
CHAPTER-V

CONCLUSIONS

5.0.0 INTRODUCTION

The results, summary, implications and conclusions presented in the current chapter are based on the previous chapter. The chapter four presented data analysis, results and interpretations. Objective-wise interpretation of results and the related discussions are presented, below, under different headings in this chapter. Summary, implications and suggestions for further studies are also being part of this chapter.

Objective-wise findings and interpretation of results with discussions have been presented in this section under different sub-headings.

5.1.0 FINDINGS

Objective-wise findings are presented in Chapter – IV, under different sub-headings. Findings flow from the interpretation of data presented in the previous chapter. Findings of the present study are presented, below.

- The students of Experimental Group achieved higher in Mathematics than the students of Control Group. Therefore, it can be inferred from the result of the present study that Self-Regulated Learning was more effective than the Traditional Method of Teaching in terms of Achievement in Mathematics. The students taught through the Self-Regulated Learning method were higher than the Traditional Method of Teaching.
- The students of Experimental Group slightly lower attitude towards Mathematics than the students of Control Group. Therefore, it can be inferred from the result of the present study that Self-Regulated Learning method was more effective than the Traditional Method of Teaching in terms of student's Attitude towards Mathematics. The Attitude towards Mathematics of students taught through the Self-Regulated Learning was nearly similar to the students taught through the Traditional Method of Teaching.

- There is a significant effect of Treatment (Self-Regulated Learning) on Achievement in Mathematics Subject of Class IX students as compared to traditional method.
- There is no significant effect of Gender on Achievement in Mathematics of Class IX students.
- There is no significant interaction effect of Treatment and Gender on Overall Achievement in Mathematics of Class IX students.

5.2.0 EFFECT OF SELF REGULATED LEARNING IN MATHEMATICS OF CLASS IX STUDENTS

The Self-regulated learning was found to be effective in terms of Achievement of students in Mathematics with Achievement test scores. Zimmerman et al.'s (1992) study found that students' personal goals played a key role in their grade attainment, thereby providing support for a social cognitive view of academic self-regulation. In accordance with prior research, the higher students' perceptions of their own self-efficacy, the higher the goals they set for themselves (Bandura & Wood, 1989). The influence of parents' goal-setting for students additionally influenced academic attainment, largely by fostering self-motivation. In other words, students who felt that their parents had high goals for their grades personally sought to attain those goals (Zimmerman et al., 1992). The results of the present investigation are an outcome of the comparison of two types of methods used to teach the students; those are Self-regulated learning and Traditional method of teaching. Consequently, it may be concluded that the Self-regulated learning used as a teaching strategy led to the results observed in this study.

5.3.0 ATTITUDE TOWARDS MATHEMATICS OF CLASS IX STUDENTS

The students of the Experimental Group have a slightly lower attitude towards Mathematics than the students of the Control Group. Therefore, it can be inferred from the result of the present study that Self-regulated learning was more effective than the Traditional Method of Teaching in terms of student's Attitude towards Mathematics. Pape, Bell & Yetkin [2008] reported the results of a one year long intervention of developing pupils' SRL skills in a seventh grade class. During the classes students were encouraged to make their solutions public, to name and describe their strategies, to use multiple representations while solving the problems. After the

intervention period students were more able than previously to communicate mathematical understanding and justify their mathematical reasoning. A small proportion of students recognized the relationship between the strategies they used and the grades they got. Samuelsson [2013] has studied the impact of three different teaching methods, traditional (with mostly frontal activities at the blackboard), independent work, and problem-solving on seventh grade pupils' arithmetic and self-regulated learning skills. The results show that students' self-conception is affected more with traditional or problem-solving methods. This is because with these methods they get feedback from the teacher and from their colleagues. The interest of the pupils towards Mathematics was best developed by the problem-solving method. The results of the present investigation are an outcome of the comparison of Attitudes of students towards Mathematics between two groups of students studying through different methods those are Self-regulated learning and Traditional method of teaching. Consequently, it may be concluded that Self-regulated learning and the Traditional Method of Teaching used as teaching strategies led to the results observed in this study. Therefore, it may be stated that Attitude of Students towards Mathematics was independent of their achievement in Mathematics.

5.4.0 EFFECT OF TREATMENT ON ACHIEVEMENT IN MATHEMATICS OF CLASS IX STUDENTS

The effect of Treatment on Achievement in Mathematics of Class IX students was found significant by taking their Pretest scores of Achievement in Mathematics as a covariate. Therefore, it may be said that the Self-Regulated Learning method made a significant difference in the Achievement in Mathematics of Class IX students. Perry et al. (2002) asserted that, by embedding assessments and evaluation into the classroom's ongoing activities, teachers created non threatening and intrinsically motivating learning contexts. In these classrooms, students demonstrated attitudes and actions that were aligned with independent, academically effective learners' meta-cognition, intrinsic motivation, and strategic action. Perry et al.'s (2002) work continues to be a seminal example of not only SRL's existence as a concept, but it's practical ability to advance academic achievement for students as young as primary school. Mathematics involves a lot of communication with other people and develops patience and perseverance in Students. Students were taught through Self-Regulated

Learning, constantly, throughout the interventions to make conscious improvements. After forty-five days of interventions, a significant difference was observed when compared to the Control group of the study. Therefore, it may be stated that the Self-Regulated Learning made a significant difference in the Achievement in Mathematics of Class IX students as compared to the Traditional method of teaching.

5.5.0 Effect of Gender on Achievement in Mathematics of Class IX Students

The effect of Gender on Achievement in Mathematics of Class IX students was not found significant when their pre-test scores of Achievement in Mathematics was taken as covariate. According to the study done by Dursun and Dede (2004), teachers suggest that gender does not have a significant effect on mathematical achievement. There are also some other studies in the literature that the attitudes of students towards mathematics do not change significantly according to gender (Bulut, Yetkin & Sazak, 2002; Çelik & Ceylan, 2009; Georgiou, Stavrinides & Kalavana, 2007; McGraw, Lubienski, & Strutchens, 2006; Yücel & Koç, 2011) Hyde, Fennema, Ryan, Frost and Hopp (1990) emphasizes that students are influenced by attitudes regardless of gender, and gender is not a determining factor here. Various Surveys reported that Men participated more in an active learning course in math, Science, technology and engineering, while women reported lower perceptions of their scientific abilities, were more aware of gender identity and more likely to feel judged based on gender. Various Surveys also reported that Women participated more in an active learning course in math, Mathematics, technology and engineering. In the present study, two aspects are taken into consideration, those are Male and Female and their achievement score was calculated. All the students were taught through Self-regulated learning method and allowed to make their own progress individually. Therefore, it may be said that Gender did not produce a significant differential effect on the Achievement in Mathematics of Class IX students when their pre-test scores of Achievement in Mathematics was taken as covariate.

5.6.0 Interaction of Treatment and Gender on Achievement in Mathematics of Class IX Students

The interaction between Treatment and Genders on Overall Achievement in Mathematics of Class IX students was not found to be significant when their pre-test

scores of Achievement in Mathematics was considered as covariate. The results indicated that the Boy and Girl Students were benefited to the same extent with both modes of teaching. . Thus, Gender differential was not noticed in the said interaction on Achievement. But, the mean achievement scores of boys and girls of the Experimental group were higher than that of the boys and girls of the Control group. Further, achievement of boys of Experimental group was found higher than their girls' counterparts of the same group. But in the control group girls achieved higher than the boys of the same group. It may, therefore, be said that gender of the pupils did not affect their achievement in Mathematics in both experimental and Control groups to the same degree.

5.7.0 SUMMARY

5.7.1 Introduction

One subject that is necessary to all the Mathematics is mathematics. It is the main vehicle for developing students' logical thinking and higher-order cognitive skills since it plays a major role in a number of other scientific fields such as physics, engineering, and statistics. With these connections, strong understanding and good achievement in mathematics of the students are required and necessary.

Many interventions are positively linked to the mathematical performance of the students and one of which is the self-regulated learning (SRL) strategies. According to Zimmerman (2008), self-regulated learning (SRL) is one of the determinants of performance of the students. It is an academically effective form of learning through which the learner set goals and make plans before starting to learn; monitor and regulate his/her cognition, motivation and behavior during the learning process; and reflect on his/her learning process.

5.7.2 Statement of the Problem

Effectiveness of self regulated learning for teaching mathematics to class IX student of Balasore district.

5.7.3 Rationale of the Study

Self-regulation is viewed as the fourth 'R' of education as critical to student success as a firm foundation in reading, writing and arithmetic (The fourth R, 2014). This analysis of literature is important because no recent reviews of studies on self-

regulated learning are available. This review reveals the growing importance of self-regulated learning researches and focuses on the factors that affect self-regulated learning and on the students' learning outcomes from application of self-regulated learning.

There is emerging evidence that SRL protocols demonstrate strong psychometric properties for motoric tasks such as serving a volley ball, dart throwing, or shooting a basketball free-throw. Across such tasks, SRL protocols have been shown to differentiate high and low achievers and predict future achievement (Cleary & Zimmerman, 2001; Cleary, Zimmerman, & Keating, 2006; Kitsantas & Zimmerman, 2002).

Since many SRL measures consist of single items, reliability is most often calculated in terms of inter-rater reliability. Several studies have shown that SRL measures display acceptable reliability (Cleary, Callan, & Zimmerman, 2012; Cleary & Zimmerman, 2001; Cleary et al., 2006; Kitsantas & Zimmerman, 2002).

5.7.4 Objectives Of The Study

- To study the self regulated learning in mathematics of class IX students of Balasore district.
- To study the attitude towards mathematics of class IX of Balasore district.
- To study the area , gender and their interaction on self regulated learning in mathematics of Balasore district.

5.7.5 Hypotheses

- There is no significant difference between the self-regulated learning method of teaching in mathematics and the traditional method of teaching in mathematics of class IX students of Balasore district.
- There is no significant relationship between attitudes towards mathematics of class IX student of Balasore district.
- There is no significant difference between the treatment of boys and girls and their interaction of self-regulated learning in mathematics of Balasore district.

5.7.6 Methodology

The Experimental method will be employed for the study. The main purpose of a self-regulated learning is to establish an acceptable model that can consistently define the relationship between the independent variables and the dependent variables using the least number of variables possible. The dependent variable of the study was the “self regulated learning” of the students and the independent variables were effect of treatment, gender and their interaction on achievement in mathematics.

5.7.7 Design

Nonequivalent control group design was employed for the study

5.7.8 Sample

In this research the stratified random sampling was used. The size of the sample was 60 students of Balasore district. All students are divided in to two groups. One Experimental Group and other was Controlled Group. There are thirty students present in each group. For this research two schools were taken randomly named Kansh high school, Kansh and Panchayat high school, Narsinghpur from Balasore district. The students of Panchayat high school, Narsinghpur were chosen as Experimental group and the students of Kans high school, Kansh were chosen as the Controlled group.

5.7.9 Tools

There were two types of tools used the first one was Achievement test in mathematics which was developed by the investigator. The second one was Attitude towards mathematics scale which was developed by Dr. Ali Imam (Lucknow) and Dr. Tahira Khatoon (Aligarh) in the year 2015.

5.7.10 Procedure of Data Collection

Two school of Balasore district will be selected randomly and from each school 30 student of class IX will be selected randomly. One school will be designated as experimental group another school will be designated as controlled group.

The experimental group will be taught through the specially designed contents in mathematics and the controlled group student will be taught through the traditional teaching method. Treatment of 45 days will be given to both the groups as per the respective methods mentioned above before given the treatment of 45 days, the attitude towards mathematics scale (Dr. Ali Imam (Lucknow) and Dr. Tahira Khatoon (Aligarh), 2015) will be administered to both the groups. Previous year mathematics achievement marks of the students of respective groups will be collected from school register.

An achievement test in mathematics would be developed by the investigator and would be administered at the end of the treatment of 45 days to both the groups. Both the tools will score properly and data will be analyzed using the appropriate statistical techniques.

5.7.11 Statistical Techniques Used For the Analysis of Data

In this research Mean, Standard Deviation, Percentile, Co-efficient of variation and 2×2 factorial designed. ANCOVA of unequal sized were used for analysis of data.

5.7.12 Finding

The finding from the research are, the students of Experimental Group achieved higher in Mathematics than the Control Group when taught through the self Regulated Learning method. The students of Experimental Group slightly lower attitude towards Mathematics than the Control Group when taught through the self Regulated Learning method. There is a significant effect of Treatment (Self-Regulated Learning) on Achievement in Mathematics Subject of Class IX students as compared to traditional method. There is no significant effect of Gender on Achievement in Mathematics of Class IX students. There is no significant interaction effect of Treatment and Gender on Overall Achievement in Mathematics of Class IX students.

5.8.0 IMPLICATIONS

The implications of this study are valuable for the field of education, not just in mathematics, but in all study areas. The results found through this study varied from what research suggests. Therefore, there is a need for another study to be conducted.

When another study is conducted there are changes that should take place for better results to possibly occur. First, understanding that there is a need for students to be self-regulated in their learning is vital. Today, there are many online classes being offered in which the students are required to regulate their learning. This study showed that when students are regulating their learning there is not a direct relationship to a higher achievement level. Second, it shows that there cannot be an instant change in grades when the teaching strategy is differentiated. To develop a concise understanding, the new strategy will take time and practice to develop the learners into confident self-regulated students.

With continued research on the achievement level of mathematics due to self-regulated learning methods, a researcher could conduct a very similar study. This research confirmed that self-regulated learning does not always produce a higher achievement level. This result has many contributing factors and possible reasons why this may have occurred. However, the researcher continues to argue that with the possible resources, time, and increased student population, the results of this study would have differed. The researcher would recommend that this study be done again as a longitudinal study using the same students over a three-year time span. This time would allow students to master the study strategy and understand the value of self-regulated learning. The shortest amount of time the researcher suggests would be two years. Forty-five days was not enough time to develop self-regulation in a classroom. Overall it appears as though the treatment was effective and worthwhile. The requirements for implementation are minimal, especially when weighed against the possible benefits. Adding explicit self-regulated learning strategy instruction is a small but valuable addition to mathematics content instruction. The recommendation for mathematics teachers would be to include explicit self-regulated learning strategy instruction.

5.9.0 SUGGESTION

Taking into consideration the present studies and its findings the following studies may further be conducted.

1. The study may be conducted by taking the different samples of different classes of different level taking into consideration the other cognitive and psychomotor variables.
2. Studies may be conducted in e-content developed by different agencies for studying its effectiveness.
3. Studies may be conducted for making comparison of different methods by taking selected variables.
4. Studies may be conducted in the area of inclusive education and studying effectiveness of the approach in terms of cognitive and other demographic variables.
5. Studies may be conducted administering this research in tribal area to find out the problems present there.
6. Studies may be conducted using this study to analyze self-regulated learning in Subjects other than mathematics.
7. Studies may be conducted for the findings of the current dissertation and examine the predictive validity of additional Self-regulated learning processes across a continuum of achievement situations.
8. Studies may be conducted for how Self-regulated learning relates to both task specific and global outcomes in additional academic settings.
9. Studies may be conducted for the application of Self-regulated learning data to inform teacher's instructional practices.
10. Studies may be conducted for examining new and currently existing Self-regulated learning intervention programs from a component analysis perspective with Self-regulated learning measures could be a fruitful research venture.
11. Studies may be conducted Applying this study to rural and urban area schools and compare their results.

5.10.0 CONCLUSION

Although the effect size was small, the findings are encouraging. The students in the Experimental group indicated they used self-regulated learning strategies more than the Controlled group. It is not surprising that both groups of students indicated they used some self-regulated learning strategies and that use increased for both groups of students. For this study, the treatment went beyond a focus on traditional study skills to include strategies of self-regulation. This was evident when the investigation indicated significant differences, with the treatment group showing greater frequency of self-regulated learning strategy use when analyzed as a whole. The intent of explicit self-regulated learning strategy instruction is to help students learn strategies which will support their efforts to reach learning goals. This is evident by the significantly higher mathematics achievement scores realized by the Experimental group.

These findings complement other research studies that indicate that self-regulation can be taught (Zimmerman, 2002) and that the instruction is most effective when it is imbedded in content instruction (Pape & Smith, 2002; Randi & Corno, 2000). Zimmerman's (1986) work indicates that there are benefits for students who take an active role in their own learning, which is what using self-regulated learning strategies enable students to do. Based on this study, it appears that students can be taught to take an active role in their own learning and when that occurred mathematics achievement increases.

In this age of school accountability, teachers and administrators are always looking for programs that will increase student achievement. The findings from this study indicated that including explicit self-regulated learning strategy instruction may be a beneficial addition for this purpose. Even though the effect size was small, it was heartening to see that the Experimental group showed both significantly higher mathematics test scale scores. It is very difficult to demonstrate a significant change in scale scores by introducing a small supplement to instruction, so even a minimal increase is worth investigating further.

It is important to note that students' use of self-regulated learning strategies explained a significant percentage of the variance in both mathematics test scale scores. This provides evidence that there is a connection between students' use of self-regulated

learning strategies and their mathematics achievement. This is also not surprising. The current research indicates that to be the case (Pape & Smith, 2002).