathematics to the school children. Therefore, the mathematics teachers may be trained in using CAM for teaching of mathematics.

References :

- Eggen, P. D., & Kauchak, D. P. (1988). Strategies for teachersteaching content and thinking skills. New Jersey: Prentice Hall.
- Joyce, B. & Weil, M. (1985). *Models of Teaching*. New Delhi: Prentice Hall of India Pvt. Ltd.
- Kajapeer, M. (2001). Bridging gap between research and classroom practices in Mathematics education at the school stage. *Journal of Indian Education*, 27(2), 44-53 NCERT.
- Lekha, G. (2000). Effectiveness of concept attainment model on achievement in mathematics at secondary 1evel. Unpublished M.Ed Thesis. Mahatma Gandhi University, Kottayam.
- NCERT.(2005). National Curriculum Framework for School Education: A Discussion Document. New Delhi.
- Prabhu. (1991). A comparative study of the effectiveness of the reception oriented and modified concept attainment model on learning concepts in Geometry. Retrieved on 11April,2014 fromwww. shodhganga.nflibnet.ac.in%3A8080%2Fjspui%2Fbi tstream%2F1

