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A STUDY OF EFFECTIVENESS OF CONCEPT ATTAINMENT MODEL ON ACHIEVEMENT, STRESS AND ATTITUDE TOWARDS MATHEMATICS OF 10th STANDARD STUDENTS

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ABSTRACT

This study aimed at finding the Impact of Concept Attainment Model on Achievement, Stress and Attitude towards Mathematics of 10th Grade students. A sample of 100 Students of 10th Grade was selected randomly from Inchageri Village of Indi Taluka of Vijayapur District. Among them 50 Students were randomly selected for each controlled and Experimental group. In this study experimental-control (pre-test post-test) parallel group design was used. The study was completed in two stages: Pre-test stage and Post-test stage. The data were collected and analyzed with the help of Differential analyses i.e. T-test. A significant difference was found between the Pre-Test and Post-Test scores of Achievement, Stress, and Attitude towards Mathematics of both experimental and controlled group. The study reveals that the gain of achievement and Attitude towards Mathematics of experimental group is higher than the control group and the gain of Stress in Mathematics of experimental group is lower than the control group. It shows that the treatment given to experimental group through Concept Attainment Model is more effective than the Traditional method of teaching.

KEYWORDS: *Concept Attainment Model, Achievement, Stress, Attitude towards Mathematics.*

INTRODUCTION

It goes without saying that Teaching –Learning is as old as is the humanity. Some sort of teaching has always been going on which might have been of any level. Improvements in the process of Teaching have been made from time to time by the teachers. Some research workers, intellectuals, administrators etc. have been making special efforts to improve the teaching process.

The objectives of education have changed from time to time and so has our concept of teaching. What we teach? And how we teach? Depends to a great extent on what we want to achieve. Teaching is both an art and science. Able teachers are always find ways and means to improve their teaching techniques. The improvement of teacher by employing newer methods of teaching is a need of the locus. The ways the knowledge, skills and values are delivered to the learner have a meaning both for a teacher and the student.

The most recent concept of teaching is: teach the child how to learn, how to discover, how to think and how to inquire. The emphasis is upon 'know how' rather than 'know what. In modern world, knowledge increases at a terrific pace and social change is very rapid. Education can no longer be taken as the preparation of a finished product. Due to science and technological advancement the entire world has been shrunken in its space and time. And it also impacts on all human activities. So that teacher should adopt dynamic methods to cater the needs and interest of the children. For that teacher should provide conducive environment for the full development of the learner's potentials.

At present, instructional strategies are being developed for effective teaching of Mathematics. The models can create most suitable environment and stimuli for the student to solve problems pertaining to Mathematics. The concept Attainment Model (CAM) is designed and developed to teach concepts and to help students to become more efficient at learning. The CAM developed by Bruner succeeded in the learning the concepts. So a genuine interest was aroused in the minds of investigator to prove the effectiveness of CAM on secondary school students with special reference to Academic achievement, Attitude towards Mathematics and Stress.

CONCEPT ATTAINMENT MODEL

Teaching models are **prescriptive teaching strategies** designed to accomplish particular instructional goals. They are perspective in that the teacher's responsibilities during

the planning, implementing and assessment stages of instruction are clearly defined.

Paul.D.Eggen et.al (1979)

A model of teaching is a description of learning environment. They have many uses, ranging from planning curriculum courses, units and lesson plans to design instructional materials – text book and work books, multimedia programs and computer assisted learning programs In order to develop inductive thinking, higher order-critical thinking the concept attainment is considered as best among other models. The concept attainment model is an inductive teaching strategy designed to help **students of all ages reinforce their understanding of concepts and practice hypothesis testing**. The models use positive and negative examples to illustrate concepts of simple and complex.

The design of this model first suggested by **Joyce and weil** (1972) is based on the work of Bruner, Good now, and Austin (1956). Who investigated how different variables affect the concept learning process. The concept attainment model is also useful for giving students experience with the scientific method and particularly with hypotheses testing.

OBJECTIVES OF STUDY

The main objective of this study was to find out the effectiveness of CAM on achievement, Attitude and Stress of 10th grade students. This is further explicated by the following specific objectives:

1. To study the effectiveness of Concept Attainment Model (CAM) and Traditional Method (TM) of instruction on the achievement of 10th graders
2. To find out the effectiveness of CAM and TM on the Attitude towards Mathematics of the 10th grade students. .
3. To find out the effectiveness of CAM and TM on the Stress of the 10th grade students.

HYPOTHESES

1. There is no significant difference between control and experiment groups with respect to pre-test, post-test and gain scores of achievement in Mathematics of 10th standard students of secondary schools
2. There is no significant difference between control and experiment groups with respect to pre-test, post-test and gain scores of stress of 10th standard students of secondary schools
3. There is no significant difference between control and experiment groups with respect to pretest, post-test and gain scores of attitude towards mathematics of 10th standard students of secondary schools

METHODOLOGY

In this study experimental-control (pre-test post-test) parallel group design was used. The study was completed in two stages: Pre-test stage and Post-test stage. The study was conducted in the S.S.M.P high school Inchageri Tq. Indi of Vijayapur District. The sample selected was purposive but representative of the population. 100 Pupils 10th Grade Students were selected on the basis of intelligence by administering R.P.M (Raven's Progressive Mattresses) and were randomly assigned to two groups (on the basis of Intelligence viz.above Average, Average and below Average) to be taught through two different methods.

TOOLS USED

In order to collect the data pertaining to achievement, Attitude towards Mathematics and Stress towards Mathematics, following tools were used in the Present study.

1. Achievement test which was developed and standardized by the investigator.
2. _Dr.S.C.Gakhar and Dr.Rajni's Attitude Towards Mathematics scale
3. Dr.Ayatollah Karimi and Prof.S.Venkatesan, Mathematics Stress (Anxiety) Scale

RESULTS AND DISCUSSION

Comparison of experiment and control groups, with respect to pre test and post test scores of achievement, attitude towards Mathematics and Stress in Mathematics of 10th grade students. To achieve this hypothesis, the unpaired t-test was applied and results represented in the following table.

Hypothesis-1: *There is no significant difference between control and experiment groups with respect to pretest, posttest and gain scores of achievement in Mathematics of 10th standard students of secondary schools*

To achieve this hypothesis, the unpaired t test was applied and the results are presented in the following table.

Table No-1: Results of t test between control and experiment groups with respect to pre-test, post-test and gain scores of achievement in Mathematics of 10th standard students of secondary schools

Variable	Groups	Mean	SD	SE	t-value	P-value	Signi.
Pretest	Control	55.32	8.60	1.22	0.0427	0.9660	>0.05
	Experiment	55.24	10.07	1.42			NS
Posttest	Control	56.28	9.17	1.30	-18.0736	0.0001	<0.05
	Experiment	88.16	8.45	1.20			S
Gain	Control	0.96	3.53	0.50	-17.8895	0.0001	<0.05
	Experiment	32.92	12.13	1.72			S

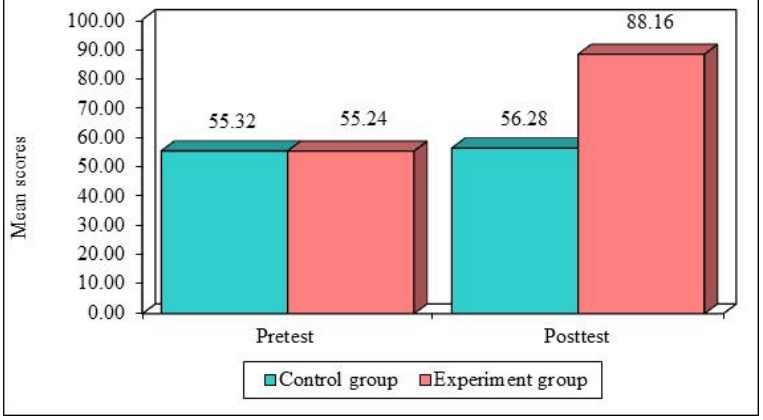
From the above table, it can be observed that,

1. Control and Experimental groups do not differ significantly with respect to pre-test scores of achievement in Mathematics of 10th standard students of secondary schools (t=0.0427, p>0.05) at 5% level of significance. Hence the null hypothesis is not rejected. It can be concluded that, the Control and Experimental groups have similar

pre-test scores of achievement in Mathematics of 10th standard students of secondary schools.

2. Control and Experimental groups differ significantly with respect to post- test scores of achievement in Mathematics of 10th standard students (t=-18.0736, p<0.05) at 5% level of significance. Hence the null hypothesis is rejected. It can be concluded that, the students of Experimental groups scored significantly high on post achievement test when compared to students of secondary schools of Control group.
3. Control and Experimental groups differ significantly with respect to gain scores of pre and post-test of achievement in Mathematics of 10th standard students of secondary schools (t=-17.8895, p<0.05) at 5% level of significance. Hence the null hypothesis is rejected. It can be concluded that, the gain scores of achievement in Mathematics of 10th standard students of secondary schools is significantly higher in Experimental group as compared to Control group. The mean of pre-test, post-test and gain scores are also presented in the following figure.

Figure No-1: Comaprison of control and experiment groups with respect to pretest, posttest and gain scores of achievement in Mathematics of 10th standard students of secondary schools



Hypothesis -2: There is no significant difference between control and experiment groups with respect to pre-test, post-test and gain scores of stress of 10th standard students of secondary schools

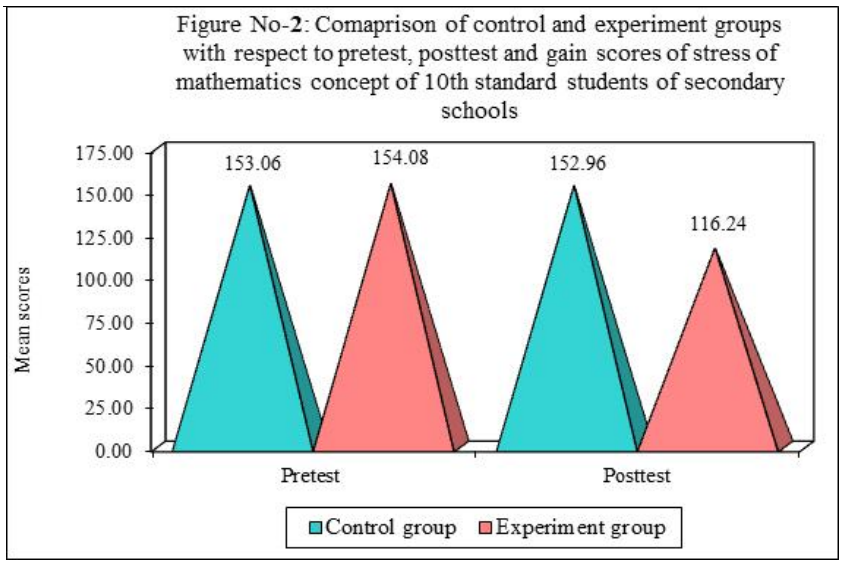
To achieve this hypothesis, the unpaired t test was applied and the results are presented in the following table.

Table No-2: Results of t test between control and experiment groups with respect to pre-test, post-test and gain scores of stress of 10th standard students of secondary schools

Variable	Groups	Mean	SD	SE	t-value	P-value	Signi.
Pretest	Control	153.06	14.06	1.99	-0.3626	0.7177	>0.05
	Experiment	154.08	14.07	1.99			NS
Posttest	Control	152.96	13.95	1.97	10.8575	0.0001	<0.05
	Experiment	116.24	19.42	2.75			S
Gain	Control	0.10	0.89	0.13	-11.1882	0.0001	<0.05
	Experiment	37.84	23.84	3.37			S

From the above table, it can be observed that,

- Control and Experimental groups do not differ significantly with respect to pre-test scores of stress of 10th standard students of secondary schools (t=-0.3626, p>0.05) at 5% level of significance. Hence the null hypothesis is not rejected. It can be concluded that, the Control and Experimental groups have similar pre-test scores of stress of 10th standard students of secondary schools.
- Control and Experimental groups differ significantly with respect to post- test scores of stress of 10th standard students (t=10.8575, p<0.05) at 5% level of significance. Hence the null hypothesis isrejected. It can be concluded that, the students of Experimental groups scored significantly lower on post-test stress when compared to students of secondary schools of Control group.
- Control and Experimental groups differ significantly with respect to gain scores of pre and post-test of stress of 10th standard students of secondary schools (t=-11.1882, p<0.05) at 5% level of significance. Hence the null hypothesis is rejected. It can be concluded that, the gain scores of stress of 10th standard students of secondary schools is significantly lower in Experimental group as compared to Control group. The mean of pre-test, post-test and gain scores are also presented in the following figure.



Hypothesis-3: There is no significant difference between control and experiment groups with respect to pre-test, post-test and gain scores of attitude towards mathematics of 10th standard students of secondary schools

To achieve this hypothesis, the unpaired t test was applied and the results are presented in the following table.

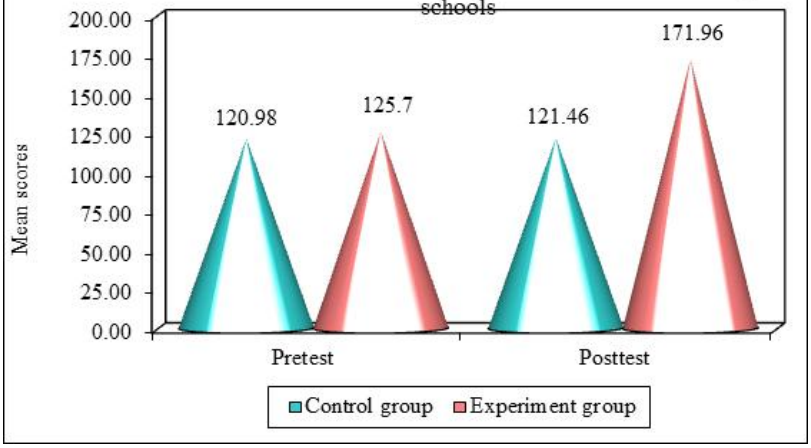
Table N0-3: Results of t test between control and experiment groups with respect to pre-test, post-test and gain scores of attitude towards mathematics of 10th standard students of secondary schools

Variable	Groups	Mean	SD	SE	t-value	P-value	Signi.
Pretest	Control	120.98	22.96	3.25	-1.1273	0.2624	>0.05
	Experiment	125.70	18.69	2.64			NS
Posttest	Control	121.46	22.36	3.16	-13.2323	0.0001	<0.05
	Experiment	171.96	15.11	2.14			S
Gain	Control	0.48	2.00	0.28	-15.0082	0.0001	<0.05
	Experiment	46.26	21.48	3.04			S

From the above table, it can be observed that,

- Control and Experimental groups do not differ significantly with respect to pre-test scores of attitude towards mathematics of 10th standard students of secondary schools (t=--1.1273, p>0.05) at 5% level of significance. Hence the null hypothesis is not rejected. It can be concluded that, the Control and Experimental groups have similar pre-test scores of attitude towards mathematics of 10th standard students of secondary schools.
- Control and Experimental groups differ significantly with respect to post- test scores of attitude towards mathematics of 10th standard students (t=-13.2323, p<0.05) at 5% level of significance. Hence the null hypothesis is rejected. It can be concluded that, the students of Experimental groups scored significantly lower on posttest attitude towards mathematics when compared to students of secondary schools of Control group.
- Control and Experimental groups differ significantly with respect to gain scores of pre and post-test of attitude towards mathematics of 10th standard students of secondary schools (t=--15.0082, p<0.05) at 5% level of significance. Hence the null hypothesis is rejected. It can be concluded that, the gain scores of attitude towards mathematics of 10th standard students of secondary schools is significantly higher in Experimental group as compared to Control group. The mean of pre-test, post-test and gain scores are also presented in the following figure.

Figure No-3: Comaprison of control and experiment groups with respect to pretest, posttest and gain scores of attitude towards mathematics of 10th standard students of secondary schools



EDUCATIONAL IMPLICATIONS

CAM provides a chance to analyze the students thinking process and to help them develop more effective strategies for thinking and concept attainment. In this study CAM has been found to facilitate achievement of learners in Mathematics, apart from that this study facilitates to reduce the Stress (Anxiety) among the secondary school students. 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.

Keeping in view the limitations of the present study, and the constraints under which it was conducted, the findings do not warrant wide generalization. It is, therefore, suggested that replication of this study on a larger sample of different age-groups, grade levels, subject areas, sex, socio-economic status and intelligence level, be made to arrive at more reliable and precise results.

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