

## **A Study of Constructivist Approach for Enhancing Metacognitive Awareness among Secondary School Students**

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### **Abstract**

The present study is aimed to investigate the effect of Constructivist approach enhancing Metacognitive Awareness in Geometry among IX<sup>th</sup> standard students. The sample was selected using purposive sampling techniques. The total sample size was 80 students studying in Std. IX<sup>th</sup> Marathi medium school, having SSC board. In the present study, Researcher has employed the Pretest-Posttest Nonequivalent-Groups Design of Experimental method. Findings indicated that : There was significant difference in the post-test scores of experimental group and control group with respect to Metacognitive Awareness. Therefore, the significant relationship was found in Constructivist Approach with Metacognitive Awareness of the students. At the end some suggestions are given to teachers based on the present study.

**Keywords:** Constructivist Approach, Metacognitive Awareness, Geometry, Experimental method etc.

### **Introduction**

Mathematics is the group of sciences dealing with quantities, magnitudes and forms and their relationships attributes by the use of numbers and symbols. It provides opportunity for the intellectual gymnastic of the man's inherent powers. Certainly the subject, which is so useful from social, cultural, ethical and practical point of view, should be given an important place in

the school curriculum. In present curriculum, mathematics divide into two parts Algebra and Geometry.

Geometry (From the Ancient Greek: geo- "earth", -metron"- measurement") is a branch of mathematics concerned with questions of shape, size, relative position of figures, and the properties of space. But, Mathematics especially Geometry is generally regarded as a dull and boring subject by the students. They soon forget what they have learned. Learning occurs in a vacuum and the link to the real world is rarely made. A widely accepted theory, known as constructivism, suggests that learners must be active participants in the development of their own understanding. Each learner, it is now believed, constructs his/her own meaning in his/her own special way. This happens because of learner's knowledge which they already have. When learners create their own meaning of the content, it requires them to use higher order thinking skills, As a result, learners determine what they need to learn, manage their own learning activities and develop greater Metacognitive skills, such as reflective thinking and problem solving. It's automatically affecting their academic success.

Hence, If constructivism is seen as approach of better living, the investigator played with an idea that why Metacognition Awareness in Geometry cannot be enhanced using this approach. This student centered approach might help students and teachers to enhance not only the Metacognitive Awareness in geometry but also in other school subjects too. The most appropriate topic would be 'Circle', an area which students find it difficult. Thus the present study was conceptualized.

## **Need of the study**

In the present scientific and technological age, the conventional teaching methods are not sufficient to meet up to the intellectual, psychological and emotional needs of the students. The methods of teaching Geometry need to be changed. The modern teaching concepts hold the view that it is more learner-centered and learner driven education has been undergoing a slow evolution from teacher centered system to a learner centered system and this demands changes in the instructional strategy and material used for making the process more effective.

If a curriculum is to be effective in the classroom, it must contain different ways of motivating the students, different ways of presenting sequences, and different opportunities for some students to sip parts while others work their way through different ways of putting things. Keeping in mind the above mentions factors the researcher felt it is appropriate to make use of Constructivist Approach strategy for enhancing Metacognitive Awareness and teaching of Geometry included in the IX standard Geometry syllabus of Maharashtra State Board of Secondary and Higher Secondary Education.

All students cannot learn the Geometry by the same way or by same method and it is also required to teach the Geometry by different methods together so make it more effective way of learning Geometry. So researcher was keen in understanding the effectiveness of Constructivist Approach using strategy specially to make them understanding Metacognitive Awareness in Geometry in the effective manner.

## **Title**

"Effect of Constructivist Approach enhancing Metacognitive Awareness in Geometry among IX<sup>th</sup> standard students".

## **Operational Definitions of Terms**

**1) Constructivist Approach:** In this study Constructivist Approach is defined as the activity plans that will be developed for teaching the concepts related to 'Circle' for the students of standard IX<sup>th</sup>. The activity plan will include unit goal, activity objectives, knowledge source, knowledge dimension, cognitive process dimension and the learning strategy.

**2) Metacognitive Awareness:** In this study Metacognitive Awareness is defined as the students awareness about their own thinking and utilizing it in solving problems.

## **Aim of the study**

The broad aim of the present study will as follows:

To study the effect of Constructivist approach enhancing Metacognitive Awareness in Geometry among IX<sup>th</sup> standard students.

## **Objectives of the study**

- 1) To identify the pre-test scores of experimental group and control group with respect to Metacognitive Awareness.
- 2) To identify the post-test scores of experimental group and control group with respect to Metacognitive Awareness.
- 3) To compare the pre-test and post-test scores of experimental group and control group with respect to Metacognitive Awareness.

## **Hypothesis of the Research**

- 1) There is no significant difference in the pre-test scores of experimental group and control group with respect to Metacognitive Awareness.
- 2) There is no significant difference in the post-test scores of experimental group and control group with respect to Metacognitive Awareness.
- 3) There is no significant difference in pre and post-test scores of experimental group and control group with respect to Metacognitive Awareness.

## **Scope and Delimitations of the study**

Enhancing Metacognitive Awareness among IX<sup>th</sup> standard students was the main focus of the study. Through the present study researcher made an attempt to see whether Metacognitive Awareness was enhanced through Constructivist Approach or not. In the present study, researcher used Constructivist Approach to teach a very important topic from Geometry i.e. 'Circle'. The school for the study was the Co-educational, Marathi medium school, having SSC board and not other medium or board was considered. The present study was restricted only to

the students of the standard IX<sup>th</sup> and did not include students of other standards. The study was confirmed to Mumbai region only.

## Methodology of the Research

In the present Research, Researcher has employed Quasi-Experimental Design of Experimental method.

### The Pretest-Posttest Nonequivalent-Groups Design :

$O_1$  X  $O_2$

$O_3$  C  $O_4$  where X : Experimental group C: Control group

$O_1$  and  $O_3$  = Pre-test Scores  $O_2$  and  $O_4$  = Post-test Scores .

The difference of the means  $O_1$  and  $O_3$  scores and the difference between the mean of  $O_2$  and  $O_4$  scores are tested for statistical significance.

## Sampling

Purposive sampling was used for the selection of sample for the Experimental Research. In the present research, the researcher has inducted 40 students in Control group and 40 students in a Experimental group of Marathi medium of same school.

## Tools of the Research

In this research following tools were employed for collection of the necessary data:-

- 1] To measure the Metacognition Awareness of the students Metacognition Awareness Inventory certified by Schraw, G. & Dennison, R.S. (1994) was used.
- 2] Instructional Module on Constructivist Approach was prepared by researcher with the help of his guide.

## Major Findings and Conclusions

### Hypothesis

1) There is no significant difference in the pre-test scores of experimental group and control group with respect to Metacognitive Awareness

Table 1

Differences in Pre Test Scores of Metacognitive Awareness Inventory for Experimental and Control Groups

Variable	Group	N	Df	Mean	SD	t-ratio	Level of Significance
Metacognitive Awareness	Experimental	40	78	21.75	2.03	0.2830	Not Significant
	Control	40		21.32	2.06		

From above Table, for N=40, df=78, tabulated t=1.99 at 0.05 level and t=2.64 at 0.01

From the above table it can be seen that for df=78 the tabulated value are 1.99 and 2.64 at 0.05 and 0.01 levels of significance respectively. The obtained value of t is 0.2830 for Metacognitive Awareness which is less than the tabulated value at both levels of significance. Hence the hypothesis is accepted at both the levels of significance.

**Conclusion:** There is no significant difference in the pre-test scores of experimental group and control group with respect to Metacognitive Awareness.

2) There is no significant difference in the post-test scores of experimental group and control group with respect to Metacognitive Awareness.

Table 2

Differences in Post Test Scores of Metacognitive Awareness Inventory for Experimental and Control Groups

Variable	Group	N	Df	Mean	SD	t-ratio	Level of Significance
Metacognitive Awareness	Experimental	40	78	37.8	3.329	3.63022	significant
	Control	40		21.85	2.248		

From above Table, for N=40, df=78, tabulated t=1.99 at 0.05 level and t=2.64 at 0.01

From the above table it can be seen that for  $df=78$  the tabulated value are 1.99 and 2.64 at 0.05 and 0.01 levels of significance respectively. The obtained value of  $t$  is 3.630 for Metacognitive Awareness post test which are more than the tabulated value at both levels of significance. Hence the hypothesis is rejected at both the levels of significance.

**Conclusion:** There is significant difference in the post-test scores of experimental group and control group with respect to Metacognitive Awareness.

3) There is no significant difference in pre and post-test scores of experimental group and control group with respect to Metacognitive Awareness

Table 3

Differences in pre and post-test scores of experimental group and control group of Metacognitive Awareness Inventory for Experimental and Control Groups

Variable	Group	Test	N	Df	Mean	SD	t-ratio	Level of Significance
Metacognitive Awareness	Experimental	Pre	40	78	21.75	2.03	7.17	Significant
		Post	40		37.8	3.32		
	Control	Pre	40	78	21.32	2.06	0.186	Not Significant
		Post	40		21.85	2.24		

From above Table, for  $N=40$ ,  $df=78$ , tabulated  $t=1.99$  at 0.05 level and  $t=2.64$  at 0.01

From the above table it can be seen that for  $df=78$  the tabulated value are 1.99 and 2.64 at 0.05 and 0.01 levels of significance respectively. The obtained value of  $t$  is 7.17 for Experimental group of Metacognitive Awareness and for control group of same variable obtained value of  $t$  is 0.186.

The obtained value of  $t$  is 7.17 for Experimental group of Metacognitive Awareness for pre and post test, which is more than tabulated value, hence null hypothesis is rejected.

**Conclusion:** There is significant difference in pre and post test scores of Experimental Group.

The obtained value of  $t$  is 0.186 for Control group of Metacognitive Awareness for pre and post test, which is less than tabulated value, hence null hypothesis is accepted.

**Conclusion:** There is no significant difference in pre and post test scores of Control Group.

## **Discussion**

1) There is no significant difference in Pre Test Scores of Metacognitive Awareness Inventory for Experimental and Control Groups .The probable reason behind this could be that the students in the pre-test had not been taught the content. They had to rely on their previous knowledge regarding the questions asked. This also means that understanding level of both the group at the pre-test was the same. The probable reasons could be that the maturity level of both the group was same. May owe to lack of practice their performance in pre-test was less.

2) There is difference in the scores obtained by the post-test scores of control and experimental group. This shows that there was some effect of the module of Constructivist Approach strategy on the students after the treatment was given to them. The other reason could be that they would have practiced more looking since the new way of learning Geometry was innovative for them so they may have given more attention towards it. Students already knew traditional method, since Constructivist Approach strategy was innovative so they more concentrated more on the topic. And secondly it may have been easy to understand and involved interest and curiosity.

3) Metacognitive Awareness of Experimental group was increased. This shows that there was some effect of the module of Constructivist Approach strategy on the students after the treatment was given to them .The other reason could be that they would have practiced more looking since the new way of learning Geometry was innovative for them so they may have given more attention towards it. For Control group the treatment was not given hence their Metacognitive Awareness could not be increased by Traditional way of teaching.

## **Educational Implications of the study**

- Secondary school teachers can make use of the strategy for teaching difficult concept in Mathematics in Constructivist manner.
- Constructivist Approach should be used in Mathematics and Science teaching at the level of primary school, high school and college.
- Teachers training colleges can introduce the use of Constructivist Approach Strategies while conducting practice lesson.

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