CHAPTER – VI

SUMMARY AND CONCLUSION
6.1. Introduction:

This chapter is devoted to discuss the results of the study as detailed in previous chapter. The result concern to achievement, retention and attitude towards science. The achievement is one of the dependent variables studied with respect to Blooms taxonomy of objectives, out of which the cognitive domain objectives are given more emphasis.

The retention is another dependent variable is the root cause of intelligence, proper understanding and meaningful fixing of concept for long time.

The attitude is most environment influencible factor determines the strength of one’s love towards concept learning.

The concept attainment model is effective in improving achievement, retention and attitude towards science among different ability students.

Different strategies of concept attainment model:

The strategies of concept attainment model are mainly categorized into three types. They are selection-oriented, reception-oriented and unorganized material model. Another type of classification is inductive type and deductive type attainment.
Bruce Joyce and Marsh weil (1985) established that inductive process of concept formation and attainment increases students retention of information by enabling them to developmental structures which allow them to ‘hold’ the information better than structures which are provided for them. In addition the inductive approach to concept attainment can help students in developing observational and analytical abilities.

6.2. Statement of the problem:

To study the effect of concept attainment model on different abilities of IX standard students’ achievement, retention and attitude towards science.

6.3. Objectives of the study:

1. To study the effect of concept attainment model on achievement in science among 9th Standard students.

2. To study the effect of concept attainment model on attitude towards science among 9th standard students.

3. To study the effect of concept attainment model on retention of science concepts among 9th standard students,

4. To compare the effect of concept attainment model on achievement in science among boy and girl students of 9th standard.

5. To compare the effect of concept attainment model on attitude towards science among boy and girl students of 9th standard.
6. To compare the effect of concept attainment model on retention of science concepts among boy and girl students of 9th standard.

7. To compare the effect of concept attainment model on achievement in science with respect to ability group (low ability, average ability and high ability) of 9th standard students.

8. To compare the effect of concept attainment model on attitude towards science with respect to ability group (low ability, average ability and high ability) of 9th standard students.

9. To compare the effect of concept attainment model on retention of science concepts with respect to ability group (low ability, average ability and high ability) of 9th standard students.

10. To compare the effect of concept attainment model with that of traditional teaching on achievement in science among students of 9th standard.

11. To compare the effect of concept attainment model with that of traditional teaching on attitude towards science among students of 9th standard.

12. To compare the effect of concept attainment model with that of traditional teaching on retention of science concepts among 9th standard students.
13. To compare the effect of concept attainment model with that of traditional teaching on achievement in science among 9th standard boy students.

14. To compare the effect of concept attainment model with that of traditional teaching on attitude towards science among 9th standard boy students.

15. To compare the effect of concept attainment model with that of traditional teaching on retention of science concepts among 9th standard boy students.

16. To compare the effect of concept attainment model with that of traditional teaching on achievement in science among girl students of 9th standard.

17. To compare the effect of concept attainment model with that of traditional teaching on attitude towards science among girl students of 9th standard.

18. To compare effect of concept attainment model with that of traditional teaching on retention of science concepts among girl students of 9th standard.

19. To compare effect of concept attainment model, traditional teaching method on achievement in science among Girl and boy students of 9th standard.
20. To compare effect of concept attainment model, traditional teaching on attitude towards science among girl and boy students of 9th standard.

21. To compare effect of concept attainment model, traditional teaching method on retention of science concepts among girl and boy students of 9th standard.

22. To study the interaction effect with respect to gender (boys & Girls) teaching methods (concept attainment model, traditional teaching method) and ability groups (low ability, average ability and high ability) on achievement in science among 9th standard students.

23. To study the interaction effect with respect to gender (boys & Girls) teaching methods (concept attainment model, traditional teaching method) and ability groups (low ability, average ability and high ability) on attitude towards science among 9th standard students.

24. To study the interaction effect with respect to gender (boys & Girls) teaching methods (concept attainment model, traditional teaching method) and ability groups (low ability, average ability and high ability) on retention of science concepts among 9th standard students.
6.4. Hypotheses:

1. There is the effect of concept attainment model on achievement in science among 9th Standard students.

2. There is the effect of concept attainment model on attitude towards science among 9th standard students.

3. There is the effect of concept attainment model on retention of science concepts among 9th standard students.

4. There is the effect of concept attainment model on achievement in science among boy and girl students of 9th standard.

5. There is the effect of concept attainment model on attitude towards science among boy and girl students of 9th standard.

6. There is the effect of concept attainment model on retention of science concepts among boy and girl students of 9th standard.

7. There is the effect of concept attainment model on achievement in science with respect to ability group (low ability, average ability and high ability) of 9th standard students.

8. There is the effect of concept attainment model on attitude towards science with respect to ability group (low ability, average ability and high ability) of 9th standard students.
9. There is the effect of concept attainment model on retention of science concepts with respect to ability group (low ability, average ability and high ability) of 9th standard students.

10. There is the effect of concept attainment model as compare to traditional teaching on achievement in science among students of 9th standard.

11. There is the effect of concept attainment model as compare to traditional teaching on attitude towards science among students of 9th standard.

12. There is the effect of concept attainment model as compare to traditional teaching on retention of science concepts among of 9th standard students.

13. There is the effect of concept attainment model as compare to traditional teaching on achievement in science among 9th standard boy students.

14. There is the effect of concept attainment model as compare to traditional teaching on attitude towards science among 9th standard boy students.

15. There is the effect of concept attainment model as compare to traditional teaching on retention of science concepts among 9th standard boy students.
16. There is the effect of concept attainment model as compare to traditional teaching on achievement in science among girl students of 9th standard.

17. There is the effect of concept attainment model as compare to traditional teaching on attitude towards science among girl students of 9th standard.

18. There is the effect of concept attainment model as compare to traditional teaching on retention of science concepts among girl students of 9th standard.

19. There is the effect of concept attainment model, traditional teaching method on achievement in science among Girl and boys students of 9th standard.

20. There is the effect of concept attainment model, traditional teaching on attitude towards science among girl and boy students of 9th standard.

21. There is the effect of concept attainment model, traditional teaching method on retention of science concepts among girl and boy students of 9th standard.

22. There is the interaction effect with respect to gender (boys & Girls) teaching methods (concept attainment model, traditional teaching method) and ability groups (low ability, average ability and high ability) on achievement in science among 9th standard students.
23. There is the interaction effect with respect to gender (boys & Girls) teaching methods (concept attainment model, traditional teaching method) and ability groups (low ability, average ability and high ability) on attitude towards science among 9th standard students.

24. There is the interaction effect with respect to gender (boys & Girls) teaching methods (concept attainment model, traditional teaching method) and ability groups (low ability, average ability and high ability) on retention of science concepts among 9th standard students.

6.5. Design of the Study:

The study had quasi-experimental design. In this design two pre-assembled groups more or less similar were selected. One class is designed as experimental group and the other class as control group. A pre-test was given to ascertain that both the groups do not differ significantly to begin with. Then experimental treatment say concept attainment model was given to the experimental group and the controlled group was taught with conventional method. The independent variables of the study were teaching methods with two levels i.e. Concept Attainment Model and Conventional teaching. Sex with two levels i.e. boys and girls and ability with three levels i.e. below, average, high ability are taken as moderator variable. But, the achievement, attitude towards science and retention in science are three dependent variables.
6.6. Limitations of the study:

Whatever the scope of the study it has its own limitations. The limitations are act as frames of the study and specify the study. The limitations are the boundaries of the study.

The limitations were the self imposed restrictions by the investigator due to paucity of time, limited availability of resources and several other aspects.

The following are the limitations of the study.

1) The study was limited to students of Kannada medium school of urban area that is Bellary.

2) The study was limited to students of urban area that is Bellary city only.

3) The study was restricted to teaching science for IX standard only.

4) The study was confined to selected topics of IX standard science Karnataka state syllabus.

5) The study was limited to study the effect of concept attainment model

6) The study was limited to achievement, attitude and retention of science concepts.

7) The study was limited to comparing the effectiveness of concept attainment model with respect to traditional teaching.
8) The study was restricted to Quasi-experimental design.

9) The study was limited to use of Avinash grewal attitude towards science scale.

10) The study was limited to the sexual difference as intervening variable.

6.7. **Major findings of the study:**

6.7.1. **Findings of the descriptive analysis:**

1. There is no significant difference between the mean of scores on pre-test of experimental and control group.

2. There is significant difference between the means of scores on post-test of experimental group.

3. There is significant difference between the means of achievement scores on pre-test and post-test of experimental group.

4. There is no significant difference between the means of achievement scores of pre-test and post-test of control group.

5. There is significant difference between the means of attitude scores on pre-test and post-test of experimental group.

6. There is no significant difference between the means of attitude scores pre-test and post-test of control group.

7. There is significant difference between the means of retention scores on pre-test and post-test of experimental group.
8. There is no significant difference between the means of retention scores pre-test and post-test of control group.

9. There is no significant difference between the means of achievement scores on post-test of boys and girls and of control group.

10. There is significant difference between the means of achievement scores of boys and girls on post-test of experimental group.

11. There is no significant difference between the means of attitude scores on post-test of boys and girls and of control group.

12. There is significant difference between the means of attitude scores of boys and girls on post-test of experimental group.

13. There is no significant difference between the means of retention scores on post-test of boys and girls of control group.

14. There is significant difference between the means of retention scores of boys and girls on post-test of experimental group.

15. There is no significant difference between the means of scores on pre-test of different levels of ability groups and of experimental and control group.

16. There is significant difference between the mean of scores on post-test of different levels of ability groups of experimental group.
17. There is no significant difference between the means of scores on post-test of different levels of ability groups and of experimental and control group.

18. There is no significant difference between the means of scores of achievement on post-test of different levels of ability groups of control group.

19. There is significant difference between the means of scores of achievement on post-test of different levels of ability groups of experimental group.

20. There is no significant difference between the means of scores of attitude on post-test of different levels of ability groups of control group.

21. There is significant difference between the means of scores of attitude on post-test of different levels of ability groups and of experimental group.

22. There is no significant difference between the means of scores of retention on post-test of different levels of ability groups and of control group.

23. There is significant difference between the means of scores of retention on post-test of different levels of ability groups and of experimental group.
24. There is significant difference between the means of achievement scores on post-test of boys and girl students in experimental group are different i.e. boy students are showed high achievement as compare to girl students.

25. There is significant difference between the means of attitude scores on post-test of boys and girl students in experimental group are different i.e. girl students are showed more attitude towards science as compare to boy students.

26. There is significant difference between the means of retention scores on post-test of boys and girl students in experimental group are different i.e. boy students are showed good retention of science concepts as compare to girl students.

6.7.2. Findings of the Differential Analysis:

27. There is a significant difference was observed on pre-test and post-test scores of achievement in science of girl students with low ability and of experimental group.

28. There is no significant difference was observed on pre-test and post-test scores of achievement in science of girl students with low ability and of control group.
29. There is a significant difference was observed on pre-test and post-test scores of achievement in science of girl students with average ability and of experimental group.

30. There is no significant difference was observed on pre-test and post-test scores of achievement in science of girl students with average ability and of control group.

31. There is a significant difference was observed on pre-test and post-test scores of achievement in science of girl students with high ability and of experimental group.

32. There is no significant difference was observed on pre-test and post-test scores of achievement in science of girl students with high ability and of control group.

33. There is a significant difference was observed on pre-test and post-test scores of achievement in science of boy students with low ability and of experimental group.

34. There is no significant difference was observed on pre-test and post-test scores of achievement in science of boy students with low ability and of control group.

35. There is a significant difference was observed on pre-test and post-test scores of achievement in science of boy students with average ability and of experimental group.
36. There is no significant difference was observed on pre-test and post-test scores of achievement in science of boy students with average ability and of control group.

37. There is a significant difference was observed on pre-test and post-test scores of achievement in science of boy students with high ability and of experimental group.

38. There is no significant difference was observed on pre-test and post-test scores of achievement in science of boy students with high ability and of control group.

39. There is a significant difference was observed on pre-test and post-test scores of attitude in science of girl students with low ability and of experimental group.

40. There is no significant difference was observed on pre-test and post-test scores of attitude in science of girl students with low ability and of control group.

41. There is a significant difference was observed on pre-test and post-test scores of attitude in science of girl students with average ability and of experimental group.

42. There is no significant difference was observed on pre-test and post-test scores of attitude in science of girl students with average ability and of control group.
43. There is a significant difference was observed on pre-test and post-test scores of attitude in science of girl students with high ability and of experimental group.

44. There is no significant difference was observed on pre-test and post-test scores of attitude in science of girl students with high ability and of control group.

45. There is a significant difference was observed on pre-test and post-test scores of attitude in science of boy students with low ability and of experimental group.

46. There is no significant difference was observed on pre-test and post-test scores of attitude in science of boy students with low ability and of control group.

47. There is a significant difference was observed on pre-test and post-test scores of attitude in science of boy students with average ability and of experimental group.

48. There is no significant difference was observed on pre-test and post-test scores of attitude in science of boy students with average ability and of control group.

49. There is a significant difference was observed on pre-test and post-test scores of attitude in science of boy students with high ability and of experimental group.
50. There is no significant difference was observed on pre-test and post-test scores of attitude in science of boy students with high ability and of control group.

51. There is a significant difference was observed on pre-test and post-test scores of retention in science of girl students with low ability and of experimental group.

52. There is no significant difference was observed on pre-test and post-test scores of retention in science of girl students with low ability and of control group.

53. There is a significant difference was observed on pre-test and post-test scores of retention in science of girl students with average ability and of experimental group.

54. There is no significant difference was observed on pre-test and post-test scores of retention in science of girl students with average ability and of control group.

55. There is a significant difference was observed on pre-test and post-test scores of retention in science of girl students with high ability and of experimental group.

56. There is no significant difference was observed on pre-test and post-test scores of retention in science of girl students with high ability and of control group.
57. There is a significant difference was observed on pre-test and post-test scores of retention in science of boy students with low ability and of experimental group.

58. There is no significant difference was observed on pre-test and post-test scores of retention in science of boy students with low ability and of control group.

59. There is a significant difference was observed on pre-test and post-test scores of retention in science of boy students with average ability and of experimental group.

60. There is no significant difference was observed on pre-test and post-test scores of retention in science of boy students with average ability and of control group.

61. There is a significant difference was observed on pre-test and post-test scores of retention in science of boy students with high ability and of experimental group.

62. There is no significant difference was observed on pre-test and post-test scores of retention in science of boy students with high ability and of control group.
6.8. Discussion and conclusion:

In the present study the experimental and control groups are tested for progress in achievement, retention of science concepts and attitude towards science after the treatment. For the experimental group concept attainment model was used as treatment and for control group the traditional method was followed to develop concepts in science of 9th standard.

The following are the conclusions of the study,

i. The achievement of science among experimental group taught through concept attainment model is found to be higher as compare to control group students taught through traditional method.

ii. The attitude towards science among experimental group taught through concept attainment model is found to be higher as compare to control group students taught through traditional method.

iii. The retention of science concepts among experimental group students is higher as compare to control group students taught through the traditional method.

iv. The gain of achievement scores in science among boys of experimental group is higher compare to girls of same group.
v. The gain of attitude scores towards science among girls of experimental group is higher compare to boys of same group.

vi. The gain of retention scores in science concepts among boys of experimental group is higher than the girls of same group.

vii. The achievement in science among girls of experimental group is higher than the boys of same group.

viii. The attitude towards science among girls of experimental group is higher than the boys of same group.

ix. The retention of science concepts among girls of experimental group taught through concept attainment model is higher than the boys of same group.

On the basis of above conclusion it can be stated that concept attainment model is more useful to increase achievement, retention and attitude towards science. This model provides adequate practice, in understanding exemplars, framing hypothesis, listing attributes of concepts. The findings of present study are on line and similar to chikkar (1985), Mehana (1986), singh (1988), passi, Singh, Sansanwal (1988), Bhaveja (1989), Manocha (1991), Bawa (1991), Mahajan (1992), paul J Germann (1994), Whiyham and Morghan (1995), padi JS (1994).
The present study helps the classroom teachers to undertake remedial measures to solve the problems of misconception among students in learning concepts properly.

6.9. Educational implications:

It has been found out that in the present study concept attainment model was significantly effective with the experimental group in achieving the objectives. This implies that, this technique/method of teaching could be used in schools after developing the model for various units to different courses of the study whenever possible.

Following are the some of the implications,

i. These models sketch a sequence on various activities involved to teaching-learning process.

ii. This sequence facilitates learning by individuals. The present study undertaken to determine the instructional efficiency of the model from the “Information Processing of Model” is significant in suggesting that tried and established models of teaching to be followed in the teaching-learning process of concepts.
iii. To bring out qualitative changes in our education, we should implement faithfully these models in our class room teaching with certain modifications.

iv. Concept attainment model is especially useful to structure extended curriculum sequences or courses and to instruct students systematically in the key ideas of a field.

v. Step by step, major concepts and propositions are explained and integrated so that, at the end of the period on the entire area being studied.

vi. The model can also be shaped to teach the skills of effective reception, critical thinking and cognitive recognition can be explained to the learners, who receive direct instruction in orderly thinking and in the nation of knowledge hierarchies.

vii. Concept attainment model can provide the teachers to help the students its grasp relationships and make connections.

viii. It can help the students to relate new information to prior knowledge.
6.10. Suggestions for further study:

The researcher offers the following suggestions for further research

i) The study could be extended on a large number of samples.

ii) The model can also be constructed for primary, higher primary and college students.

iii) Similar study could be carried out by comparing rural and urban students.

iv) A comparative study between two or more models could be done. Eg: Concept attainment model programmed learning material and CAM.

v) An attempt to find out effectiveness of CAM in terms of density, error, sequence progression and % gain can be made.

vi) The study could be extended to English medium.

vii) Units of other subjects like mathematics, social science and other subjects could be modeled in Kannada as the models for Kannada medium are rare.
6.11. Conclusion:

Models approach of teaching has many advantages which have revolutionized the theory and practice of teaching. A number of researches have been conducted on concept attainment model, which have shown model approach in teaching is more effective technique in the learning process. The present study is also one of them, which shows concept attainment model is the effective method in comparison with the conventional method.

So by all these observations, we can conclude that this study by saying Concept attainment model is an effective method of teaching. The conclusions emanating from the study have important implications for day-to-day classroom teaching. ‘Model Approach’ to the teaching of science may be introduced for the benefit of the students and teachers.