5.0 INTRODUCTION

Students feel the subject Mathematics is very difficult to understand. Also they come across the fact that once if they understand the concept then it is a very easy subject. How to understand the concept is the very big problem among students. Hope this Mind map strategy will give solutions to their problem in different angle. This research invites the student to use their left as well as the right brain. Not only the students but also encourage the High school teachers to engage with Mind maps.

5.1 STATEMENT OF THE PROBLEM

Researcher reviewed the related researches. Orhan Akinoglu, and Zeynep Yasar. (2007). studied the effects of note taking in science education through the mind mapping technique on students’ attitudes, academic achievement and concept learning. Thangarajathi, S. (2008). found out the effectiveness of Mind mapping technique in teaching Mathematics at High school level in terms of sex, parental educational qualification and parental income. Toi, H. (2009). revealed that the mind map improves memory. Anthony, V., D'Antoni, Genevieve, P., Zipp, Valerie, G., Olson, and Terrence, F., Cahill. (2010). investigated the mind map learning strategy facilitate information retrieval and critical thinking in medical students. Ertug Evrekli, Didem Inel, and Ali Günay Balim. (2010). found out the development of a scoring system to assess mind maps. From the review, it was recognized that very few researches are done on Mind map in India. The present study is entitled as, “THE IMPACT OF MIND MAP TEACHING STRATEGY ON ACHIEVEMENT IN MATHEMATICS AND CERTAIN SELECT VARIABLES OF HIGH SCHOOL STUDENTS”.
5.2 NEED AND SIGNIFICANCE OF THE STUDY

National Policy of Education (1986) remarkably suggests that “mathematics should be visualized as the vehicle to train the child to think, reason, analyze and articulate logically.” Attainment or achievement in mathematics is based on mastery of fundamental skills. The new curriculum in mathematics at secondary school level demands for rapid learning and clear understanding of new curriculum. In this curriculum more concepts, theories, theorems, principles, axioms, postulates, formulae have to be taught and students have to be trained in solving numerical problems. Many researchers are in thirst to find out, through which methodology, understanding mathematics can made easy and reach highest performance. A team from World Bank, Venita Kaul, Deepa Sankar and Savita Dhingra and European commission, Shanti Jagannathan visited the SSA programme in Tamil Nadu, from August 19-21, 2008 with the objectives of learning and understanding the education reform and the active learning methodology (ALM) programme in upper primary schools. A key feature of an ALM class is to encourage each student to prepare a ‘mind map’ of a particular concept or theme. This cause the investigator to study on “the impact of mind map teaching strategy on achievement in mathematics and certain select variables of High school students”.

5.3 OBJECTIVES OF THE STUDY

The study has the following objectives

1. To develop and validate Mind Map teaching strategy for teaching Mathematics to the High school students.
2. To construct and validate a tool to assess the Achievement in Mathematics and scale of Attitude towards Mind map teaching strategy of High school students.
3. To study the Achievement in Mathematics of High school students learning mathematics through mind map teaching strategy and through conventional Lecture method.

4. To study the impact of Mind map teaching strategy on Achievement in Mathematics of High school students over the Conventional lecture method.

5. To study the Attitude towards Mind map teaching strategy and Problem solving ability in Mathematics of High school students.

6. To find out the correlation between Achievement in Mathematics and Attitude towards Mind map teaching strategy; Attitude towards Mind map teaching strategy and Problem solving ability in Mathematics; and Problem solving ability in Mathematics and Achievement in Mathematics of High school students.

7. To recommend the results of Mind map teaching strategy for Policy making at High School Programme.

5.4 VARIABLES OF THE STUDY

The Independent variable is the Mind map teaching strategy.

The Dependent variable is the Achievement in Mathematics. It is studied with following four criteria

- Knowledge
- Understanding
- Application and
- Skills.

Attitude towards Mind Map teaching strategy and Problem solving ability in Mathematics of High school students are some more variables taken for the study.
5.5 HYPOTHESES OF THE STUDY

Based on the objectives and variables the following null hypotheses were framed

1. There is no significant difference in the Achievement in Mathematics between the control group and experimental group High school students.

2. There is no significant difference in the Achievement in Mathematics with respect to the objective Knowledge between the control group and experimental group High school students.

3. There is no significant difference in the Achievement in Mathematics with respect to the objective Understanding between the control group and experimental group High school students.

4. There is no significant difference in the Achievement in Mathematics with respect to the objective Application between the control group and experimental group High school students.

5. There is no significant difference in the Achievement in Mathematics with respect to the objective Skills between the control group and experimental group High school students.

6. There is no significant difference in the Attitude towards Mind map teaching strategy between the control group and experimental group High school students.

7. There is no significant difference in the Knowledge dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students.

8. There is no significant difference in the Emotion dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students.
9. There is no significant difference in the Skills dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students.

10. There is no significant difference in the Creativity dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students.

11. There is no significant difference in the Problem solving dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students.

12. There is no significant difference in the Problem solving ability in Mathematics between the control group and experimental group High school students.

13. The Mind map teaching strategy is not effective in enhancing the Achievement in Mathematics of High school students than the Conventional lecture method.

14. There is no significant correlation between the Achievement in Mathematics and Attitude towards Mind map teaching strategy of High school students.

15. There is no significant correlation between the Attitude towards Mind map teaching strategy and Problem solving ability in Mathematics of High school students.

16. There is no significant correlation between the Problem solving ability in Mathematics and Achievement in Mathematics of High school students.

5.6 METHODOLOGY

5.6.1 METHOD

To study the impact of mind map teaching strategy, the pre-test, Treatment, post-test equivalent group experimental design was adopted in the study.
5.6.2 SAMPLE

The students studying 9th std. in Holy Redeemers Girls Higher Secondary School, Palakarai, Trichy was considered as Control group, whereas the students studying 9th std. in St. Philomena’s Girls Higher Secondary School, Melapudhur, Trichy was considered as Experimental group. Each group consisted of 45 girls students. They were selected through Purposive sampling technique.

5.6.3 TOOLS

The following tools were used in the study

1. “Achievement Test in Mathematics” constructed and validated by the researcher.
2. “Scale of Attitude towards Mind map teaching strategy” constructed and validated by the researcher.

5.7 STATISTICAL TECHNIQUES APPLIED

The following statistical techniques were used to analyze the data

1. Differential analysis-‘t’-test.
2. Gain score analysis.
3. Effect size analysis.
5. Regression analysis and
6. Case study analysis.
5.8 FINDINGS OF THE STUDY

1. There is significant difference in the Achievement in Mathematics between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Achievement in Mathematics.

2. There is significant difference in the Achievement in Mathematics with respect to the objective Knowledge between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Achievement in Mathematics with respect to the objective Knowledge.

3. There is significant difference in the Achievement in Mathematics with respect to the objective Understanding between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Achievement in Mathematics with respect to the objective Understanding.

4. There is significant difference in the Achievement in Mathematics with respect to the objective Application between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Achievement in Mathematics with respect to the objective Application.

5. There is significant difference in the Achievement in Mathematics with respect to the objective Skills between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Achievement in Mathematics with respect to the objective Skills.
6. There is significant difference in the Attitude towards Mind map teaching strategy between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Attitude towards Mind map teaching strategy.

7. There is significant difference in the Knowledge dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Knowledge dimension of the Attitude towards Mind map teaching strategy.

8. There is significant difference in the Emotion dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Emotion dimension of the Attitude towards Mind map teaching strategy.

9. There is significant difference in the Skills dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Skills dimension of the Attitude towards Mind map teaching strategy.

10. There is significant difference in the Creativity dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Creativity dimension of the Attitude towards Mind map teaching strategy.
11. There is significant difference in the Problem solving dimension of the Attitude towards Mind map teaching strategy between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Problem solving dimension of the Attitude towards Mind map teaching strategy.

12. There is significant difference in the Problem solving ability in Mathematics between the control group and experimental group High school students. The experimental group High school students are at a higher level than the control group High school students in their Problem solving ability in Mathematics.

13. The Mind map teaching strategy is effective in enhancing the Achievement in Mathematics of High school students than the Conventional lecture method. The Gain score analysis showed that the Gain percentage score in Achievement in Mathematics is more for the experimental group than the control group. The effect size analysis showed that the Cohen’s d scores for the Achievement in Mathematics, Attitude towards Mind map teaching strategy and Problem solving ability in Mathematics of the High school students are d=3.83, d=4.00 and d=1.57 respectively. The Effect is large for the variables Achievement and Attitude. It is medium for the variable Problem solving ability in Mathematics. So the Mind map teaching strategy is effective in enhancing the Achievement in Mathematics of the High school students than the Conventional lecture method.

14. There is significant positive correlation between the Achievement in Mathematics and Attitude towards Mind map teaching strategy of High school students.

15. There is significant positive correlation between the Attitude towards Mind map teaching strategy and Problem solving ability in Mathematics of High school students.
16. There is significant positive correlation between Problem solving ability in Mathematics and Achievement in Mathematics of High school students.

5.9 DISCUSSION WITH THE RESULTS OF OTHER RELATED STUDIES

The results of the present study, “the impact of Mind map teaching strategy on achievement in Mathematics and certain select variables of High school students” were discussed with the related results of others studies.

The study reveals that the Mind map teaching strategy is effective in enhancing the Achievement in Mathematics of High school students than the Conventional lecture method. It is in concurrence with the result of Wu, C.-H., Hwang, G.-J., Kuo, F.-R., & Huang, I. (2013) who reported that the two experimental groups are significantly superior to those of the control group, implying that the mind mapping mechanism embedded in the learning activity was definitely beneficial to the experimental group students and significantly enhanced the students' innovative performance in a project-based learning task.

The study reveals that there is significant difference in the Achievement in Mathematics between the control group and experimental group High school students. It is in concurrence with the result of Randeep Pannu. (2013) who reported that there was significant influence of interaction between gender and intuitive cognitive style on academic achievement of adolescents. Also Ksham Batra, et.al. (2012) who reported that there exists significant difference in students’ achievement in Biology when taught through CAI (simulated laboratory experiences) and traditional (laboratory experiences) and also said the effectiveness of teaching Biology through CAI is higher than that of traditional teaching.

The study reveals that there is significant correlation between Problem solving ability in Mathematics and Achievement in Mathematics of High school students. It is in
concurrence with the result of Guven, B., & Cabakcor, B. O. (2013) who reported that there was a highly significant relationship between academic successes and Problem solving achievement.

The study reveals that Mind map teaching strategy is effective in enhancing the achievement in Mathematics of High school students than the conventional lecture method. It is in concurrence with the results of Egitim, Bilim. (2012) who reported that it was determined that using Mind mapping increased students’ academic achievement in learning English and affected their attitudes positively.

The study reveals that there is significant correlation between attitude towards Mind map strategy and problem solving ability in Mathematics of High school students. It is in concurrence with the result of Manoj, T. I., & Devanathan, S. (2011) who reported that Problem based learning group students attained significantly higher scores than conventional group students for process skills and also problem based leaning strategy has significant bearing on enhancing scientific attitude.

The study reveals that there is significant correlation between achievement in Mathematics and attitude towards Mind map strategy of High school students. It is in concurrence with the result of Valarmathi, K. E. (2011) who reported that there is correlation between Mind mapping attitude and achievement of standard IX students with respect to the variables medium, locality of the residence, parents occupation, parents educational qualification, Kindergarten education reading habit, basic knowledge in science.
5.10 CONCLUSION AND EDUCATIONAL IMPLICATIONS

The study reveals that the Mind map teaching strategy is effective in teaching Mathematics over the Conventional lecture method at the High school level.

The Mind map teaching strategy provides learning experiences with higher achievement for students. Most learning involves non-visual methods and tons of words, which may not work very well for those who tend to retain material better through visual cues. Students who were taught to use Mind map were encouraged to explore the relationship with ideas of their own and relate these and able to form number of branches and sub branches that emanate from a single central idea. This strategy facilitated better revision of learned material and it’s an excellent group activity, allowing for a lot of collaboration and enthusiastic discussion. Based on the findings and discussions, High school students who are having positive attitude towards mind map teaching strategy are having better problem solving ability and achieve more.

Educational Implications

1. The Achievement in Mathematics is improved by the Mind map teaching strategy.
2. The habit of drawing Mind maps helps the students to grasp the main theme and the connected sub ideas within short time.
3. The rapport between teachers and students improve the performance of the students in their educational activities.
4. The Mind map teaching strategy has the potential to provide intellectual challenges for enhancing students’ Knowledge, Understanding, Application and Skills in Mathematics.
5. The Mind map teaching strategy raises the students’ Knowledge attitude, Emotional attitude, Skills attitude, Creativity attitude and Problem solving attitude towards this strategy.

6. Problem solving ability in Mathematics is improved by this strategy.

5.11 RECOMMENDATIONS

The following are some of the recommendations of the study

Recommendations to the Mathematics teachers

It is recommended

1. The students should be encouraged to draw Mind maps to various Mathematical problems and concepts of their own.

2. Weekend Mind map Mathematics Associations can be arranged with some experts from SSA.

3. Students should be given some project work connected with their life situations and ask them to find out various solutions through Mind map.

Recommendations to the Government

1. Mind map Training programme may be organized to improve teaching quality among teachers.

2. Mind map teaching strategy may be implemented in class room for High school students in course of time.

3. Mind map teaching strategy may be included in the curriculum of Bachelor of Education.
5.12 SCOPE FOR FURTHER STUDY

Further studies may be carried out in the following ways

1. Studies may be conducted by using Mind map teaching strategy to teach other subjects like science, social science etc.

2. Studies may be conducted to teach Language subjects using Mind map teaching strategy.