## CHAPTER-V
### SUMMARY OF FINDINGS AND CONCLUSION

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CHAPTER – V
SUMMARY OF FINDINGS AND CONCLUSION

5.1 Introduction

The present investigation is aimed at finding out the Effectiveness of Advanced Visualization Tools on pupils’ Achievement and Interest in Science at High School Level. An Advanced Visualization Tools were constructed and the data collected were analyzed in order to test the hypothesis formulated for this study with the help of statistical techniques. Based on the data analysis and hypothesis testing, a number of findings were found out.

This chapter presents the consolidated findings of the recapitulating the main features contained in the previous ones. Apart from the major findings emerged from the study, suggestions for further researches in the light of the present investigation are also given.

5.2 Need for the Study

The present study has its importance because today we are in gray revolution. The advancement in science and technology has changed the face of education. The role of a teacher has also changed. Yesterday a teacher was only one source of information. But today a teacher has been one of the sources of information. The invention of internet and World Wide Web has opened the source of information for all. The paradigm shift in the field of education triggered by Gray Revolution is matched by real life teaching learning situations. The whole game of education becomes learner-centric and learning centric. To be tune with the paradigm shift that the world of education witnessed, any teacher at any level of education must “adapt their relationship with learners, switching from ‘soloist’ to ‘accompanist’ and shifting
the emphasis from dispensing information to helping learners seek, organize and manage knowledge, guiding them rather than molding them”. (Delor’s Commission Report).

The use of such technology in the institutions will motivate the teaching community and create better learning conditions. Hence, keeping all these in view the researcher made an attempt on experiment to apply Advanced Visualization Tools in Science at high school level.

5.3 Scope of the study

The scope of this study is restricted to Science at high school level prescribed by Board of Secondary Education, Government of Tamil Nadu. This study is primarily concerned to what extent the children have the interest in Science and also about how much that the Advanced Visualization Tools influences the achievement in Science. This study also composes the type of attitude towards Advanced Visualization Tools at high school level.

5.4 Statement of the problem

The problem under the present investigation is “A Study of the Effectiveness of Advanced Visualization Tools on pupils’ Achievement and Interest in Science at High School Level”
5.5 Objectives of the study

1. To develop instructional design for selected topics in Science at high school level.

2. To develop suitable Advanced Visualization Package for the selected topics in Science at high school level.

3. To develop suitable Criterion Reference Test for the selected topics in Science at high school level.

4. To validate the Advanced Visualization Package for the selected topics in Science at high school level.

5. To validate the Criterion Reference Test for the selected topics in Science at high school level.

6. To study the effectiveness of Advanced Visualization Tools on pupil’s achievement and interest in Science at high school level.

7. To find-out the significance of difference between the Pre-test and Post-test mean scores of the achievement in Science of the experimental group and the control group.

8. To find-out the significance of difference between the Pre-test and Post-test mean scores of the interest in Science of the experimental group and the control group.

9. To find-out the significance of difference between the Pre-test and Post-test mean scores in attitude towards Advanced Visualization Tools of the experimental group and the control group.

10. To find-out the significance of difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to sex.
11. To find-out the significance of difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to parents’ educational qualification.

12. To find-out the significance of difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to parents’ occupation.

13. To find-out the significance of difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to parents’ income.

14. To find-out the significance of difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to locality.

15. To find-out the significance of difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to study habit.

16. To find-out the significance of difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to chances for using internet.

17. To find-out the significance of difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to experience in using internet.

18. To find-out the significance of difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to sex.

19. To find-out the significance of difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to parents’ educational qualification.
20. To find-out the significance of difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to parents’ occupation.

21. To find-out the significance of difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to parents’ income.

22. To find-out the significance of difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to locality.

23. To find-out the significance of difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to study habit.

24. To find-out the significance of difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to chances for using internet.

25. To find-out the significance of difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to experience in using internet.

26. To find-out the significance of difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to sex.

27. To find-out the significance of difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to parents’ educational qualification.

28. To find-out the significance of difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to parents’ occupation.
29. To find-out the significance of difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to parents’ income.

30. To find-out the significance of difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to locality.

31. To find-out the significance of difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to study habit.

32. To find-out the significance of difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to chances for using internet.

33. To find-out the significance of difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to experience in using internet.

34. To find-out the relationship between the achievement in Science and interest in Science of the experimental group in the Post-test.

35. To find-out the relationship between the achievement in Science and attitude towards Advanced Visualization Tools of the experimental group in the Post-test.

36. To find-out the relationship between the interest in Science and attitude towards Advanced Visualization Tools of the experimental group in the Post-test.
5.6 Hypotheses of the study

The followings are the hypothesis framed for this study.

1. There is no significant difference between the Pre-test and Post-test mean scores of the achievement in Science of the control group and the experimental group.

2. There is no significant difference between the Pre-test and Post-test mean scores of the interest in Science of the control group and the experimental group.

3. There is no significant difference between the Pre-test and Post-test mean scores in attitude towards Advanced Visualization Tools of the control group and the experimental group.

4. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to sex.

5. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to parents’ educational qualification.

6. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to parents’ occupation.

7. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to parents’ income.

8. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to locality.
9. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to study habit.

10. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to chances for using internet.

11. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to experience in using internet.

12. There is no significant difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to sex.

13. There is no significant difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to parents’ educational qualification.

14. There is no significant difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to parents’ occupation.

15. There is no significant difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to parents’ income.

16. There is no significant difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to locality.

17. There is no significant difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to study habit.

18. There is no significant difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to chances for using internet.
19. There is no significant difference between the Post-test mean scores of the Interest in Science of the experimental group with respect to experience in using internet.

20. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to sex.

21. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to parents’ educational qualification.

22. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to parents’ occupation.

23. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to parents’ income.

24. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to locality.

25. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to study habit.

26. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to chances for using internet.
27. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to experience in using internet.

28. There is no relationship between the achievement in Science and interest in Science of the experimental group in the Post-test.

29. There is no relationship between the achievement in Science and attitude towards Advanced Visualization Tools of the experimental group in the Post-test.

30. There is no relationship between the interest in Science and attitude towards Advanced Visualization Tools of the experimental group in the Post-test.

5.7 Research procedure

In the present study, Experimental Research method was adopted for its suitability and accuracy. Two group of pupils, namely the experimental and control group were taken for the study. The control group was taught through conventional method of teaching and Advanced Visualization Tool was used for teaching the experimental group.

5.8 Sample of the experiment

The sample selected for this experiment was purposive random sample. The researcher selected two groups from IX standard. One group was taken as experimental group and the other group was taken as control group. The 40 students studying IX standard in Kalaimagal Matric Higher Secondary School, Pillaiyarpatti, Thanjavur Taluk, Thanjavur District were treated as experimental group and the 40
students studying IX standard in E.D Thomas Matric Higher Secondary School, Kudikadu, Papanasam Taluk, Thanjavur District were treated as control group.

### 5.9 Tools used

The researcher has selected the following tools and used them to collect the data for this study.

(i) Advanced Visualization Tools for the Chapters ‘Motion and Liquids’ and ‘Addiction and Healthy Lifestyles’ in Science of standard IX.

(ii) Achievement Test in Science (ATS)

(iii) Science Interest Inventory (SII)

(iv) Pupils’ attitude towards Advanced Visualization Tools Scale

### 5.10 Statistical techniques used in the study

The researcher used the following statistical techniques for analysing the data.

(i) **Mean and Standard Deviation**

Mean and Standard Deviation were used to determine the central tendencies and descriptive variables on the Achievements, Interest and Attitude towards Advanced Visualization Tools in Pre-test and Post-test among control and experimental groups. This type of analysis highlights the nature of a particular group of individuals.

(ii) **t-test and F-test**

The t-test and F-test were used to find out the significance of the level of difference in Pre-test and Post-test on the Achievement, Interest, and Attitude towards Advanced Visualization Tools among the control and experimental groups.
(iii) Correlation

Statistical Correlation was used to find out the relationship between the
(i) Achievement in Science and Interest in Science (ii) Achievement in Science and
Attitude towards Advanced Visualization Tools in the Post-test scores.

5.11 Limitations of the study

Owing to the constraint of time and money,

1. Only the high school level is taken for the study.

2. Only English medium is taken for the study.

3. In Science, at high school level though there are many units, only ‘Motion and
   Liquids’ and ‘Addiction and Healthy Lifestyles’ units were considered for the
   present study.

4. Only some limited variables were assumed for the study.

5. Only Thanjavur Educational District is included for the study.

5.12 Summary of findings

The following are the findings of the present study.

1. There is no significant difference between the Pre-test mean scores of the
   achievement in Science of the control group and the experimental group. But,
   there is a significant difference between the Post-test mean scores of the
   achievement in Science of control group and experimental group. It is also
   inferred that the effectiveness of Advanced Visualization Tools on
   achievement in Science is higher compared to traditional method.

2. There is no significant difference between the Pre-test mean scores of the
   interest in Science of the control group and the experimental group. But, there
is a significant difference between the Post-test mean scores of the interest in Science of the control group and the experimental group. Therefore it is also inferred that the Science interest is increased by the Advanced Visualization Tools. Advanced Visualization Tools are having effectiveness on interest in Science.

3. There is no significant difference between the Pre-test mean scores of the attitude towards Advanced Visualization Tools of the control group and the experimental group. But, there is a significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the control group and the experimental group. Therefore it is also the introduction of Advanced Visualization Tools enhances the attitude towards Advanced Visualization Tools.

4. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to sex.

5. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to parents’ educational qualification.

6. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to parents’ occupation.

7. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to parents’ income.

8. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to locality.
9. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to study habit.

10. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to chances for using internet.

11. There is no significant difference between the Post-test mean scores of the achievement in Science of the experimental group with respect to experience for using internet.

12. There is no significant difference between the Post-test mean scores of the interest in Science of the experimental group with respect to sex.

13. There is no significant difference between the Post-test mean scores of the interest in Science of the experimental group with respect to parents’ educational qualification.

14. There is no significant difference between the Post-test mean scores of the interest in Science of the experimental group with respect to parents’ occupation.

15. There is no significant difference between the Post-test mean scores of the interest in Science of the experimental group with respect to parents’ income.

16. There is no significant difference between the Post-test mean scores of the interest in Science of the experimental group with respect to locality.

17. There is no significant difference between the Post-test mean scores of the interest in Science of the experimental group with respect to study habit.

18. There is no significant difference between the Post-test mean scores of the interest in Science of the experimental group with respect to chances for using internet.
19. There is no significant difference between the Post-test mean scores of the interest in Science of the experimental group with respect to experience for using internet.

20. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to sex.

21. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to parents’ educational qualification.

22. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to parents’ occupation.

23. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to parents’ income.

24. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to locality.

25. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to study habit.

26. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to chances for using internet.
27. There is no significant difference between the Post-test mean scores of the attitude towards Advanced Visualization Tools of the experimental group with respect to experience for using internet.

28. There is no relationship between the achievement in Science and interest in Science of the experimental group in the Post-test. Even though the value of ‘r’ is positive, the relationship is negligible.

29. There is no relationship between the achievement in Science and attitude towards Advanced Visualization Tools of the experimental group in the Post-test. Even though the value of ‘r’ is positive, the relationship is negligible.

30. There is no relationship between the interest in Science and attitude towards Advanced Visualization Tools of the experimental group in the Post-test. Even though the value of ‘r’ is positive, the relationship is negligible.

\textbf{5.13 Educational Implications of the study}

The results of the study have proved that Advanced Visualization Tools are more effective than the traditional method in teaching Science at high school students when it is very effective then, it has to be equally effective to other standards also.

The use of the Advanced Visualization Tools enhances the achievement; it will diminish wastage and stagnation in school. So, a necessary orientation may be given at DIET level in order to create awareness among school teachers.

Students could get concrete information and practical experience about operation of hardware and application of software.

Advanced Visualization Tools is very useful for low achievers and slow learners in learning Science.

It helps the learners to learn the content easily in a limited period.
All the theoretical knowledge and practical knowledge can be enhanced through Advanced Visualization Tools.

### 5.14 Recommendations of the study

The recommendations of the present study are as follows:

i. New teaching methodologies using Advanced Visualization Tools may be introduced.

ii. In-service courses for the preparation of Advanced Visualization Tools should be given to the Science teacher.

iii. Science teacher should be trained to use the Advanced Visualization Tools effectively in the classroom.

iv. Pupils may also be involved in the preparation of Advanced Visualization Tools along with teachers.

v. Students, who are studying Science at high school level, should be trained in using Computer and Internet.

vi. Advanced Visualization tools awareness, attitude, literacy programme have to be conducted periodically for the student community.

### 5.15 Suggestions for further research

The Suggestions of the present study are as follows:

i. Studies on effectiveness of Advanced Visualization Tools may be extended to other subjects.

ii. Studies on effectiveness of Advanced Visualization Tools may be extended to other educational levels like primary, higher secondary, graduation and post-graduation.
iii. Studies on effectiveness of Advanced Visualization Tools may be extended from district to the state.

iv. The study may be extended to a large sample taking some more variables.

v. More chapters can be taken up to analyse the effectiveness of Advanced Visualization Tools.

vi. Studies on effectiveness of Advanced Visualization Tools may be extended for difficult areas in Science.

5.16 Conclusion

Advanced Visualization Tools are suitable, flexible and effective technique for effective Teaching. It is an alternative to face-to-face teaching is now being extended as an application to higher education. Much effort is undertaken to provide multimedia rich, attractive content to learners. Computer-mediated technologies deliver more than earlier technologies. Really it is an age of information and we find human lives dominated by technologies lead by it. Education, too, is found under change in the light of web. It is very difficult to say that this information access has affected fundamentals of pedagogy. As the pedagogy is the science of teaching one should keep all fundamentals of pedagogy observed while discussing about pedagogical issues in Advanced Visualization Tools.