EFFECTIVENESS OF REFLECTIVE THINKING STRATEGY ON ACHIEVEMENT IN MATHEMATICS OF SECONDARY SCHOOL STUDENTS OF COASTAL AREA

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HYPOTHESES

1. There exists significant difference in the mean pre-test scores in Achievement in Mathematics of the experimental and the control group of the Secondary School Students of coastal Area.

2. The mean post test scores in Achievement in Mathematics of the experimental group will be significantly higher than the mean post test scores of the control group for the total sample and subsamples based on Gender.

3. There exists significant difference in the mean gain scores of the experimental group and the control group.

4. The mean post test scores in Achievement in Mathematics of the experimental group will be significantly higher than the mean post test scores of the control group for the Secondary School Students of Coastal Area under the category of objectives (a) Understanding (b) Application (c) Skill.

OBJECTIVES OF THE STUDY

1   To compare the mean pre-test scores in Achievement in Mathematics of the experimental and control group of the Secondary School Students of Coastal Area.

2   To compare the mean post test scores in Achievement in Mathematics of the experimental and control group for the total sample and subsamples based on Gender.

3   To test the significance of mean gain score of the experimental and control group in Achievement in Mathematics.

4   To compare the mean post test scores in Achievement in Mathematics of the experimental and control group for the Secondary School Students of Coastal Area under the category of objectives (a) Understanding (b) Application (c) Skill.

METHODOLOGY IN BRIEF

Design of the study

The method adopted for the investigation was the experimental study.The design assigned for the study is the *pre-test post-test Non equivalent group design.* Two class divisions were treated as the experimental group and other two as the control group. The selected chapters were taught through the Reflective Thinking Strategy for the experimental group and conventional method used for the control group for twelve class periods, each of having 45 minutes.

Variables

The independent variables are the methods of instruction viz.

- Reflective Thinking Strategy
- Conventional Method

The dependent variable used in the study is Achievement in Mathematics

Sample

In this study, the investigator selected a sample of 100 secondary school students of Std. IX who are residing in the coastal area of Thiruvananthapuram district.

Tools

The researcher used the following tools for the collection of data required for the study.

- Lesson transcripts based on Reflective Thinking Strategy.

- Lesson transcripts based on Activity – Oriented Method (Conventional Method)

- Standardised Achievement Test in Mathematics

Statistical Techniques

The researcher used the following statistical techniques to analyse the data:

  a. t – test

  b. ANCOVA

ANALYSES

The details of the analysis and interpretation of data are given under the following heads:

Comparison of the Mean pretest scores in Mathematics between the Experimental group and the Control group.

Comparison of the Mean Achievement Scores in Mathematics between Experimental and Control groups for the total sample and subsamples based on Gender.

Comparison of the Mean gain scores in Mathematics between the Experimental group and the Control group.

Comparison of the Mean Achievement Scores in Mathematics between Experimental and Control groups under each category of objectives

      a) Understanding
      b) Application
      c) Skill

SUMMARY OF FINDINGS

The different statistical analysis enabled the investigator to summarize the major findings of the study as follows:

1. Achievement in Mathematics of Secondary School students taught through Reflective Thinking Strategy is significantly higher than that of students taught through Conventional Method.

This conclusion is deducted from the following findings:

A) The mean of the post-test scores of experimental group taught through Reflective Thinking Strategy (M=41.54) was found to be greater than that of control group taught through Conventional Method (M=30.96). The Critical Ratio obtained is 8.49(P<0.01) between the means of experimental group and control group. This throws light on to the fact that experimental group has superiority over the control group in Achievement in Mathematics.

B) The ANOVA of pretest and post test scores of experimental group and control group showed that there is a significant difference between the means of the post-test scores of two groups(F_Y=72.05;p<.01).This indicates that experimental group exceeds control group in Achievement in Mathematics.

C) The comparison of the adjusted means of pretest scores of experimental and control group showed that there is a significant difference between the groups. The value of the ANCOVA ($F_{Y.X}$=164.97) is significant at 0.01 level. Hence it is clear that the final average score on achievement after adjusted for the initial difference in experimental group is significantly higher than that of the control group. So it can be concluded that the Reflective Thinking Strategy is statistically effective than the Conventional Method for teaching Mathematics at secondary level for students in Coastal Area.

D) A t-value 13.37 is obtained by comparing adjusted means of experimental and control group. This showed a significant difference exists between experimental group and control group.

2. Achievement in Mathematics of Girls taught through Reflective Thinking Strategy is significantly higher than that of students taught through Conventional Method.

The t-value obtained between girls of experimental group and control group (t=5.98) shows the superiority of girls in experimental group over the girls in control group.

3. Achievement in Mathematics of Boys taught through Reflective Thinking Strategy is significantly higher than that of students taught through Conventional Method.

The t-value obtained between boys of experimental group and control group (t=5.90) shows the superiority of boys in experimental group over the boys in control group.

4. Gain score of Achievement in Mathematics of Secondary School students taught through Reflective Thinking Strategy significantly differ from students taught through Conventional Method.

The mean of the gain scores of experimental group taught through Reflective Thinking Strategy (M=13.2) was found to be greater than that of control group taught through Conventional Method (M=6.9). The Critical Ratio obtained is 9.46(P<0.01) between the experimental group and control group. This shows the superiority of experimental group over the control group.

5. Achievement in Mathematics of Secondary School students taught through Reflective Thinking Strategy significantly differs from students taught through Conventional Method under the objective UNDERSTANDING.

This conclusion is deducted from the following findings:

A) The ANOVA of pretest and post test scores of objective Understanding of experimental group and control group showed that there is a significant difference between the means of the post-test understanding scores of two groups(F_Y=29.48;p<.01).This indicates that experimental group exceeds control group in Understanding scores.

B) The comparison of the adjusted means of pretest scores of experimental and control group showed that there is a significant difference between the groups. The value of the ANCOVA ($F_{Y.X}$=25) is significant at 0.01 level. Hence it is clear that the final average score on achievement after adjusted for the initial difference in experimental group is significantly higher than that of the control group. So it can be concluded that the Reflective Thinking Strategy is statistically effective than the Conventional Method for teaching Mathematics at secondary level for the objective understanding.

C) A t-value 5.19 is obtained by comparing adjusted means of experimental and control group. This showed a significant difference between experimental group and control group.

6. Achievement in Mathematics of Secondary School students taught through Reflective Thinking Strategy is significantly higher than that of students taught through Conventional Method under the objective APPLICATION.

This conclusion is deducted from the following findings:

A) The ANOVA of pretest and post test scores of objective Application of experimental group and control group showed that there is a significant difference between the means of the post-test application scores of two groups($F_Y=77.29$;p<.01).This indicates that experimental group exceeds control group in Application scores.

B) The comparison of the adjusted means of pretest scores of experimental and control group showed that there is a significant difference between the groups. The value of the ANCOVA ($F_{Y.X}=80.84$) is significant at 0.01 level. Hence it is clear that the final average score on achievement after adjusted for the initial difference in experimental group is significantly higher than that of the control group. So it can be concluded that the Reflective Thinking Strategy is statistically effective than the Conventional Method for teaching Mathematics at secondary level for the objective Application.

C) A t-value 9.48 is obtained by comparing adjusted means of experimental and control group. This showed a significant difference between experimental group and control group.

7. Achievement in Mathematics of Secondary school students taught through Reflective Thinking Strategy is significantly higher than that of students taught through Conventional Method under the objective SKILL.

This conclusion is deducted from the following findings:

A) The ANOVA of pretest and post test scores of objective Skill of experimental group and control group showed that there is a significant difference between the means of the post-test skill scores of two groups(F_Y=5.92;p<.05).This indicates that experimental group exceeds control group in post test Skill scores at 0.01 level.

B) The comparison of the adjusted means of pretest scores of experimental and control group showed that there exists no significant difference between the groups. The value of the ANCOVA ($F_{Y.X}$=3.46) is not significant even at 0.05 level. Hence there exists no significant difference beteen final average score on achievement after adjusted for the initial difference in experimental group and the control group. So it can be concluded that the Reflective Thinking Strategy is not statistically effective than the Conventional Method for teaching Mathematics at secondary level for the objective Skill.

C) A t-value 2.32 is obtained by comparing adjusted means of experimental and control group. This showed a significant difference between experimental group and control group.

EDUCATIONAL IMPLICATIONS

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Reflective Thinking Strategy gives an insight into the learning process to each student. Thus, they can understand the content and methods thoroughly through this method. As this is a learner centered approach, this improves the motivation level as well as the interest level of the student. This is an effective method to reduce wastage and stagnation occurs especially in coastal area. Reflective Thinking Strategy helps the students to develop higher order thinking skills like creative thinking, critical thinking and skill of problem solving. The retention of the student improves with reflection. Correct concept formation can be attained through this method. The transfer value of the content learned is higher when compared to other methods. Meaningful learning occurs through this strategy which enables the student to achieve more. This helps the student to approach Mathematics without fear. Reflective Thinking Strategy leads the student to learning to learn.

CONCLUSION

The study revealed that teaching through Reflective Thinking Strategy is superior to the Conventional Method in enhancing Mathematics Achievement for the total sample and subsamples based on Gender and also for attaining different objectives viz. UNDERSTANDING, APPLICATION, SKILL.