Chapter – VI

Summary and Conclusion
CHAPTER VI
SUMMARY AND CONCLUSION

6.0 INTRODUCTION

In this chapter, the researcher has tried to present the summary of the research work carried out by him. Brief discussion of the result obtained through the study is also given. The researcher has tried to enlist a few recommendations for further researches in the area of present study. Educational implications of the present study are also given in this chapter.

6.1 STATEMENT OF THE PROBLEM

Science is a search for explanation and interaction of facts and ideas. The major task of professional preparation for science teacher is to develop a teaching style based on approach which helps students to develop memory process. Information constantly enters into our minds through stimulation, sensation, attention, perception and this information is stored in the long-term memory. Teachers can take advantage of these processes to help students retain the information and retrieval it when needed. These are possible only by a student’s having good memory. Such students are properly integrated sensory stimuli towards learning process; this made the investigator to proceed to develop a model to raise the level of memory and achievement in science. The title of the present study is ‘EFFECTIVENESS OF MULTISENSORY INTEGRATION APPROACH ON ENHANCING MEMORY AND ACHIEVEMENT IN SCIENCE AMONG IX STANDARD STUDENTS’.
6.2 NEED AND SIGNIFICANCE OF THE STUDY

Students achievement in science is derived from the teachers’ capacity to reach out to deprived children and to create a rich and multisensory environment for them effective teaching depends on the methodology and technology of teaching. Teaching is process in which the teacher and students create an interactive environment in such a way the students become effective and productive learners. So it is necessary to enhance the students’ achievement in science.

6.3 SCOPE OF THE STUDY

Multisensory Integration Approach model is essential for the twenty first century. They will enable students to successfully cope with new situations. In general cognitive strategies teacher and school have been more successful in increasing sustained voluntary attention in classroom settings than approaches that assumes a passive learner. Research on cognitive strategies has produced effective tools for classroom teaching and learning.

6.4 OBJECTIVES OF THE STUDY

The following are the objectives for this study

1. To design and develop Multisensory Integration Approach.
2. To implement the Multisensory Integration Approach on enhancing memory and achievement in science.
3. To find out the effect of the Multisensory Integration Approach on enhancing memory and achievement in science among students.

6.5 RESEARCH QUESTIONS

The investigation has to be done to find out answers to the following questions:

1. What is meant by Multisensory Integration Approach?
2. Can Multisensory Integration Approach be evaluated?
3. If so, how can it be evaluated?
4. Can the Multisensory Integration Approach be implemented?
5. If so, how can it be implemented?
6. Is the Multisensory Integration Approach effective on Science Teaching and learning at IX standard level?
7. If so, how far is it effective?
8. Does the Multisensory Integration Approach improve the memory and achievement in learning science?
9. What are the advantages of Multisensory Integration Approach in teaching and learning science?
10. Is there any difference between the Multisensory Integration Approach and conventional method in improving the memory and achievement of the learners?
6.6 ASSUMPTIONS

The following are the Assumptions for this study:

1. Students in IX standard adopt some strategies to enhance memory and achievement in science.

2. Memory and achievement in science is dependent on Multisensory Integration Approach.

3. It is possible to design and develop Multisensory integration Approach to enhance the student’s memory and achievement in science.

4. Students could be oriented towards the Multisensory Integration Approach.

5. Memory and Achievement of the students could be enhanced by following the Multisensory Integration Approach.

6.7 DELIMITATIONS OF THE STUDY

The following are the Delimitations for this study:

1. In the present study, students who are undergoing IX standard in science have only been selected as the sample.

2. All the students studying in the section A & B were selected for investigation.

3. The investigation is confined to boy students only.

4. The investigation has been carried out in Government Boys Higher Secondary School, Thirukogarnam, Pudukkottai.
6.8 HYPOTHESES OF THE STUDY

The following are the Hypotheses for this study:

1. There is no significant mean difference between control and experimental group students in their Home environment, Anxiety and Achievement Motivation.

2. There is no significant mean difference between control and experimental group students in their achievement in pretest.

3. There is no significant mean difference between control and experimental group students in their achievement in progressive test I.

4. There is no significant mean difference between control and experimental group students in their achievement in progressive test II.

5. There is no significant mean difference between control and experimental group students in their achievement in progressive test III.

6. There is no significant mean difference between control and experimental group students in their achievement in posttest.

7. There is no significant mean difference between pretest and post test Scores of achievement in control group.

8. There is no significant mean difference between pretest and post test scores of achievement in experimental group.

9. There is no significant mean difference between control and experimental group students in their memory in pretest.
10. There is no significant mean difference between control and experimental group students in their memory in posttest.

11. There is no significant mean difference between pretest and posttest Scores of memory in control group.

12. There is no significant mean difference between pretest and post test Scores of memory in experimental group.

13. There is no significant mean difference between control and experimental group of Memory Recall Test in pretest.

14. There is no significant mean difference between control and experimental group of Memory Recognition Test in Pretest.

15. There is no significant mean difference between control and experimental group of Visual Retention of Similar Pair Memory Test in pretest.

16. There is no significant mean difference between control and experimental group of Visual Imagery Memory Test in pretest.

17. There is no significant mean difference between control and experimental group of Memory Recall Test in posttest.

18. There is no significant mean difference between control and experimental group of Memory Recognition Test in posttest.

19. There is no significant mean difference between control and experimental group of Visual Retention Similar Pair Memory Test in posttest.

20. There is no significant mean difference between control and experimental group of Visual Imagery Memory Test in posttest.
21. There is no significant mean difference between pretest and posttest of Memory Recall Test in control group.

22. There is no significant mean difference between pretest and posttest of Memory Recognition Test in control group.

23. There is no significant mean difference between pretest and posttest of Visual Retention Similar Pair Memory Test in control group.

24. There is no significant mean difference between pretest and posttest of Visual Imagery Memory Test in control group.

25. There is no significant mean difference between pretest and posttest of Memory Recall Test in experimental group.

26. There is no significant mean difference between pretest and posttest of Memory Recognition Test in experimental group.

27. There is no significant mean difference between pretest and posttest of Visual Retention Similar Pair Memory Test in experimental group.

28. There is no significant mean difference between pretest and posttest of Visual Imagery Memory Test in experimental group.

29. There is no relationship between achievement and memory of post-test of the control group.

30. There is no relationship between achievement and memory of post-test of the experimental group.
6.9 EXPERIMENTAL DESIGN

The research design gives a holistic structure of the research procedure. It provides planning on selection of subject, data gathering devices and data analysis techniques in relation to objectives of research.

The experimental method is clearly the best for determining the causal effect of an isolated, single variable and dependent variable. It helps in answering research questions in a systematic and logical way. It is the best way to establish cause and effect relationships between variables.

This method is considered to be the best because it provides for a high degree of control over extraneous variables and the manipulation of variables.

The experimental method is a scientific method of research. It helps to test hypotheses of causal relationships between variables. It reduces bias and increases reliability. It gives a rationale for each and every step. It enables the researcher to go beyond description and prediction, beyond identification of what causes them. In experimental research the investigator has adopted an experimental design for the present investigation.

The present research has followed the two group pre-test post-test designs. In this design subjects are assigned to the experimental group and the control group at random and are given a pre-test. The experimental group taught through Multisensory Integration Approach and the control group taught through traditional method. After which the two groups are measured on dependent variable.
6.10 VARIABLES OF THE STUDY

The present investigation is an attempt to determine the effectiveness of Multisensory Integration Approach on Enhancing Memory and Achievement in Science and to estimate the extent of relationship between selected variables in the most effective Multisensory Integration Approach.

a. The Multisensory Integration Approach is the independent variable in this study.

b. The Achievement score in science is the dependent variable.

c. The Memory score of the students is yet another dependent variable.
d. The other extraneous variables are as follows.

   i) Home environment ii) Anxiety iii) Achievement motivation.

6.11 EXPERIMENTATION IN PHASES

Phase: I

1. Understanding of the Multisensory Integration Approach.

2. Developing a systematic model for the application of multisensory integration approach instruction promoting memory and achievement in science.


Phase: II

4. Trying out the Effectiveness of Multisensory Integration Approach with a small group of students as pilot study.

5. Formation of two groups for conducting experiment, one is control group and another one is experimental group.

Phase: III

6. Conducting pre – test to assess the entry behaviour of the students in the classroom.

7. Administering of memory test to the students.
8. Comparing the control and experimental group students based on pre – test achievement scores so as to enable them to establishing the equality of the two groups by mean and standard deviation.

Phase: IV

9. The students of experimental group to be taught through Multisensory Integration Approach and control group to be taught through the traditional method of teaching.

10. Duration of the treatment would be of three months.

Phase: V

11. Administering the test after the completion of equal amount of portions allotted to the experiment so as to enable the investigator to administer three progressive tests.

12. Administering the posttest after the completion of instructional units

13. Entering, categorizing and analyzing the pre – test, progressive tests and post – test scores

6.12 SAMPLE FOR THE STUDY

6.12.1 Location

The present investigation was carried out in Government Boys Higher Secondary School, Thirukogarnam, Pudukkottai District. This is affiliated to the State Board of Higher Secondary Education, Government of Tamil Nadu.
6.12.2 Selection of the sample

The Simple Random Sampling Technique has followed in the Study. In the school selected for the study, the IX standard students were taken for investigation, 60 were selected out of 90 students (other than 30 those selected for pilot study) in the IX standard formed the sample of the study.

Out of 3 groups in IX standard, A group assigned as control group, B group assigned as experimental group and C group already taken for pilot study. Students were randomly assigned to form the two groups- control and experimental group. The pretest was conducted to the control and experimental groups fortunately their mean score are almost equal. To these two groups memory test was administered to measure the level of their memory.

6.13 TOOLS FOR THE STUDY

The investigator administered the tool of achievement test to measure the achievement (dependent variable) of the students in their science learning. The investigator also administered memory test to measure the level of memory. The tools used were the following.

1. Achievement test for learning science.
2. Memory test.
3. Home environment scale.
4. Anxiety inventory.
5. Achievement motivation inventory.
6.14 DATA COLLECTION

The IX standard students were randomly assigned to form two groups, control and experimental group. Experimental group students were taught through Multisensory Integration Approach. Control group students were taught through traditional method. Initially they were administered the following tools to find out the level of their achievement.

1. Memory Test
2. Achievement Test.

During the course of instruction at regular intervals progressive tests were conducted. The marks scored in the three progressive tests were computed for analysis. Finally a post – test was conducted after the completion of all portions. The reliability of the progressive tests and the posttest were established. They were found to be significant.

6.15 SCHEME OF DATA ANALYSIS

In the present study the relevant data obtained from test scores of 60 students in the pretest, progressive tests and the posttest have been analyzed as follows.

i) Descriptive analysis

This generates information about the nature of a particular group of individuals. Mean and standard deviation were calculated to determine the central tendencies and dispersion of variables.
ii) Differential analysis

This tool involves determination of statistical significance of difference between the groups with reference to selected variables. It involves “t” test to determine the difference.

iii) Correlation analysis

Pearson product moment Correlation was used to find out the significant relationship between the variables.

6.16 SUMMARY

The present study was taken on hand, to check the effectiveness of Multisensory Integration Approach on Enhancing Memory and Achievement in Science among IX standard students. For that, the researcher had developed the MSIA model.

Work plan of the present study was prepared for the research as under:

1) Students were randomly assigned to form the two groups control and experimental group.

2) Thirty students were considered as Experiment group and another thirty students as Control group.

3) MSIA Model was prepared under which, thirty days’ teaching through this model for Experiment group. In the same time control group was taught through traditional approach. Pre-determined topic Chemistry from Science
of standard nine, were taught to both groups by the Investigator. Thirty periods of sixty minutes each, were provided, every day in the time-table.

4) The teaching was organized by using MSIA model and using with Multisensory lesson planning.

5) Post tests were prepared to check the effectiveness of the model. The standardization of the post test was also carried out.

6) Post-test was administrated to Experiment group and Control group after the completion of the treatment.

7) The obtained data was analyzed and interpreted with the help of t-test to know the effectiveness of teaching through MSIA model with reference to traditional method of teaching. Level of significance of mean difference of post test scores of both groups was measured administrating the t-test to test the hypothesis.

6.17 FINDINGS

The following are the findings of the study:

1. It is found that there is no significant mean difference between control and experimental group students in their mean score of Home environment, Anxiety and Achievement Motivation.

2. It is found that the achievement mean scores of control and experimental group are similar in pretest. Hence the two groups are equivalent before the treatment.
3. It is found that the achievement mean scores of experimental group is greater than the control group in progressive test I.

4. It is found that the achievement mean scores of experimental group is greater than the control group in progressive test II.

5. It is found that the achievement mean score of experimental group is greater than the control group in progressive test III.

6. It is found that the achievement mean scores of experimental group is greater than the control group in posttest. Therefore the Multisensory Integration Approach is more effective than the traditional method.

7. It is found that the achievement mean score of posttest of control group is marginally increased than the pretest.

8. It is found that the achievement mean scores of posttest of experimental group is greater than the pretest.

9. It is found that the memory mean scores of control and experimental group is similar in pretest.

10. It is found that the memory mean scores of experimental group is greater than the control group in posttest. Therefore the Multisensory Integration Approach on enhancing memory is greater than the traditional method.

11. It is found that the memory mean score of posttest of the control group is marginally increased than the pretest.

12. It is found that the memory mean scores of posttest in experimental group is greater than the pretest of experimental group.
13. It is found that there is no significant mean difference between control and experimental group of Memory Recall Test in pretest.

14. It is found that there is no significant mean difference between control and experimental group of Memory Recognition Test in Pretest.

15. It is found that there is no significant mean difference between control and experimental group of Visual Retention of Similar Pair Memory Test in pretest.

16. It is found that there is no significant mean difference between control and experimental group of Visual Imagery Memory Test in pretest.

17. It is found that the Memory Recall Test scores of experimental group is greater than the control group in posttest.

18. It is found that the Memory Recognition Test scores of experimental group is greater than the control group in post-test.

19. It is found that the Visual Retention Similar Pair Memory Test scores of experimental group is greater than the control group in posttest.

20. It is found that the Visual Imagery Memory Test scores of experimental group is greater than the control group in posttest.

21. It is found that there is no significant differences between Memory Recall Test mean scores of pretest and posttest of the control group.

22. It is found that the Memory Recognition Test scores of post- test of control group is marginally increased than the pretest of control group.
23. It is found that there is no significant difference between Visual Retention of Similar Pair Memory Test scores of pretest and posttest of the control group.

24. It is found that there is no significant difference between visual imagery test score of pretest and posttest of the control group.

25. It is found that the Memory Recall Test scores of posttest of experimental group is greater than the pretest of experimental group.

26. It is found that the Memory Recognition Test scores of post-test of experimental group is greater than the pretest of experimental group.

27. It is found that the Visual Retention of Similar Pair Memory Test scores of posttest of experimental group is greater than the pretest of experimental group.

28. It is found that the Visual imagery Memory Test scores of posttest of experimental group is greater than the pretest of experimental group.

29. It is found that the positive relationship between achievement and memory of the posttest of the control group.

30. It is found that the highly positive relationship between achievement and memory of the posttest of the experimental group.

6.18 INTERPRETATION


6.19 EDUCATIONAL IMPLICATIONS

The present study has undertaken to check the effectiveness of Multisensory integration approach on teaching of Science. This model has developed by the investigator keeping in mind basics and application of sensory integration. This model leads the educational aims, towards the higher academic achievement as it was prepared specifically for that purpose. The statistical treatment of data revealed the effectiveness of this model on enhancing memory on learning in Science. The major findings are:
1. The Multisensory Integration Approach Model significantly enhances the memory of the students.

2. Teacher should be given proper orientation towards the Multisensory Integration Approach.

3. Teacher should be trained to develop Multisensory Integration Approach Model for various disciplines and chapters.

4. Multisensory Integration Approach provides better opportunities to the learners to take part in the process of learning activity.

6.20 RECOMMENDATION FOR FURTHER RESEARCH

Following are some recommendations for further researches of the present study.

1. The present study was confined to a sample of Secondary students in the Government Boys Higher Secondary School, Pudukkottai. The findings may not be the same in other districts with a different cultural background and environmental facilities. So it is suggested that the study of the above may be repeated among students of other districts and other states.

2. The present investigation was carried out to find the effectiveness of Multisensory Integration Approach Model enhancing Memory in the chemistry class. It could be replicated in other branches of Science/humanities.

3. A Meta-analysis could be attempted on identifying the efficacy of Multisensory Integration Approach in science, Maths etc.
4. Effect if any of other extraneous variable on Memory could be studied
   Multi-variate analysis

5. Multiple/partial correlation analysis should be applied to find out the
   contribution of Multisensory Integration Approach Model on Achievement
   and Enhancing Memory.

6. Cross-cultural longitudinal studies could be attempted to identify the
   efficacy of Multisensory Integration Approach Model

6.21 CONCLUSION

   Multiple teaching strategies including oral communication, writing, metaphor, reiteration, interactive activities, humour, music that independently
   benefits learning enhances information retention through the pedagogic principle
   of extra information processing (Gopnick et al., 1999). Visual, Auditory and
   Kineshetic models are useful if used with full understanding of all the modalities
   and the development of all the learning styles, which is where reflective learning
   as the highest skill in Bloom’s taxonomy plays a lead role (lisle, 2006).

   Our nation's schools are being challenged to make science literacy a reality
   for all students. Although the benefits of science literacy for students with learning
   difficulties have been recognized, many of these students perform poor in science
   because of a variety of pedagogical and training factors. This research has
   designed to help educators meet the challenge of enhancing science literacy of all
   students by offering guidelines for adapting, implementing, and assessing the
effectiveness of Multisensory Integration approach to teaching science to students with learning difficulties. So, there is an urgent need to gear up national effort towards the implementation of the Multisensory Integration Approach Model at all levels of education, and in particular at the secondary level. It is also imperative to give proper training to the teachers to equip themselves for practising the Multisensory Integration Approach Model in classrooms. Hence there is the need to include steps in the implementation of the Multisensory Integration Approach Model in teacher education courses.

The present research study “Effectiveness of Multisensory Integration Approach on Enhancing Memory and Achievement in Science among IX Standard Students” reveals that activating appropriate processes through on Multisensory Integration Approach plays a vital role in improving achievement in science. Further it is observed that the Multisensory Integration Approach expands the learning schema, since the learners is able to activate appropriate sensory integration. This contributes to meaningful and joyful learning. This facilitates the teacher’s task of enabling the students to apply Multisensory Integration Model in enhancing memory.

It is found out that Memory in Science is improved by learning through the Multisensory Integration Approach Model. Hence educational planners, administrators and curriculum designers should play a vital role in restructuring teacher education courses at all levels with the incorporation of Multisensory Integration Approach components (steps). This will certainly develop the Memory
of the students in Science. This research study highlights the need for optimum utilization of the Multisensory Integration Approach to gain maximum educational benefits to the society.