Chapter - V
Summary of Findings and Conclusion
### CHAPTER-V
SUMMARY OF FINDINGS AND CONCLUSION

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 CHAPTER V
SUMMARY OF FINDINGS AND CONCLUSION

5.1 Introduction

In the present study, an attempt has been made to study the effectiveness of e-Learning in selected lessons at high school level. This chapter presents the consolidated findings of the study recapitulating the main features contained in the previous ones. A part from the major findings emerged from the study, suggestions for further research in the light of the present study are also given.

5.2 Need for the study

Today we are in grey revolution, the advancement in science and technology has changed the role of education, the role of teacher is also changed the force of education. The teacher is only source of information; but today, teacher is one of the sources of information. The invention of Internet and World Wide Web opened the source of information for all. The paradigm shift in the field of education is from teacher-centric to learner-centric; and learner centre to be in the paradigm of any teacher of any level of education must adapt their relationship with the learner, switching from dispensing information to helping learners by guiding them rather than molding.

An appropriate educational technology in the hands of competent teachers can ensure better teaching learning process. At present the role of the teachers in educating the pupils has gained a paramount importance. The classrooms are over crowded, with heavy amount of syllabi, the pupils are expected to gain knowledge, to improve the levels of understandings, to develop the interests on pupils, to enrich meaningful development of independent study habit and to create purposeful development of self-confidence in learning. An alternative process of teaching has to be adopted. Moreover, in fast
developing world, where knowledge explosion is taking place in every sphere, it is unreasonable to expect that the spoken or written words alone could convey the volume of relevant information to the learner. Teaching and learning are the most important processes in our educational system. Learning is the process of changing behavioural tendencies of the learner. The method of teaching differs from teacher to teacher; their aim is to reach the goals. For this purpose, teachers use various techniques, plans and strategies, which can match the objectives of teaching, as well as, those of pupils learning. The teacher can select and use various techniques whenever and wherever required.

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 attempted an experiment to apply e-Learning in Mathematics at high school level.

5.3 Scope of the study

The scope of this study is restricted to Mathematics at high school level prescribed by Board of Secondary Education, Government of Tamilnadu. This study is primarily concerned to what extent the children have the interest in Mathematics and also about how much that the multimedia especially e-Learning influences the achievement in Mathematics. This study also composes the type of attitude towards computer and Mathematics at high school level.

5.4 Statement of the problem

The movement towards the Educational Technology and the interference of behavioural psychology influenced the field of teaching and learning. e-Learning, web-based learning, virtual learning and online learning are becoming popular in the field of education. Knowledge packing and web casting have changed the traditional rigid class
room environment and learning materials. The problem under the present investigation is

"A Study of the Effectiveness of e-Learning on pupils' Achievement and Interest in
Mathematics; Attitude towards Computer and Mathematics at High School Level"

5.5 Objectives of the study

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

2) To develop suitable e-Learning Package for the selected topics in Mathematics at high school level.

3) To develop suitable Criterion-Referenced test for the selected topics in Mathematics at high school level.

4) To validate the e-Learning Package for the selected topics in Mathematics at high school level.

5) To validate the Criterion-Referenced test for the selected topics in Mathematics at high school level.

6) To study the effectiveness of e-Learning on pupil's achievement and interest in Mathematics; attitude towards computer and Mathematics 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 Mathematics 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 Mathematics 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 Computer of the experimental group and the control group.

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10) To find-out the significance of difference between the Pre-test and Post-test mean scores in attitude towards Mathematics of the experimental group and the control group.

11) To find-out the significance of difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to sex.

12) To find-out the significance of difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to parents' educational qualification.

13) To find-out the significance of difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to parents' occupation.

14) To find-out the significance of difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to parents' income.

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

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

17) To find-out the significance of difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to the course on computer.

18) To find-out the significance of difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to the experience in using computer.
19) To find-out the significance of difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to participation in computer games.

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

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

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

23) To find-out the significance of difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to parents’ educational qualification.

24) To find-out the significance of difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to parents’ occupation.

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

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

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28) To find-out the significance of difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to the course on computer.

29) To find-out the significance of difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to the experience in using computer.

30) To find-out the significance of difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to participation in computer games.

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

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

33) To find-out the significance of difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to sex.

34) To find-out the significance of difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to parents’ educational qualification.

35) To find-out the significance of difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to parents’ occupation.

36) To find-out the significance of difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to parents’ income.
37) To find-out the significance of difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to locality.

38) To find-out the significance of difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to study habit.

39) To find-out the significance of difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to the course on computer.

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49) To find-out the significance of difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to study habit.

50) To find-out the significance of difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to the course on computer.

51) To find-out the significance of difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to the experience in using computer.

52) To find-out the significance of difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to participation in computer games.

53) To find-out the significance of difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to chances for using internet.

54) To find-out the significance of difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to experience in using internet.
55) To find-out the relationship between the achievement in Mathematics and interest in Mathematics of the experimental group in the Post-test.

56) To find-out the relationship between the achievement in Mathematics and attitude towards computer of the experimental group in the Post-test.

57) To find-out the relationship between the achievement in Mathematics and attitude towards Mathematics of the experimental group in the Post-test.

5.6 Hypotheses of the study

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

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

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

4) There is no significant difference between the Pre-test and Post-test mean scores in attitude towards Mathematics of the experimental group and the control group.

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

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

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

9) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to locality.

10) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to study habit.

11) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to the course on computer.

12) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to the experience in using computer.

13) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to participation in computer games.

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

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

16) There is no significant difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to sex.
17) There is no significant difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to parents' educational qualification.

18) There is no significant difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to parents' occupation.

19) There is no significant difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to parents' income.

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

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

22) There is no significant difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to the course on computer.

23) There is no significant difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to the experience in using computer.

24) There is no significant difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to participation in computer games.

25) There is no significant difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to chances for using internet.

26) There is no significant difference between the Post-test mean scores of the Interest in Mathematics of the experimental group with respect to experience in using internet.
27) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to sex.

28) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to parents’ educational qualification.

29) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to parents’ occupation.

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36) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to chances for using internet.
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38) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to sex.

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40) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to parents' occupation.

41) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to parents' income.

42) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to locality.

43) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to study habit.

44) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to the course on computer.

45) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to the experience in using computer.

46) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to participation in computer games.

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47) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to chances for using internet.

48) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to experience in using internet.

49) There is no relationship between the achievement in Mathematics and interest in Mathematics of the experimental group in the Post-test.

50) There is no relationship between the achievement in Mathematics and attitude towards computer of the experimental group in the Post-test.

51) There is no relationship between the achievement in Mathematics and attitude towards Mathematics 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 students, namely the experimental and control group were taken for the study. The control group was taught through conventional method of teaching and e-Learning Package was used for experimental group.

5.8 Sample of the experiment

According to Goode and Hatt (1952), “A sample is smaller representation of the larger whole” The sample selected for this experiment was purposive random sample. The present study is concerned only to IX students. 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 50 students studying IX standard in Rajah’s Higher Secondary School, Thanjavur were treated as experimental group and the 50 students
studying IX standard in Blake Higher Secondary School, Thanjavur were treated as control group.

5.9 Tools used

Effectiveness of evaluation largely depends upon the accuracy of measurement. Accuracy of measurement in turn depends on the precision of the instrument or tool. The tool is of many types. The researcher has selected the following tools and used them to collect the data for this study.

(i) **e-Learning Package** for the unit ‘Coordinate Geometry’ in Mathematics of standard IX.

(ii) Achievement Test in Mathematics (ATM)

(iii) Mathematics Interest Inventory Scale (MIIS)

(iv) Students’ attitude towards Computer Scale

(v) Mathematics Attitude Scale

5.10 Statistical techniques used in the study

Statistical techniques serve the fundamental purpose of the descriptive and inferential analysis. 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, Attitude towards computer and Attitude towards Mathematics 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, Attitude towards computer and Attitude towards Mathematics among the control and experimental groups.

(iii) Correlation

Statistical Correlation was used to find-out the relationship between the
(i) Achievement in Mathematics and Interest in Mathematics (ii) Achievement in Mathematics and Attitude towards computer (iii) Achievement in Mathematics and Attitude towards Mathematics 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 Tamil medium is taken for the study.

3) In Mathematics, at high school level though there are many units, only ‘Coordinate Geometry’ unit was 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 Mathematics of the experimental group and the control group.

But, there is a significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group and the control group. It
is also inferred that the effectiveness of e-Learning on achievement in Mathematics is higher compared to traditional method.

2) There is no significant difference between the Pre-test mean scores of the interest in Mathematics of the experimental group and the control group. But, there is a significant difference between the Post-test mean scores of the interest in Mathematics of the experimental group and the control group. It is also inferred that the Mathematics interest is increased by the e-Learning. e-Learning is having effectiveness on interest in Mathematics.

3) There is no significant difference between the Pre-test mean scores of the attitude towards computer of the experimental group and the control group. But, there is a significant difference between the Post-test mean scores of the attitude towards computer of the experimental group and the control group. It is also inferred that the introduction of e-Learning enhances the attitude towards computer.

4) There is no significant difference between the Pre-test mean scores of the attitude towards Mathematics of the experimental group and the control group. But, there is a significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group and the control group. From this it is inferred that the effectiveness of e-Learning on attitude towards Mathematics for the experimental group is high.

5) There is a significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to sex, and the female students have achieved more than the male students.

6) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to parents' educational qualification.
7) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to parents' occupation.

8) There is a significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to parents' income, and the students whose parents' income is 60,000 and above are achieved more than the students whose parents' income is below 60,000.

9) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to locality.

10) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to study habit.

11) There is a significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to course on computer, and the students who have done computer course have achieved more than the students who have not done computer course.

12) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to the experience in using computer.

13) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to the participation in computer games.

14) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to the chances for using internet.
15) There is no significant difference between the Post-test mean scores of the achievement in Mathematics of the experimental group with respect to the experience in using internet.

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

17) There is no significant difference between the Post-test mean scores of the interest in Mathematics of the experimental group with respect to parents' educational qualification.

18) There is no significant difference between the Post-test mean scores of the interest in Mathematics of the experimental group with respect to parents' occupation.

19) There is no significant difference between the Post-test mean scores of the interest in Mathematics of the experimental group with respect to parents' income.

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

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

22) There is a significant difference between the Post-test mean scores of the interest in Mathematics of the experimental group with respect to course on computer, and the students who have done computer course are more interested in Mathematics than the students who have not done computer course.

23) There is no significant difference between the Post-test mean scores of the interest in Mathematics of the experimental group with respect to the experience in using computer.

24) There is no significant difference between the Post-test mean scores of the interest in Mathematics of the experimental group with respect to the participation in computer games.
25) There is a significant difference between the Post-test mean scores of the interest in Mathematics of the experimental group with respect to the chances for using internet, and the students who are having chances for using internet are more interested in Mathematics than the students who are not having chances for using internet.

26) There is no significant difference between the Post-test mean scores of the interest in Mathematics of the experimental group with respect to the experience in using internet.

27) There is a significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to sex, and the female students have more favourable attitude than the male students.

28) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to parents' educational qualification.

29) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to parents' occupation.

30) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to parents' income.

31) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to locality.

32) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to study habit.

33) There is a significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to the course on computer, and the students who have done computer course have more favourable attitude towards computer than the students who have not done computer course.
34) There is a significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to the experience in using computer, and the students who are experienced in using computer course have more favourable attitude towards computer than the students who are not experienced in using computer.

35) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to the participation in computer games.

36) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to the chances for using internet.

37) There is no significant difference between the Post-test mean scores of the attitude towards computer of the experimental group with respect to the experience in using internet.

38) There is a significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to sex, and the female students have more favourable attitude towards Mathematics than the male students.

39) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to parents’ educational qualification.

40) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to parents’ occupation.

41) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to parents’ income.
42) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to locality.

43) There is a significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to study habit, and the students who are doing self study have more favourable attitude towards Mathematics than the students who are doing group study.

44) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to the course on computer.

45) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to the experience in using computer.

46) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to the participation in computer games.

47) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to the chances for using internet.

48) There is no significant difference between the Post-test mean scores of the attitude towards Mathematics of the experimental group with respect to the experience in using internet.

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

50) There is a relationship between the achievement in Mathematics and attitude towards computer of the experimental group in the Post-test. The computed value
of ‘r’ is positive. Those who have favourable attitude towards computer secured high scores in achievement in Mathematics. But the relationship is moderate.

51) There is no relationship between the achievement in Mathematics and attitude towards Mathematics of the experimental group in the Post-test. The computed value of ‘r’ is positive. Even though the value of ‘r’ is positive, the relationship is low.

5.13 Educational Implications of the Study

The overall results of this study have shown light on the effectiveness of e-Learning in learning Mathematics at high school level. This study shows that, the experimental group achieved in Mathematics higher than the control group. This is an encouraging fact that there is bright future for e-Learning in India to learn Mathematics at high school level.

The e-Learning method will be helpful in the following ways,

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

ii. e-Learning is very useful for low achievers and slow learners in learning Mathematics.

iii. It helps the learners to learn the content easily in a limited period.

iv. It helps the learners to evaluate the instructional objectives in terms of their achievement.
5.14 Recommendations of the study

The recommendations of the present study are as follows:

i. *e-Learning* method may be used to learn Mathematics at high school level. This method may be used to provide equal opportunity in learning irrespective of time, space and person.

ii. New teaching methodologies using *e-Learning* can be introduced.

iii. Pupils may also be involved in the preparation of *e-Learning Package* along with teachers.

iv. In-service courses for the preparation of *e-Learning Package* should be given to the Mathematics teacher.

v. Mathematics teacher should be trained to use the *e-Learning Package* effectively in the classroom.

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

vii. Each school should have *e-Learning* library along with internet facilities.

viii. *e-Learning* awareness, attitude, literacy programme have to be conducted periodically for the student community.

ix. Schools should provide learning material along with the *e-Learning package*, so that learners can be benefited by any time.

x. The Government can encourage the teachers to develop effective materials in School education to cover the curriculum of School education.

xi. For developing effective learning materials, *Staff Development Programmes* can be conducted in using tools such as Flash, Photoshop, 3D Max etc., so that every teacher can develop his/her own material and globalize it for others use.
5.15 Suggestions for further research

In the light of the findings of the study, it can be very well suggested for further investigations in the following areas.

i. Studies on effectiveness of e-Learning may be extended to other subjects.

ii. Studies on effectiveness of e-Learning may be extended to other educational levels such as primary, graduation and post-graduation.

iii. Studies on effectiveness of e-Learning may be extended to other districts.

iv. Studies on effectiveness of e-Learning may be extended from district to the State.

v. A comparative study may be considered to work out the differences in the effectiveness of e-Learning in relation to academic achievement of gifted and the slow learner in learning.

vi. More units can be taken up to analyse the effectiveness of e-Learning.

vii. Studies on effectiveness of e-Learning may be extended for other difficult areas in Mathematics.

viii. It is suggested that influence of other variables than the ones now studied can also be investigated.

ix. Studies on effectiveness of e-Learning may be extended in professional courses such as medicine, engineering, law and agriculture.

x. The same study may be replicated in different types of Schools such as Corporation, Government, Matriculation and so on.

xi. Studies on effectiveness of e-Learning may be extended in the Schools which are located at rural areas.

xii. A Comparative study may be conducted among the students studying rural and urban high schools.
5.16 Conclusion

The present study has investigated the effectiveness of *e-Learning* on pupils' achievement and interest in Mathematics; attitude towards computer and Mathematics at high school level and it was found that the effectiveness and utilisation were very high in the case of achievement and interest in Mathematics and high in the case of attitude towards computer and Mathematics.

Since *e-Learning* is having effectiveness on achievement and interest in Mathematics, attitude towards computer and Mathematics in the positive direction, introduction of *e-Learning* should be encouraged at high school level.