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STUDY THE DIFFERENCE BETWEEN PRE-TEST AND POST-TEST OF METACOGNITIVE SKILLS OF IX STUDENTS IN EXPERIMENTAL AND CONTROL GROUP

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ABSTRACT:

The purpose of the study was to **Study the difference between Pre-test and Post-test of Metacognitive skills of IX students in Experimental and Control Group.** A total of 80 students of Class IX are included in the sample using random proportionate sampling technique. Among the other things, the study revealed that; i)The control group and experiment group have a similarity in pre-test scores of metacognitive skills of students; i) The experiment group is showing significant and higher improvement in metacognitive skills of students after posttest as compared to control group; iii) The control group and experiment group have a similar in pretest scores of first dimension of meta cognitive skills i.e. Knowledge about cognation of students; iv) The experiment group is showing significant and higher improvement in first dimension of metacognitive skills i.e. Knowledge about cognition of students after post-test as compared to control group

KEYWORDS: Metacognitive Skills, Experimental Group, Control Group

INTRODUCTION:

Definitions of Technical Terms

The operational definitions of the terms used in the present study are given below:

Constructivist based Facilitating Program

A teaching program which involves constructivist based teaching and which is student focused, interactive and responsive towards student interests and needs. The Constructivist based facilitating program on the Unit “Surface Areas and Volumes" in Mathematics of Class IX , is planned through the 5E model developed by Roger By bee based on the Constructivist theory to learning. The 5 phases of 5E Model are Engage, Explore, Explain, Expand and Evaluate.

Traditional Instructional Program

A teaching program which involves the conventional method and is flexible as per teaching competency of teacher is considered as Traditional Instructional Program. In this program the teaching of the Unit “Surface Areas and Volumes" in Mathematics of Class IX is planned through Motivation, Content Presentation, Recapitulation, Evaluation and Assignment according to traditional instructional program.

Experimental Group

The group, which is given learning experiences through Constructivist based facilitating program based on 5E Model is considered as the experimental group.

Control Group

The group, which is given learning experiences through traditional teaching program is considered as the control group.

Pre-experimental

The scores of mathematics subject of the students of the final examination of 8th standard, which is held in March-April 2019 in the sample school, of the experimental and control group will be treated as pre-achievement to know the equalization status of both groups. The Metacognitive Awareness Inventory self-regulated learning questionnaire and the critical thinking scale will be administered to both the groups.

Post-experimental

The scores of the test developed by researcher is considered as Post -Test. Post- test will be administered after the learning sessions on experimental and control group are completed and the score is considered as Post experimental. The test is based on the content of the Unit "Surface Areas and Volumes" in Mathematics of Class IX' and the learning objectives selected by the researcher for the experiment. The Metacognitive Awareness Inventory self-regulated learning questionnaire and the critical thinking scale will be administered to both the groups. Opinionnaire will be administered to the students of the experimental group to know their opinion about Constructivist based facilitating program.

Metacognition

Metacognition includes two components - knowledge of cognition and regulation of cognition. Knowledge of cognition deals with all the concepts, which are related to our thinking processes such as self-concept of knowledge, self-intelligence, self-memory, attention, study habits etc., and regulation of cognitive processes, includes all those mechanisms through which we regulate our thinking process, such as orientation, planning, monitoring, testing, repairing, evaluating, reflecting etc.

Self-regulated learning

Self-regulated learning is an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behaviour, guided and constrained by their goals and the contextual features in the environment. Self-regulated learning strategies help to prepare learners for lifelong learning and the improve capacity to transfer skills, knowledge, and abilities from one domain or setting to another.

Thinking strategies

Students use complex ways to think about what they are learning. Higher-order thinking takes thinking to a whole new level. Students using it are understanding higher levels rather than just memorizing mathematical facts. They would have to understand the facts, infer them, and connect them to other concepts. Critical thinking involves students thinking broadly and deeply using skills, behaviours and dispositions such as reason, logic, resourcefulness, imagination and innovation in all learning areas at school and beyond school.

According to Scriven (1996) : "Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action".

Objectives of the Study

The present study was designed with the following objectives in views :

1. Study the difference between control group and experimental group and experiment group with respect to pre-test and post-test of metacognitive skills of students.
2. Study the difference between control group and experimental group and experiment group with respect to pre-test and post-test of first dimension of meta cognitive skills i.e., Knowledge about cognition of students.

Null Hypotheses

Null Hypothesis 1: No significant difference between control group and experiment group with respect to pre-test and post-test scores of metacognitive skills of students.

Null Hypothesis 2: No significant difference between control group and experiment group with respect to pre-test and post-test scores of first dimension of meta cognitive skills i.e. Knowledge about cognition of students.

METHODOLOGY

This research study will delve into the effectiveness of constructivist based approach in mathematics. The study is quasi experimental in nature. Quasi-experimental designs provide experimental control in natural settings. Pre-test and Post-test comparisons will be conducted within group as it allows assessment of a pedagogical intervention by detecting differences in learning outcomes between two points of time, before and after the intervention. The present study will assign students randomly to groups and use identical measures to assess the learning outcomes of each group.

Sample

To collect the needed data for the study the researcher prepared and used Instructional materials. Researcher will develop different instructional materials which will help in imparting instruction and facilitate learning. The constructivist based approach facilitating program will have 30 lessons on the Unit “Surface Areas and Volumes” in subject Mathematics of Class IX for the experimental group and the traditional method of teaching for the control group.

The sample for the present study is an urban government school in Dharwad district, selected for conducting the experiment for the study. One section of Class IX of the school will be taken as the Experimental group and the other section as the Control group.

The Experimental group consisting of 40 students will be given treatment in Constructivist Based approach whereas the Control group consisting 40 students will be given treatment in Traditional Method of Teaching. A total of 80 students of Class IX are included in the sample using random proportionate sampling technique.

Tools

For the collection of the data following tools were employed by the investigator, Metacognitive Awareness Inventory (MAI) designed and tested by Schraw and Dennison in 1994 will be used to measure the metacognitive skills of ninth class students. This tool will be administered before the treatment and after the treatment.

Statistical Techniques

Descriptive Statistics

Analysis and Interpretation

Null Hypothesis 1: No significant difference between control group and experiment group with respect to pre-test and post-test scores of metacognitive skills of students.

To accomplish above hypothesis or assumption, the independent t-test was applied and the results are presented in the following table.

Table-1: Results of independent t-test between control group and experiment group with respect to pre-test and post-test scores of metacognitive skills of students.

Time	Groups	Mean	SD	t-value	p-value
Pretest	Experiment group	30.35	3.78	-1.4925	0.1396,NS
	Control group	31.75	4.57		
Posttest	Experiment group	29.08	3.35	-16.0054	0.0001,S
	Control group	40.80	3.20		

From the results of the above table, it can be seen that

- No significant difference was observed between control group and experiment group with respect to pre-test scores of metacognitive skills of students (t=-1.4925, p=0.1396) at 5% level of significance. Hence, the above null hypothesis is rejected and alternative hypothesis is accepted. It means that, the pre-test scores of metacognitive skills of students is similar in control group and experiment group. We conclude that, the control group and experiment group have a similarity in pre-test scores of metacognitive skills of students.
- A significant difference was observed between control group and experiment group with respect to posttest scores of meta-cognitive skills of students at 5% level of significance (t=-16.0054, p=0.0001). Hence, the above null hypothesis is accepted and alternative hypothesis is rejected. It means that, the post-test scores of metacognitive skills of students are significantly higher in experiment group as compared to control group. We conclude that, the experiment group is showing significant and higher improvement in metacognitive skills of students after posttest as compared to control group. The mean and SD of pretest and posttest scores of metacognitive skills of students are also presented in the following figure.

Null Hypothesis 2: No significant difference between control group and experiment group with respect to pre-test and post-test scores of first dimension of meta cognitive skills i.e. Knowledge about cognition of students.

To accomplish above hypothesis or assumption, the independent t-test was applied and the results are presented in the following table.

Table-2: Results of independent t-test between control group and experiment group with respect to pre-test and post-test scores of first dimension of metacognitive skills i.e. Knowledge about cognition of students

Time	Groups	Mean	SD	t-value	P-value
Pretest	Experiment group	10.50	1.57	-0.9551	0.3425,NS
	Control group	10.90	2.13		
Posttest	Experiment group	9.88	1.83	-10.3688	0.0001,S
	Control group	13.75	1.50		

From the results of the above table, it can be seen that

- No significant difference was observed between control group and experiment group with respect to pre-test scores of first dimension of metacognitive skills i.e. Knowledge about cognition of students (t=-0.9551, p=0.3425) at 5% level of significance. Hence, the above null hypothesis is rejected and alternative hypothesis is accepted. It means that, the pre-test scores of first dimension of metacognitive skills i.e. Knowledge about cognition of students is similar in control group and experiment group. We conclude that, the control group and experiment group have a similar in pretest scores of first dimension of meta cognitive skills i.e. Knowledge about cognation of students.

- A significant difference was observed between control group and experiment group with respect to posttest scores of first dimension of meta cognitive skills i.e. Knowledge about cognition of students (t=-10.3688, p=0.0001) at 5% level of significance. Hence, the above null hypothesis is accepted and alternative hypothesis is rejected. It means that, the post-test scores of first dimension of meta cognitive skills i.e. Knowledge about cognition of students are significantly higher in experiment group as compared to control group. We conclude that, the experiment group is showing significant and higher improvement in first dimension of metacognitive skills i.e. Knowledge about cognition of students after post-test as compared to control group. The mean and SD of pre-test and post-test scores of first dimension of metacognitive skills.

DISCUSSION AND CONCLUSION

In this study, the researcher aimed to **Study the difference between Pre-test and Post-test of Metacognitive skills of IX students in Experimental and Control Group..** From the analysis report, it is concluded that; i)The control group and experiment group have a similarity in pre-test scores of metacognitive skills of students; i) The experiment group is showing significant and higher improvement in metacognitive skills of students after posttest as compared to control group; iii) The control group and experiment group have a similar in pretest scores of first dimension of meta cognitive skills i.e. Knowledge about cognation of students; iv) The experiment group is showing significant and higher improvement in first dimension of metacognitive skills i.e. Knowledge about cognition of students after post-test as compared to control group

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