CHAPTER V

MAIN FINDINGS, DISCUSSION OF RESULTS, EDUCATIONAL IMPLICATIONS AND SUGGESTIONS FOR FURTHER STUDIES

After analysis and interpretation of data, the investigator is in position to arrive at main finding of the present study. For this purpose, investigator devoted this chapter to the main findings of the study, discussion of the results, educational implications, suggestions for further study based on the analysis of data. These have been discussed in different headings in this chapter.

5.1 Main Findings of the study

Main finding of the present study have been derived from the analysis and interpretation. This study is focused on the effect of smart classroom on achievement, Creativity and retention on high secondary school students of commerce. This research utilized a quantitative analysis of the use of smart classroom on the academic growth of students during teaching in smart classroom.

Findings of the results are divided into three sections Section A deal with the Achievement test, Section B deals with Retention and the section C related to creativity. The data
collected for this purpose was subjected to statistical analysis which revealed the following findings:

Section- A

5.1.1 Findings of the Achievement in commerce

1. There exists no significant difference between the pre-test scores of achievement test in commerce among the students in control group and experimental group. Thus, it concludes that both the groups were at same level of achievement in commerce before the commencement experiment.

2. There exists no significance of difference between the Pre-test scores of achievement test in commerce among the girls in control group and experimental group. This means there was no significant difference between achievement in commerce among the girls of control group and experimental group before commencement of the experiment.

3. There is no significant difference between the means of pre-test scores of achievement test in commerce among the boys in control group and experimental group. Thus, it concludes that before commencement of experiment
the achievement level of commerce were same in the boys.

4. There exists significant difference between the pre-test scores and post-test scores of achievement in commerce of the students in control group. Thus it concludes that the significant difference between pre-test and post-test achievement in commerce among the students of control group which shows the effectiveness of the treatment. The result reveals that the treatment had an effect on the students of control group and their achievement during treatment was significant.

5. There exists significant difference between the Pre-test scores and Post-test scores of Achievement test in Commerce among the girls in Control group. Thus, it means that difference between the achievement of girls in commerce in control group before and after the experiment is found significant.

6. There exists significant difference between the Pre-test scores and Post-test scores of Achievement test in Commerce among the boys in Control group. Thus, it concludes that after taught in conventional classroom significant difference is found between the pre-test and
post-test scores of achievement in commerce among the boys.

7. There exists significant difference between the pre-test scores and post-test scores of achievement test in commerce of students in Experimental group, which means that there is significant difference in the level of knowledge among the students of experimental group prior to and after the treatment. It shows that the achievement of the students in commerce in significantly differ from their knowledge they had prior to the treatment.

8. There exists significant difference between the pre-test scores and post-test scores of achievement test in commerce among the girls in Experimental group. This means that the knowledge of girls in experimental group has increased after the treatment of teaching in smart classroom.

9. There exists significant difference between the pre-test scores and post-test scores of achievement test in commerce among the boys in Experimental group. Thus, it means that the knowledge of boys in experimental group has improved after the treatment of teaching in smart classroom.
10. There exists significant difference between the post-test scores of achievement test in commerce among the students in control group and experimental group is accepted. It indicates that the students of two groups differ significantly. Thus, it indicates that significant difference is found in the achievement in commerce between the experimental groups that taught in Smart Classroom in comparison to control group that taught in traditional classroom.

11. There exists significant difference between the post-test scores of achievement test in commerce among the girls in control group and experimental group. Thus, it indicates that the academic achievement among girls in experimental group those taught in Smart Classroom is significantly effective in comparison to girls in control group taught in traditional classroom.

12. There exists significant difference between the post-test scores of achievement test in commerce among the boys in control group and experimental group. Thus, it conclude that the results of achievement test in commerce of boys in experimental group taught in smart classroom are significantly different from the results of
boys in experimental group taught in traditional classroom taught teaching in Smart Classroom.

13. There exists significant difference between the gain scores of achievement test in commerce among the students in control group and experimental group. Thus, it concludes that the achievement in commerce among the students in experimental group enhanced more than the achievement in commerce among the students of control group.

14. There exists significance of difference between the gain scores of achievement test in commerce among the girls in control group and experimental group. Thus, it indicates that after being taught in smart classroom significant difference is found between the gain scores of girls in experimental group.

15. There exists significance of difference between the gain scores of achievement test in commerce among the boys in control group and experimental group. Thus, it indicates that after being taught in smart classroom significant difference is found between the gain scores of boys in experimental group.
Section - B

5.1.2 Findings of Achievement test for Retention of achievement in commerce

1. There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the students in control group. Thus, it concludes that no significant difference is found between the post-test scores of achievement in commerce among the students and the scores of the achievement test conducted after two months for retention in control group.

2. There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the girls in control group. Thus, it concludes that the achievement level in commerce of girls is found not significantly different from their achievement level after two months in control group.

3. There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the boys in control group. Thus, it concludes that there is
no significant difference found in the achievement level in commerce among boys at the end of treatment and after two months in control group.

4. There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the students in experimental group. Thus, it concludes that there is no significant difference among the students’ achievement level at the end of the experiment and after two months in experimental group.

5. There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the girls in experimental group. Thus, it concludes that no significant difference is found in the level of achievement in commerce at the end of experiment and after two months among the girls in experimental group.

6. There exists no significant difference between the scores of post-test of achievement test and achievement test (after two months for retention) in commerce among the boys in experimental group. Thus, it concludes that no significant difference is found in the level of
achievement in commerce at the end of experiment and after two months among the boys in experimental group.

7. There exists significant difference between the scores of achievement test (after two months for retention) in commerce among the students in control group and Experimental group. Thus, it concludes significant difference is found in retention in commerce among the students taught in smart classroom in comparison to those who taught in traditional classroom.

8. There exists significant difference between the scores of achievement test (after two months for retention) in commerce among the girls in control group and Experimental group. Thus, it concludes significant difference is found in retention in commerce among the girls taught in smart classroom in comparison to those who taught in traditional classroom.

9. There exists significant difference between the scores of achievement test (after two months for retention) in commerce among the boys in control group and Experimental group. Thus, it concludes significant difference is found in retention in commerce among the boys taught in smart classroom in comparison to those who taught in traditional classroom.
Section C

5.2.3 Findings of Creativity

1. There exists no significant difference between the pre-test scores of creativity test among the students of commerce in control group and experimental group. Thus, it concludes that no significant difference is found in the scores of creativity test among the students of control group and experimental group before the commencement of experiment.

2. There exists no significant difference between the pre-test scores of creativity test among the girls of commerce in control group and experimental group. Thus, it concludes that no significant difference is found in the scores of creativity test among the girls of control group and experimental group before the commencement of experiment.

3. There exists no significant difference between the pre-test scores of creativity test among the boys of commerce in control group and experimental group. Thus, it concludes that no significant difference is found in the scores of creativity test among the boys in control group and experimental group before the commencement of experiment.
4. There exists no significant difference between the pre-test scores and post-test scores of creativity test among the students of commerce in control group. Thus, it concludes that no significant difference is found between the creativity scores among the students of control group before and after the experiment.

5. There exists no significant difference between the pre-test scores and post-test scores of creativity test among the girls of commerce in control group. Thus, it concludes that no significant difference is found between the creativity scores among the girls of control group before and after the experiment.

6. There exists no significant difference between the pre-test scores and post-test scores of creativity test among the boys of commerce in control group. Thus, it concludes that no significant difference is found between the creativity scores among the students of control group before and after the experiment.

7. There exists no significant difference between the pre-test scores and post-test scores of creativity test among the students of commerce in Experimental group. Thus, it concludes that no significant difference is found
between the creativity scores among the students of experimental group before and after the experiment.

8. There exists no significant difference between the pre-test scores and post-test scores of creativity test among the girls of commerce in Experimental group. Thus, it concludes that no significant difference is found between the creativity scores among the girls of experimental group before and after the experiment.

9. There exists significant difference between the pre-test scores and post-test scores of creativity test among the boys of commerce in Experimental group. Thus, it concludes that no significant difference is found between the creativity scores among the boys of experimental group before and after the experiment.

10. There exists significant difference between the post-test scores of creativity test among the students of commerce in control group and experimental group. Thus, it concludes that significant difference is found in the creativity scores of post-test among the students of experimental group those who taught in smart classroom in comparison to the students in control group those who taught in conventional classroom.
11. There exists significant difference between the post-test scores of creativity test among the girls of commerce in control group and experimental group. Thus, it concludes that significant difference is found in the creativity scores of post-test among the girls of experimental group those who taught in smart classroom in comparison to the students in control group those who taught in conventional classroom.

12. There exists no significant difference between the post-test scores of creativity test among the boys of commerce in control group and experimental group. Thus, it concludes that no significant difference is found in the creativity scores of post-test among the boys of experimental group those who taught in smart classroom in comparison to the students in control group those who taught in conventional classroom.

5.2 Discussion of the results

The present investigation has been carried out to study the effect of teaching in smart classroom on achievement, retention and creativity of high secondary school students of commerce. In the light of the findings of ‘t’ ratio statistically significant differences were found between the mean scores of achievement, retention and creativity of experimental group
and control group. In order to test the hypotheses, pre and post achievement test in commerce were taken and analyzed. It is found significant difference in the results of experimental group and control group, which also proves the assumption. There were statistically significant differences between the mean scores of the two groups in achievement for the experimental group which is also supported by Marzano (2009). In the study conducted by Marzano (2009), students who were instructed using smart board technology shown a substantial increase in the scores over student who received the same instruction without use of interactive technology. In the present study the results of Achievement test in commerce shows significant difference between the students of commerce in Control and Experimental group.

From a general perspective, the results of the study were similar to those encountered in the literature. It was also found during the study that lessons conducted with smart classroom were more fun, more interesting and greater participation. The most significant evidence for the academic improvement resulting from interactive whiteboard use was a comprehensive study conducted by Becta (2003). In this study, the term ‘improvement’ was used instead of reference to ‘increasing academic achievement’.
Based on these results, it can be claimed that an interactive whiteboard in the classroom be seen as a tool that increases academic achievement, and one that brings information and communication technologies to the classroom and leads to new teaching and learning activities. In the present study all scores had been collected from 80 students of class 11th. Among these 80 students, 40 students constitute one group known as control group, and other 40 students constitutes another experimental group. The pre-test of Achievement test and Creativity test shown, not significant difference between experimental and control group while the post-tests scores of both control group and experimental group were analyzed and their mean and standard deviation and t-test calculated which lead the study towards difference in the achievement, creativity and retention. The calculated t-value is much greater than table value at df = 78 at 0.01 level of significance. According to the result of t-test, significant differences exist between control Group and Experimental Group in achievement test, creativity test and retention test and thus suggesting that the level of both groups were not similar. It was found that the achievement test scores of control and experimental group differ significantly at the end of the study. Hence, there exist a significant difference between the achievement, Creativity and retention of student
when teaching through smart classroom and traditional classroom.

Based on these result it can be claimed that while teaching through smart classroom is more effective than traditional classroom and used as a tool that increases in academic achievement and leads to new teaching and learning activities.

Similar result were obtained in the study by Dhindo & Emran (2006) compared pre- to post-test gains between college classes taught six organic chemistry lessons either with or without interactive whiteboards in classroom. The authors found statistically significant gains for students taught using interactive whiteboards, with the interactive whiteboard group averaging a mean effect size of 2.68 and the control group averaging a mean effect size of 2.16 and in the study of Marzano (2009) The students who were instructed using smart board technology showed a substantial increase in the scores over student who received the same instruction without use of interactive technology. Adding various peripheral devices such as the interactive technology further increased the performance of students instructed with the smart board technology.
5.3 Educational Implications of the study

The most outstanding characteristic of any research is that it must contribute something new to the development of the area concerned. Every study has its utility and implications in some or other area. The present study is supposed to add to the existing stock of knowledge in the field of education. The study has an important bearing on education in our country where students are taught through the chalk and talk method. It indicates that students can be taught better through new methods of teaching like through smart classroom. However, In view of inevitable limitation of technology, the present study has wider implications for teachers and students. The present study offers a number of implications. It has been found that there is a significant relationship between the achievement of students when teaching through smart classroom and traditional classroom. So, with the present method of teaching through smart classroom is very effective and it will help to attain the objective of teaching. It may also be noted that science and technology are growing rapidly and it is becoming harder and harder for school teachers to keep pace with the change. In this regard smart classroom is very helpful to equip them with latest content and they will be able to keep pace with
time. Although teachers whose students scored at or below the mean on academic assessments also were most likely to use the interactive features of whiteboards in the classroom, they tended to use these for more teacher centered activities. Many of these teachers used it to play a variety of language games and many used its timer function for timed seatwork. Due to its effective role in enhancement of academic achievement, the ministry of education must work on providing the sufficient number of smart boards in schools in accordance with their importance and their effect on providing a positive learning atmosphere within the school.

5.4 Suggestions for Further Studies

Any research work cannot say the final word of a problem because it is very difficult for a researcher to touch all the aspect of a problem. The present investigation identified several ways of possible exploration and number of important findings has been reported in the present study.

Suggestions for further research in this direction may not be kept out of place here. They can be enumerated as follow.

- The present study has been tried out in limited area and sample. So it is can be carried out in large sample and in different areas of the state for its validation.
The present study was delimited to schools following syllabus and pattern of Central Board of Secondary Education Delhi, further studies in different area of country following different (state) boards of education can be done for more validation.

The present study was delimited to one public school only. More studies may also be carried out on different types of school environments like convent-public, Aided-Unaided, government or Rural schools.

The present study was delimited to district Kurukshetra of state Haryana. Replication of this research in schools of different socio-economic levels in other states can be done.

The present study was delimited to class XI students only. It can be conducted on other grade levels also.

Similar studies may be conducted by involving more variables like interest and attitude etc.

The present study was confined to one subject business studies of commerce stream only. Similar research efforts can be put in on other subjects also e.g. Physics, Chemistry, Mathematics, Social Sciences Hindi and English etc.
The present study was delimited to 80 students only. It can be replicated on wider sample.

An elaborate study can also be designed to explore the attitude of the students towards the two approaches of teaching.

A Study can be made to explore the attitude of the teachers towards different types of learning materials.

Following are some suggestions for further researches which facilitate the use of smart board technology in the classroom. Facilitators of smart board technology could include, measuring the actual percent of time utilizing the technology in the classroom, Research teacher’s attitudes toward smart board instruction in classroom, Research of administrative and staff support of technological instruction, Research of teaching methods, types of lessons implemented and standards for best practices of smart board use.