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EFFECT OF COGNITIVE APPRENTICESHIP MODEL ON ATTITUDE TOWARDS MATHEMATICS

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ABSTRACT :

The present study is to test the effectiveness of cognitive apprenticeship model on Attitude Towards Mathematics. For this investigator conducted an experimental study based on cognitive apprenticeship model. The independent variable of this study is Cognitive Apprenticeship Model and dependent variable is Attitude Towards Mathematics. Non- equivalent control and experimental group design is used as the method of this study. The study reveals that the Cognitive Apprenticeship Model is effective for developing Attitude Towards Mathematicsamong primary school students. The total sample of this study is 64; 32 are in the experimental and 32 in control group. Attitude scale Towards Mathematics and Cognitive Apprenticeship Model are the tools and techniques used.

KEYWORDS : *Cognitive Apprenticeship Model,Attitude towards Mathematics.*

INTRODUCTION

Achievement in Mathematics is a function of many inter related variables. Among this attitude is an important factor to be taken in to account when attempting to understand and explain variability in student performance in maths. Attitude towards to mathematics plays a crucial role in the teaching and learning process in mathematics. It effects students achievement in mathematics. Mobilizing a set of different definition concerning attitudes presented since 1935, attitude is a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor (Eagly and chaiken, 1993). Zelly, Marianne and Elaine, (2005) postulate that attitudes are generally positive or negative views about a person, plays, thing or event which are often referred to as the attitude object. Mcleod(1992) and Aikan(2000) posited that attitude is a positive or negative disposition .

ATTITUDE TOWARDS MATHEMATICS

Attitudes have played a predominant role in mathematical education. Attitude towards mathematics refer to the valuation, the apprised and enjoyment of this discipline, underlyaining the effective fact more than cognitive one. The study of attitude towards mathematics by Neale(1969), underlined that,'attitudes plays a crucial role in learning mathematics and positive attitude towards mathematics is though to play and important role in causing students to do mathematics'. Neale defined mathematical attitude as " liking or disliking of mathematics, a tendency to engage in or avoid mathematical activity, a belief that one is good or bad at mathematics, a belief that mathematics is useful or useless.

A positive attitude towards mathematics reflects a positive emotional disposition in relation to the subject and

in a similar way negative attitude towards mathematics relate to a negative emotional disposition. These emotional dispositions have an impact on individuals behavior, as one is likely to achieve better in a subjects that one enjoys, has confident or finds useful. For this reason positive attitude towards mathematics are desirable since they may influence once willingness to learn and also the benefits one can derive from mathematics instruction.

ATTITUDE AND ACHIEVEMENT IN MATHEMATICS

Recent investigation have been undertaken to try to reach an understanding of the relationship between students attitudes towards mathematics and academic achievements. Most of the studies point out that a positive correlation between student attitudes towards mathematics and student academic achievement. Researchers concluded that positive attitude that towards mathematics leads students towards success in mathematics. Attempt to improve attitude towards mathematics at lower level provides base for higher studies in mathematics. It is also causes effect in achievement of mathematics at secondary level(Ma and Xn, 2004)

Nicolaidou and Philippou(2003) which reveal significant correlations between attitudes and achievement. Mato and De La Torre (2010) in a study with secondary school students also showed that those with better academic performance have more positive attitudes regarding math than those with poorer academic achievement. Cheunge(1998), in his study of 11-13 year olds, also discovered positive correlation between attitude and mathematic achievement. The correlation showed that the more positive the attitude, the higher the level of achievement in the student (Maria de laurds Mata et.al, 2012). However, these researchers emphasize the role of teachers and schools in changing attitudes stating that, math achievement could be improved by better teaching methods.

NEED AND SIGNIFICANCE OF THE STUDY

Maat and Zakariaand Vaughan (2010) identified a significant relationship between learning environment and attitude towards mathematics. Students with a higher perception of there teachers have more positive attitude towards mathematics.

An analysis of the TIMSS 1999 video study showed that 53 percent of instruction in mathematics at primary level consisted of review problems and 23 percent of time was spent on dealing with new concept and problems (TIMSS, 2003)

One critical factor in how well students learn mathematics is the quality of the teaching. studies show that the student achievement in mathematics is the quality of the teaching. studies show that the student achievements in mathematics is strongly linked to the teachers expertise in mathematics. Teaching techniques that centre on " explain- practice- memorize" are among the main source of math anxiety because focus on memorization rather than on understanding the concepts and reasoning involved.

Today's teachers working classroom filled with a broad diversity of students. Besides different learning capabilities, students come from different cultures, speak many languages, and poses varying learning styles. Direct instruction based on a one size –fits- all approach where by teachers differentiate their instruction by using a verity of techniques and strategies that address the varying needs of all students.Traditionalformat of mathematics instruction has not succeeded in providing the skills to solve problems and develop positive attitude towards mathematics. New models of instruction have been proposed to resolve this deficiency.

Cognitive apprenticeship instruction that teaches student to be problem solvers and encourage collaborative problem solving may be a more effective way to teach mathematics than traditional instruction. A cognitive apprenticeship is not just an open ended inquiry. rather it is a carefully structured set of activities designed with end goals in mind and with attention to the individuals needs of students.

Several key teaching strategies are involved in a cognitive apprenticeship. Through out the apprenticeship experience teachers and experts peers model or demonstrate how to perform a task. The teacher also scaffolds or providesthe a verity of supports, to help students accomplish their work. A third

kind of teaching strategy- coaching involves observing students as the work and facilitating and providing feedback while they perform task. Teachers may also work to help students articulate and reflect their own thinking process in order to build their strengths and identify gaps in thinking .Cognitive apprenticeship allows both teacher and students to demonstrate and share their expertise. There is little research that studies the relationship between attitude towards mathematics and cognitive apprenticeship model.

Definition of Key terms

Cognitive Apprenticeship Model

Cognitive Apprenticeship Model was developed by Brown,Collins,and Digid (1989) based on the situatd cognition theory. This model try to enculturate students into authentic practices through authentic activity and social interaction in a way similar to that which is evidently successful in craft apprenticeship. It is a model designed to improve student's thinking and problem solving skills through the learning of school subjects. Six teaching methods are associated with Cognitive Apprenticeship, namely,Modelling,Coaching , ,Scaffolding,Articulation,Reflection and Exploration.

Attitude towards Mathematics

Attitude Towards Mathematics refers to the pre disposition of an individual to respond favourable or unfavourable way toward mathematics. It has been acquired by an individual through beleifs and experiences but which could be changed. In the present study positive attitude towards mathematics indicate a positive emotional disposition and negative attitude towards mathematics indicate a negative emotional disposition. Attitude Towards Mathematics is a major factor that influences students mathematical achievement.

Objective

To test the effectiveness of the cognitive apprenticeship model over the existing method on attitude towards mathematics.

Hypothesis

Cognitive Apprenticeship Model Is Effective Over The Existing Method On Attitude Towards Mathematics .

METHDOLOGY IN BRIEF

The objective of the present research is to investigate the effectiveness of the cognitive apprenticeship model over the existing method on attitude towards mathematics. The method selected for the study. In the present study, the investigator adopts quasi-experimental method with non-equivalent pre-test post-test design. Experimentation is the most sophisticated, exact & powerful method for discovering & developing & organized body of knowledge. For this investigator select 32 students in the experimental group and 32 students in control group. The dependent variable for this study is attitude towards mathematics of the 7thstd students and analyzed by applying appropriate statistical techniques such as t test and ANCOVA

Tools and techniques used for study

a)Attitude scale towards mathematics and Cognitive Apprenticeship Model

RESULTS AND DISCUSSION

Investigator analyzed data after the intervention in the classroom using lesson transcript based on the cognitive apprenticeship model over the existing method on attitude towards mathematics .For this investigator compare the posttest scores of between Experimental and control Group using t test and Test the effectiveness using ANCOVA and adjusted mean following tables shows the results .

Table 1 Test of significance of the difference between post-test scores in the attitude towards mathematicsof the Experimental Group and Control Group.

Group	No. Of Students	Mean	Standard deviation	Critical Ratio	Level of Significance
Experimental	32	94.97	15.39	2.55	Significant at 0.05 level
Control	32	86.06	12.37		

The table 1 indicates mean scores of the experimental group and control group is 94.97 and 86.06 respectively. The critical ratio obtained is 2.55 which is greater than the table value 1.96 at 0.05 level of significance. Since the mean of the experimental group is greater than that of the control group. It is inferred that experimental group is better than the control group. Hence, it indicates that there is significant difference between the mean score of pretest and posttest of Attitude Towards Mathematics. So it can be tentatively concluded that there is greater improvement in of experimental group through practicing cognitive apprentice ship model.

Table 2 Summary of Analysis of Co-Variance of pre-test and post-test scores of pupils in Experimental group and Control group of their attitude towards mathematics

Source of variance	df	SSx	SSy	SSxy	SSyx	MSyx	SDyx	Fyx
Among Means	1.00	1.27	1269.1	40.08	1211.27	1211.27		8.87
Within the group	61.00	7095.34	12088.8	5162.50	8332.66	136.60	11.69	
Total	62.00	7096.61	13358.0	5202.58	9543.93			

The comparison of Fyx ratio was tested for significance. The F value of the ratio between among means and within groups is 8.87 which is greater than the table value 4.00. It is clear from value that the two final means which depends upon the experimental and control group differ significantly after they have been adjusted for initial difference in the pre- test scores.

Comparison of Adjusted Y Means

The adjusted means for post-test scores (Y means) of the pupil in the Experimental and control group were computed using correlation and regression. The difference between the adjusted Y means of post-test scores of pupils in the experimental group and control group are given in the table 3

Table 3 Comparison of adjusted Means of Post-test Scores of Pupils in the Experimental group and Control Group of their attitude towards mathematics

Groups	No. of Students	Mx	My	Myx (adjusted)
Experimental group	32.00	87.06	95.0	94.87
Control group	32.00	86.78	86.1	86.16
General mass	64.00	86.92	90.52	-

S.Em between the adjusted mean = 1.92, t = 2.98

The difference between the adjusted means of post-test scores of students in the experimental group and control group were tested for significance. The calculated difference between the adjusted Y means is 2.98 which is greater than the table value 1.96 at 0.05 levels. The difference between the adjusted Y means indicated that the students in the experimental group differ significantly in their attitude towards mathematics in the post-test. Thus the pupil practices Cognitive Apprenticeship Model is better than those

learned by the general conventionalmethod. From the result it can be interpreted that Cognitive Apprenticeship Model over the existing method on Attitude Towards Mathematics among primary school students..

EDUCATIONAL IMPLICATIONS

1. The results of the study revealed that the Cognitive Apprenticeship Model enhances Attitude Towards Mathematics in cmparison to the existing method.For develping these outcomes ,teachers should find ways to impliment the Cognitive Apprenticeship Model in classrom teaching.
2 . Keeping the result of the study in mind ,the instructional material based on the Cognitive Apprenticeship Model on selected units in mathematics may be developed by a team comprise of education.
3. Cognitive Apprenticeship Model should be introduced at elementary level for the development of Attitude Towards Mathematics.
4. It was found that Cognitive Apprenticeship Model is more effective than the existing activity oriented method in classroom teaching.So teacher empowerment programmes namely orientation classes ,seminars and workshops should be organized for the teachers and teacher trainees on the development of instructional materials to teach through the Cognitive Apprenticeship Model .

CONCLUSION

The investigator expects that more follow up studies will be conducted in this area to substantiate and generalize the findings of the present study. The investigator feel gratified if the findings of the study lead to a better understanding of the teaching-learning process and motivate the researcher to undertake further studies.

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