CHAPTER VI

RETROSPECTS AND PROSPECTS
## CHAPTER VI

### RETROSPECTS AND PROSPECTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Introduction</td>
<td>584</td>
</tr>
<tr>
<td>6.2 Need and Importance of the Study</td>
<td>585</td>
</tr>
<tr>
<td>6.3 Statement of the Problem</td>
<td>588</td>
</tr>
<tr>
<td>6.4 Objectives of the Study</td>
<td>588</td>
</tr>
<tr>
<td>6.5 Hypotheses of the Study</td>
<td>589</td>
</tr>
<tr>
<td>6.6 Variables of the Study</td>
<td>600</td>
</tr>
<tr>
<td>6.7 Methodology of the Study</td>
<td>601</td>
</tr>
<tr>
<td>6.7.1 Sampling Procedure</td>
<td>601</td>
</tr>
<tr>
<td>6.7.2 Tools Used for Collection of Data</td>
<td>602</td>
</tr>
<tr>
<td>6.7.3 Statistical Techniques Employed</td>
<td>602</td>
</tr>
<tr>
<td>6.8 Major Findings of the Study</td>
<td>603</td>
</tr>
<tr>
<td>6.8.1 Findings of Differential Analysis</td>
<td>603</td>
</tr>
<tr>
<td>6.8.2 Findings of Correlational Analysis</td>
<td>611</td>
</tr>
<tr>
<td>6.8.3 Findings of Multiple Regression Analysis</td>
<td>613</td>
</tr>
<tr>
<td>6.8.4 Findings of Path Analysis</td>
<td>616</td>
</tr>
<tr>
<td>6.9 Conclusions of the Study</td>
<td>620</td>
</tr>
<tr>
<td>6.10 Educational Implications</td>
<td>625</td>
</tr>
<tr>
<td>6.11 Suggestions for Further Study</td>
<td>627</td>
</tr>
</tbody>
</table>
6.1 Introduction

The new revolution in science based on automation, may have an impact on man even greater than anything that has happened so far in the history of human race. This has increased, considerably, the importance and influence of science education. Before eighteenth century science had not developed as much as we see it in the present form. Today scientific investigations and researches are being done with such a fast speed that this knowledge needs a complete knowledge of science. Thus, science has become an integrant part of human life. All the means of communication, radio, television, food grains, clothes and medicines depend upon the development of science. Man begins to feel unhappy as soon as there is deprivation of any of these scientific investigations and researches even for a short period of time. So, in the present computer era, no one can deny the importance of knowledge of science. Hence, science has naturally occupied a prominent position in school curriculum.

There are numerous advantages of science education. Science has become the basis of the cultural heritage and social progress. Not only this,
like other disciplines, education being an independent discipline of study, is placed in the Faculty of science. This is the reason why education is not only an art but science also. Most of the principles of modern education are scientific and almost all the strategies, tactics and techniques of teaching are scientific in nature today.

The Secondary Education Commission (1952-53) recommended the teaching of General Science as a compulsory subject in the high and higher secondary schools. Science found a place in the diversified courses, too. The suggestion to retain general science as a core subject is a significant milestone in the history of science education in India.

Effectiveness of any educational system is judged by the achievement of students, whether it will be cognitive, affective or psychomotor domain.

Einstein (1879-1955) says, "Science is an attempt to make the chaotic diversity of our sense experience correspond to logically uniform systems of thought".

6.2 Need and Importance of the Study

Keeping in view the scope of science and its unique role of solving the scientific problems of day-to-day life, science has been considered as one of core subjects in the curriculum at the secondary school level. Science has
changed the entire existence. It has controlled health, transportation and power. Scientists are still busy in finding out the future comforts for the man. Thus, the society cannot think of a world without science.

"There is, of course, one thing about which we feel no doubt or hesitation; education, science based and in coherence with Indian culture and values, can alone provide the foundation as also the instrument for the nation's progress, security and welfare".

- Indian Education Commission (1964-66)

The parents and pupils at large consider science as a difficult subject and these results in more number of failures in this subject. The failure in the subject science may be due to pupils' inability to read and realize the scientific derivations and principles. Apart from these factors, there may be other reasons like school climate, teacher-pupil's relations, curriculum, teaching strategies adopted. There may be social and psychological factors, as well.

Academic achievement of the learner is the primary theme of all types of educational endeavour particularly at secondary school stage; where a great emphasis is on achievement, right from the beginning to formal education. To certain extent, achievements test is a good tool for the timely appraisal of the students learning which will ensure improvement, also refinement
modification of teaching – learning process. The achievement tests will result in the higher academic achievement of the pupil.

Academic achievement in science are affected by psychological factors like attitude, aptitude, anxiety, intelligence, creativity, motivation, achievement, adjustment, environment, and the like.

In the present study the researcher has considered some of the psychological factors like cognitive style, classroom environment, and achievement motivation that affect the academic achievement of X standard pupils’ in science.

Achievement is also affected by social factors like gender, age, type of school, location of school, school climate, medium of instruction, home climate and management. In the present study the researcher has considered gender, type of management and medium of instruction as moderator variables to see their effect on achievement in science.

Therefore, the researcher intended to know the percentage of contribution of each variable in predicting achievement in science.
6.3 Statement of the Problem

The problem selected for the present investigation is stated below:

"Relationship Among Cognitive Style, Classroom Environment, Achievement Motivation and Achievement in Physics of Secondary School Pupils".

6.4 Objectives of the Study

The present study was taken up with the following objectives:

1) To construct and standardize a test in Physics for X standard pupils studying in Belgaum City of Karnataka State.

2) To find out the relationship between achievement in Physics and (a) Cognitive style (b) Achievement Motivation (c) Classroom Environment.

3) To study the significance of difference in achievement in Physics of X standard pupils when classified according to sex.

4) To study the significance of difference in achievement in Physics of X standard pupils when classified according to the medium of instruction.

5) To study the significance of difference in achievement in Physics of X standard pupils when classified according to the type of management of the school.

6) To study the correlation between the cognitive style and the following variables.

   a) Classroom Environment.
b) Achievement Motivation.

7) To study the correlation between the classroom environment and achievement motivation.

8) To study the main effects of independent variables, that is cognitive style, classroom environment and achievement motivation on achievement in Physics of secondary school pupils.

9) To study the interaction effect of independent variables, that is cognitive style, classroom environment and achievement motivation on achievement in Physics of secondary school pupils.

6.5 Hypotheses of the Study

In pursuance of objectives stated in chapter 1, the following null hypotheses were formed.

1. **Hypothesis:** There is no significant difference between age groups (14-15 and 16-17 years) of secondary school students with respect to achievement in physics.

2. **Hypothesis:** There is no significant difference between age groups (14-15 and 16-17 years) of secondary school students with respect to achievement motivation.

3. **Hypothesis:** There is no significant difference between age groups (14-15 and 16-17 years) of secondary school students with respect to their perception of classroom environment and its dimensions namely:
4. **Hypothesis:** There is no significant difference between boys and girls of secondary schools with respect to achievement in physics.

5. **Hypothesis:** There is no significant difference between boys and girls of secondary school with respect to achievement motivation.

6. **Hypothesis:** There is no significant difference between boys and girls of secondary schools with respect to their perception about classroom environment and its dimensions namely;

- Material Environment
- Cohesiveness
- Task Orientation
- Innovation
- Participation
- Teacher Support
- Personalization
- Independence
- Order and Organization
- Teacher Control
- Friction
- Competition

7. **Hypothesis**: There is no significant difference between students studying through different medium of instruction (Kannada and English) with respect to achievement in physics.

8. **Hypothesis**: There is no significant difference between students studying through different medium of instruction (Kannada and English) with respect to achievement motivation.

9. **Hypothesis**: There is no significant difference between students studying through different medium of instruction (Kannada and English) in their perception of classroom environment and its dimensions namely:
10. **Hypothesis:** There is no significant difference between students of different types of management (Government, aided and unaided) with respect to their achievement in physics.

11. **Hypothesis:** There is no significant difference between the students of different types of management (Government, aided and unaided) with respect to achievement motivation.

12. **Hypothesis:** There is no significant difference between students of different types of management (Government, aided and unaided) in their perception of classroom environment and its dimensions namely:

- Material Environment
- Cohesiveness
- Task Orientation
• Innovation
• Participation
• Teacher Support
• Personalization
• Independence
• Order and Organization
• Teacher Control
• Friction
• Competition

13. **Hypothesis**: Field dependent and field independent cognitive style students do not differ in their achievement in physics.

14. **Hypothesis**: Field dependent and field independent cognitive style students do not differ in their achievement motivation.

15. **Hypothesis**: Field dependent and field independent cognitive style students do not differ in their perception about classroom environment and its dimensions namely;

• Material Environment
• Cohesiveness
• Task Orientation
• Innovation
• Participation
• Teacher Support
• Personalization
• Independence
• Order and Organization
• Teacher Control
• Friction
• Competition

16. **Hypothesis**: There is no significant interaction effect of age (14–15, 15–16) and cognitive style (field dependent and field independent) on achievement in physics of secondary school students.

17. **Hypothesis**: There is no significant interaction effect of age (14–15, 15–16 years) and achievement motivation (high and low) on achievement in physics of secondary school students.

18. **Hypothesis**: There is no significant interaction effect of age (14–15, 15–16 years) and classroom environment (high and low) on achievement in physics of secondary school students.

19. **Hypothesis**: There is no significant interaction effect of sex (boys and girls) and cognitive style (field dependent and field independent) on achievement in physics of secondary school students.

20. **Hypothesis**: There is no significant interaction effect of sex (boys and girls) and achievement motivation (high and low) on achievement in physics of secondary school students.
21. **Hypothesis:** There is no significant interaction effect of sex (boys and girls) and classroom environment (high and low) on achievement in physics of secondary school students.

22. **Hypothesis:** There is no significant interaction effect of medium of instruction (Kannada and English) and cognitive style (field dependent and field independent) on achievement in physics of secondary school students.

23. **Hypothesis:** There is no significant interaction effect of medium of instruction (Kannada and English) and achievement motivation (high and low) on achievement in physics of secondary school students.

24. **Hypothesis:** There is no significant interaction effect of medium of instruction (Kannada and English) and classroom environment (high and low) on achievement in physics of secondary school students.

25. **Hypothesis:** There is no significant interaction effect of types of management (Government, aided and unaided) and cognitive style (field dependent and field independent) on achievement in physics of secondary school students.

26. **Hypothesis:** There is no significant interaction effect of types of management (Government, aided and unaided) and achievement motivation (high and low) on achievement in physics of secondary school students.
27. **Hypothesis:** There is no significant interaction effect of types of management (Government, aided and unaided) and classroom environment (high and low) on achievement in physics of secondary school students.

28. **Hypothesis:** There is no significant interaction effect of cognitive style (field dependent and field independent) and achievement motivation (high and low) on achievement in physics of secondary school students.

29. **Hypothesis:** There is no significant interaction effect of cognitive style (field dependent and field independent) and classroom environment (high and low) on achievement in physics of secondary school students.

30. **Hypothesis:** There is no significant interaction effect of achievement motivation (high and low) and classroom environment (high and low) on achievement in physics of secondary school students.

31. **Hypothesis:** There is no association between age and cognitive style of secondary school students.

32. **Hypothesis:** There is no association between sex and cognitive style of secondary school students.

33. **Hypothesis:** There is association between medium of instruction (Kannada and English) and cognitive style of secondary school students.
34. **Hypothesis:** There is association between types of management (Government, aided and unaided) and cognitive style of secondary school students.

35. **Hypothesis:** There is no significant relationship between achievement in physics, achievement motivation and classroom environment of secondary school students (Total).

36. **Hypothesis:** There is no significant relationship between achievement in physics with achievement motivation and classroom environment of secondary school students.

37. **Hypothesis:** There is no significant relationship between achievement in physics of aided secondary school students with achievement motivation and classroom environment.

38. **Hypothesis:** There is no significant relationship between achievement in physics of unaided secondary school students with achievement motivation and classroom environment.

39. **Hypothesis:** There is no significant relationship between achievement in physics of secondary school boys with achievement motivation and classroom environment.

40. **Hypothesis:** There is no significant relationship between achievement in physics of secondary school girls with achievement motivation and classroom environment.
41. **Hypothesis:** There is no significant relationship between achievement in physics of secondary school Kannada medium students with achievement motivation and classroom environment.

42. **Hypothesis:** There is no significant relationship between achievement in physics of secondary school English medium students with achievement motivation and classroom environment.

43. **Hypothesis:** There is no significant relationship among achievement motivation and classroom environment of secondary school students.

44. **Hypothesis:** Cognitive style, achievement motivation and classroom environment would not be a significant predictor of achievement in physics of secondary school students (total).

45. **Hypothesis:** Cognitive style, achievement motivation and classroom environment would not be a significant predictor of achievement in physics of Government secondary school Students

46. **Hypothesis:** Cognitive style, achievement motivation and classroom environment would not be a significant predictor of achievement in physics of aided secondary school students.

47. **Hypothesis:** Cognitive style, achievement motivation and classroom environment would not be a significant predictor of achievement in physics of unaided secondary school students
48. **Hypothesis**: Cognitive style, achievement motivation and classroom environment would not be a significant predictor of achievement in physics of secondary school boys

49. **Hypothesis**: Cognitive style, achievement motivation and classroom environment would not be a significant predictor of achievement in physics of secondary school girls

50. **Hypothesis**: Cognitive style, achievement motivation and classroom environment would not be a significant predictor of achievement in physics of secondary school Kannada medium students

51. **Hypothesis**: Cognitive style, achievement motivation and classroom environment would not be a significant predictor of achievement in physics of secondary school English medium students

52. **Hypothesis**: There is no significant direct and indirect effect of cognitive style, achievement motivation and classroom environment on achievement in physics of secondary school students.

53. **Hypothesis**: There is no significant direct and indirect effect of Cognitive style, achievement motivation and classroom environment on achievement in physics of Government secondary school students.

54. **Hypothesis**: There is no significant direct and indirect effect of cognitive style, achievement motivation and classroom environment on achievement in physics of aided secondary school students.
55. **Hypothesis:** There is no significant direct and indirect effect of cognitive style, achievement motivation and classroom environment on achievement in physics of unaided secondary school students.

56. **Hypothesis:** There is no significant direct and indirect effect of cognitive style, achievement motivation and classroom environment on achievement in physics of secondary school boys.

57. **Hypothesis:** There is no significant direct and indirect effect of cognitive style, achievement motivation and classroom environment on achievement in physics of secondary school girls.

58. **Hypothesis:** There is no significant direct and indirect effect of cognitive style, achievement motivation and classroom environment on achievement in physics of secondary school Kannada medium students.

59. **Hypothesis:** There is no significant direct and indirect effect of cognitive style, achievement motivation and classroom environment on achievement in physics of secondary school English medium students.

6.6. **Variables of the Study:**

The following are the variables selected for the study.

1) **Dependent Variable:**

a) Achievement in physics.
2) Independent Variables:
   a) Cognitive Style.
   b) Classroom Environment.
   c) Achievement Motivation.

3) Moderator Variables:
   a) Gender.
   b) Medium of Instruction.
   c) Types of Management.

6.7 Methodology

In the present study ex-post facto design was used for studying the problem.

6.7.1 Sampling Procedure

The pupils of X standard studying in schools of Belgaum city constituted the population for the study. Out of the large population, 600 pupils were drawn as sample for the study, using stratified random sampling technique.

The sample was selected from 30 secondary schools giving due representation to gender, type of management and medium of instruction.
6.7.2 Tools Used For the Collection of Data

The following tools were used in the study.

4) Achievement in Physics test; constructed and validated by the researcher.

6.7.3 Statistical Techniques Employed

The following statistical techniques were used to analyze the collected data:

1) t-test; and ANOVA to know the significant difference between the means of variables.
2) Coefficient of Correlation; to find out the correlation between dependent and the independent variables.
3) Multiple Regressions; to develop regression equations for dependent variable using independent variables as predictors.
4) Path analysis; to know the direct and indirect effects of independent variables on dependent variable.
6.8  Major Findings of the Study

6.8.1  Findings of Differential Analysis

1. Students between 14-15 years of age were high on achievement in physics than the between 16-17 years of age.

2. Students of 16-17 years of age were high on classroom environment when compared to students of 14-15 years of age.

3. Students of 16-17 years of age were high on participation dimension of classroom environment when compared to students of 14-15 years of age.

4. Students of 16-17 years of age were high on teachers support dimension of classroom environment when compared to students of 14-15 years of age.

5. Students of 16-17 years of age were high on personalization dimension of classroom environment when compared to students of 14-15 years of age.

6. Students of 16-17 years of age were high on competition dimension of classroom environment when compared to students of 14-15 years of age.

7. Girls were high on achievement in physics than boys.

8. Boys were high on achievement motivation compared to girls.
9. English medium students were high on achievement in physics when compared to Kannada medium students.

10. Kannada medium students were high on achievement motivation when compared to English medium students.

11. Kannada medium students were high on classroom environment when compared to English medium students.

12. English medium students were high on cohesiveness dimension of classroom environment when compared to Kannada medium students.

13. Kannada medium students were high on task orientation dimension of classroom environment when compared to English medium students.

14. English medium students were high on innovation dimension of classroom environment when compared to Kannada medium students.

15. Kannada medium students were high on participation dimension of classroom environment when compared to English medium students.

16. Kannada medium students were high on teacher support dimension of classroom environment when compared to English medium students.

17. English medium students were high on personalization dimension of classroom environment when compared to Kannada medium students.

18. Kannada medium students were high on independence dimension of classroom environment when compared to English medium students.
19. Kannada medium students were high on order and organization dimension of classroom environment when compared to English medium students.

20. Kannada medium students were high on friction dimension of classroom environment when compared to English medium students.

21. Kannada medium students were high on competition dimension of classroom environment when compared to English medium students.

22. Students of aided schools were high on achievement in physics when compared to the students of Government schools.

23. Students of aided schools were high on achievement in physics when compared to the students of unaided schools.

24. Students of aided schools were high on achievement motivation when compared to students of Government schools.

25. Students of unaided schools were high on achievement motivation when compared to students of Government schools.

26. Students belonging to Government, aided and unaided types of management were different on teacher support dimension of classroom environment.

27. Students of aided schools were high on classroom environment when compared to students of Government schools.
28. Students of unaided schools were high on classroom environment when compared to students of Government schools.
29. Students of unaided schools were high on classroom environment when compared to students of Government schools.
30. Students of aided schools were high on cohesiveness dimension of classroom environment when compared to students of Government schools.
31. Students of unaided schools were high on cohesiveness dimension of classroom environment when compared to students of Government schools.
32. Students of aided schools were high on task orientation dimension of classroom environment when compared to students of Government schools.
33. Students of aided schools were high on task orientation dimension of classroom environment when compared to students of unaided schools.
34. Students of aided schools were high on innovation dimension of classroom environment when compared to students of Government schools.
35. Students of unaided schools were high on cohesiveness dimension of classroom environment when compared to students of Government schools.
36. Students of aided schools were high on teacher support dimension of classroom environment when compared to students of Government schools.

37. Students of unaided schools were high on personalization dimension of classroom environment when compared to students of Government schools.

38. Students of unaided schools were high on cohesiveness dimension of classroom environment when compared to students of aided schools.

39. Students of Government schools were high on independence dimension of classroom environment when compared to students of aided schools.

40. Students of unaided schools were high on independence dimension of classroom environment when compared to students of Government schools.

41. Students of unaided schools were high on independence dimension of classroom environment when compared to students of aided schools.

42. Students of aided schools were high on order and organization dimension of classroom environment when compared to students of Government schools.

43. Students of unaided schools were high on order and organization dimension of classroom environment when compared to students of Government schools.
44. Students of aided schools were high on teacher control dimension of classroom environment when compared to students of Government schools.

45. Students of aided schools were high on friction dimension of classroom environment when compared to students of Government schools.

46. Students of unaided schools were high on friction dimension of classroom environment when compared to students of Government schools.

47. Students of unaided schools were high on friction dimension of classroom environment when compared to students of aided schools.

48. Students of Government schools were high on competition dimension of classroom environment when compared to students of aided schools.

49. Students of Government schools were high on competition dimension of classroom environment when compared to students of unaided schools.

50. Field dependent cognitive style students were high on achievement in physics when compared to field independent cognitive style students.

51. Field dependent cognitive style students were high on motivation when compared to field independent cognitive style students.

52. Field dependent cognitive style students were high on classroom environment, when compared to field independent cognitive style.
53. Field independent cognitive style students were high on material environment dimension of classroom environment when compared to field dependent cognitive style students.

54. Field dependent cognitive style students were high on cohesiveness dimension of classroom environment when compared to field independent cognitive style students.

55. Field independent cognitive style students were high on task orientation dimension of classroom environment when compared to field dependent cognitive style students.

56. Field dependent cognitive style students were high on innovation dimension of classroom environment when compared to field independent cognitive style students.

57. Field dependent cognitive style students were high on personalization dimension of classroom environment when compared to field independent cognitive style students.

58. Field dependent cognitive style students were high on independence dimension of classroom environment when compared to field independent cognitive style students.

59. Field dependent cognitive style students were high on order and organization dimension of classroom environment when compared to field independent cognitive style students.
60. Field independent cognitive style students were high on teacher control dimension of classroom environment when compared to field dependent cognitive style students.

61. Field dependent cognitive style students were high on competition dimension of classroom environment when compared to field independent cognitive style students.

62. Students belonging to different age groups (14-15, 16-17 years) had different achievement in physics.

63. Students belonging to different age groups (14-15, 16-17 years) had different achievement in physics.

64. Students belonging to different age groups (14-15, 16-17 years) had different achievement in physics.

65. Boys and girls had different achievement in physics.

66. Kannada and English medium students had different achievement in physics.

67. Kannada and English medium students had different achievement motivation.

68. Kannada medium students were high on field dependent cognitive style when compared to English medium students. Similarly the English medium students were high on field independent cognitive style when compared to Kannada medium students.
69. The students of aided schools were high on field dependent cognitive style when compared to students of unaided and Government schools. Similarly the students of unaided schools were high on field independent cognitive style when compared to aided and Government schools.

6.8.2 Findings of Correlational Analysis

1. Cognitive style increases the achievement in physics of secondary school students.

2. Achievement motivation increases the achievement in physics of secondary school students.

3. Classroom environment increases the achievement in physics of secondary school students.


5. Achievement motivation increases the achievement in physics of Government secondary school students.


7. Cognitive style increases the achievement in physics of aided secondary school students.
8. Achievement motivation increases the achievement in physics of aided secondary school students.

9. Classroom environment increases the achievement in physics of aided secondary school students.

10. Cognitive style increases the achievement in physics of unaided secondary school students.

11. Achievement motivation increases the achievement in physics of unaided secondary school students.

12. Classroom environment increases the achievement in physics of unaided secondary school students.

13. Cognitive style increases the achievement in physics of secondary school boys.


15. Classroom environment increases the achievement in physics of secondary school boys.


17. Achievement motivation increases the achievement in physics of secondary school girls.
18. Classroom environment increases the achievement in physics of secondary school girls.


20. Achievement motivation increases the achievement in physics of secondary school Kannada medium students.

21. Classroom environment increases the achievement in physics of secondary school Kannada medium students.


23. Achievement motivation increases the achievement in physics of secondary school English medium students.

24. Classroom environment increases the achievement in physics of secondary school English medium students.

25. Cognitive style increases the achievement motivation of secondary school students.

6.8.3 Findings of Multiple Regression Analysis

1. Cognitive style is supportive to increase the achievement in physics of secondary school students.

2. Achievement motivation supportive to increase the achievement in physics of secondary school students.
3. Classroom environment supportive to increase the achievement in physics of secondary school students

4. Cognitive style was supportive to increase the achievement in physics of Government secondary school students

5. Achievement motivation was supportive to increase the achievement in physics of Government secondary school students

6. Classroom environment was supportive to increase the achievement in physics of Government secondary school students

7. Cognitive style was supportive to increase the achievement in physics of aided secondary school students.

8. Achievement motivation was supportive to increase the achievement in physics of aided secondary school students

9. Classroom environment was supportive to increase the achievement in physics of aided secondary school students

10. Cognitive style was supportive to increase the achievement in physics of unaided secondary school students

11. Achievement motivation was supportive to increase the achievement in physics of unaided secondary school students

12. Classroom environment was supportive to increase the achievement in physics of unaided secondary school students
13. Cognitive style was supportive to increase the achievement in physics of secondary school boys.

14. Achievement motivation was supportive to increase the achievement in physics of secondary school boys.

15. Classroom environment was supportive to increase the achievement in physics of secondary school boys.

16. Cognitive style was supportive to increase the achievement in physics of secondary school girls.

17. Achievement motivation was supportive to increase the achievement in physics of secondary school girls.

18. Classroom environment was supportive to increase the achievement in physics of secondary school girls.

19. Cognitive style was supportive to increase the achievement in physics of secondary school Kannada medium students.

20. Achievement motivation was supportive to increase the achievement in physics of secondary school Kannada medium students.

21. Classroom environment was supportive to increase the achievement in physics of secondary school Kannada medium students.

22. Cognitive style was supportive to increase the achievement in physics of secondary school English medium students.
23. Achievement motivation was supportive to increase the achievement in physics of secondary school English medium students.

24. Classroom environment was supportive to increase the achievement in physics of secondary school English medium students.

6.8.4 Findings of Path Analysis

1. The direct effect of cognitive style achievement motivation and classroom environment on achievement in physics of secondary school students was found to be significant.

2. The indirect effect of achievement motivation through cognitive style on achievement in physics of secondary school students was found to be significant.

3. The indirect effect of cognitive style through motivation on achievement in physics of secondary school students was found to be significant.

4. The direct effect of cognitive style achievement motivation and classroom environment on achievement in physics of Government secondary school students was found to be significant.

5. The indirect effect of achievement motivation and classroom environment through cognitive style on achievement in physics of Government secondary school students was found to be significant.
6. The indirect effect of cognitive style and classroom environment through achievement motivation on achievement in physics of Government secondary school students was found to be significant.

7. The indirect effect of cognitive style and achievement motivation through classroom environment on achievement in physics of Government secondary school students was found to be significant.

8. The direct effect of cognitive style achievement motivation and classroom environment on achievement in physics of aided secondary school students was found to be significant.

9. The indirect effect of achievement motivation through cognitive style on achievement in physics of aided secondary school students was found to be significant.

10. The indirect effect of cognitive style through achievement motivation on achievement in physics of aided secondary school students was found to be significant.

11. The direct effect of cognitive style achievement motivation and classroom environment on achievement in physics of unaided secondary school students was found to be significant.

12. The indirect effect of achievement motivation through cognitive style on achievement in physics of unaided secondary school students was found to be significant.
13. The indirect effect of cognitive style and classroom environment through achievement motivation on achievement in physics of unaided secondary school students was found to be significant.

14. The indirect effect of achievement motivation through classroom environment on achievement in physics of unaided secondary school students was found to be significant.

15. The direct effect of cognitive style achievement motivation and classroom environment on achievement in physics of secondary school boys was found to be significant.

16. The indirect effect of achievement motivation through cognitive style on achievement in physics of secondary school boys was found to be significant.

17. The indirect effect of achievement motivation through cognitive style on achievement in physics of secondary school boys was found to be significant.

18. The direct effect of cognitive style achievement motivation and classroom environment on achievement in physics of secondary school girls was found to be significant.

19. The indirect effect of achievement motivation and classroom environment through cognitive style on achievement in physics of secondary school girls was found to be significant.
20. The indirect effect of cognitive style and classroom environment through achievement motivation on achievement in physics of secondary school girls was found to be significant.

21. The indirect effect of cognitive style and achievement motivation through classroom environment on achievement in physics of secondary school girls was found to be significant.

22. The direct effect of cognitive style achievement motivation and classroom environment on achievement in physics of secondary school Kannada medium students was found to be significant.

23. The indirect effect of motivation and classroom environment through cognitive style on achievement in physics of secondary school Kannada medium students was found to be significant.

24. The indirect effect of cognitive style through achievement motivation on achievement in physics of secondary school Kannada medium students was found to be significant.

25. The indirect effect of cognitive style through classroom environment on achievement in physics of secondary school Kannada medium students was found to be significant.

26. The direct effect of cognitive style achievement motivation and classroom environment on achievement in physics of secondary school English medium students was found to be significant.
27. The indirect effect of achievement motivation through cognitive style on achievement in physics of secondary school English medium students was found to be significant.

28. The indirect effect of cognitive style and classroom environment through achievement motivation on achievement in physics of secondary school English medium students was found to be significant.

29. The indirect effect of achievement motivation through classroom environment on achievement in physics of secondary school English medium students was found to be significant.

6.9 Conclusions of the Study

The present study was undertaken to find out the predictive efficiency of cognitive style, classroom environment and achievement motivation for achievement in physics of X standard pupils studying in Belgaum. The analysis of data revealed certain trends from which conclusions can be drawn.

1) Cognitive Style contributes significantly to achievement in Physics of X standard pupils. It was found that English medium pupils are higher in cognitive style than Kannada medium pupils; promotion of cognitive style/learning style through educational programmes among Kannada medium pupils should be one of the main aims of schools. Schools should realize that classrooms are not meant only for transmission of knowledge but also for developing their ability in students.
2) When compared to 'aided' and 'unaided' high schools pupils, Government school pupils have lower cognitive style. Atmosphere in Government schools should be improved by providing men and material resources, so that learning abilities of the pupils are sharpened. The teachers should have favorable attitude towards those who have that ability. Generally teachers expect pupils should be obedient, timid, fearful, and submissive. They do not appreciate courageous, curious, independent thinking and judgment, risk taking and initiative, which facilitate cognitive ability. Highly individualized and discovery teaching methods should be employed to foster cognitive style.

Better amenities, more enriched teachers and comprehensive curricular and co-curricular programmes should be provided. Attempt should be made to enrich educational setting of schools by providing all these facilities to promote cognitive ability in pupils. Teachers in government and Kannada medium schools should strive hard to stimulate cognitive abilities of the pupils. There should not be more stress on achieving high marks in Physics. Tendency prevails in our present day society, which gives more weightage to achievement rather than natural ability of an individual.

3) The pressure exerted by parents and teachers demand unrealistic high level of performance of their children. This situation makes the children...
more test anxious. This has ill effect on achievement in physics. To reduce physics test anxiety, the teacher should teach the subject for deep understanding. Teachers should also make the testing situations non-burdens one to the pupils. For high anxious pupils personal counselling can be provided in schools. Also parents should be told not to cause stress on pupils towards achievement. Guidance and counselling at the right time would minimize anxiety of pupils on their achievement. The teachers and parents should not discourage pupils specially those who suffer from anxiety. Teachers should identify the units, which give scope for creativity, by adopting most suitable methods of teaching. The classroom environment should be conducive and encouraging, developing basic skills, better work habits, divergent thinking, development of desirable attitude, adequate personal judgment, etc. From among the teaching methods the best methods suitable for developing academic ability among pupils such as problem solving and heuristic method should be widely practiced in classroom teaching.

4) In case of achievement motivation, it was found that boys and girls do not differ significantly, whereas in case of medium of instruction, English medium pupils and Kannada medium pupils differ significantly. Also Government unaided high school pupils differ significantly. It may
be remembered here that favourable attitude towards physics has an impact on achievement in physics. In schools, proper environment must be provided so that the pupils develop favourable attitude towards the subject physics. Physics teacher should take care to see that the pupils are not provided with confusing situations. The teachers of physics can draw well-balanced examples from life situation. To develop in pupils, the most favourable attitude towards the subject, teachers can adopt the methods like – heuristic method, guided – discovery, programmed instruction, inductive method. These will help not only to develop insight over the subject but also certainly develop favorable attitude as free environment is provided in schools to the learner.

5) One of the most important attention drawing questions in education is how to enhance the academic performance of pupils. Many factors can contribute to pupils’ lack of effort. The absence of academic motivation is reflected in pupils’ negligence of their studies. In this study it was found out that there is a marked relationship between motivation and achievement in physics. Boys and girls differ in mean scores in achievement motivation; pupils studying in English and Kannada medium also differ significantly in mean scores in achievement motivation and pupils studying in Government, aided and unaided high schools differ significantly in achievement motivation.
The first condition for and a very important factor of human behavior is motivation. Teachers can make use of ways and means of motivation, keeping in view of individual differences in intelligence, stages of development of pupils. Girls should also be given equal importance. They should be given equal opportunities and encouragement as boys and be made highly achievement oriented. The parents also should not discriminate in the upbringing of boys and girls. Teachers in government high schools should also play an important role, in providing conducive environment for the development of achievement motivation. Also Kannada medium students should be encouraged to participate in competition and taking up challenging tasks. A good intimate emotional relationship between pupils and teachers motivates pupils towards success.

6) There is significant effect of gender on achievement in physics of secondary school pupils. It is observed that girls are better in physics than boys. Boys may be encouraged to perform better in physics.

7) The types of schools in which the pupils are studying have significant effect on achievement in physics. It is observed that pupils studying in aided and unaided school perform better than pupils in corporation and Government schools. This may be due to interest of teachers and also lack of required qualification and rich experience in teaching. In
Government high schools transfer of teachers, environment of the schools and equipments have effect on achievement in physics.

8) Medium of instruction has significant effect on achievement in Physics. English medium pupils' score is higher than that of Kannada medium pupils. This shows the importance given to English medium.

There are many factors, which influence the achievement in Physics at secondary stage. In the present study, it is observed that cognitive style; classroom environment and achievement motivation have impact of achievement in physics. To enhance the performance in physics, variety of curricular, co-curricular and extra curricular programmes can be instituted in schools periodically.

6.10 Educational Implications

The major findings of the study and conclusions drawn, helped the investigator to suggest the following for the development of cognitive style, classroom environment and achievement motivation, and hence improve the achievement in physics. However, in teaching physics, the teacher may take the following measures.

1) Teaching may emphasize more on fundamental knowledge than on subject matter. More emphasis should be given on organized and meaningful learning than mechanical learning.
2) Better pupil-teacher understanding and relationships, better adaptation of teaching, learning, encouragement of pupils towards acceptance of responsibility of learning, greater satisfaction of pupil with his learning, and the like may be given importance.

3) Finding answers to problems through various methods, verification and testing of results may help in developing the cognitive level of learning.

4) Pupils may be provided with free and necessary environment at home and school for learning physics and developing their own creativity and motivation.

5) Teachers may encourage and help pupils to participate in quiz programmes, exhibitions and other competitive tests related to physics.

6) Teachers may encourage pupils to use their leisure time profitably by engaging in activities such as collecting pictures, articles, solving problems and other activities.

7) The parents may give training to the children in doing independent work. They must appreciate the successful activities of their children. The teachers may help the pupils to analyze their creativity. Attitude and motivation, which would make them, believe that they are responsible for their success.
6.11 Suggestions for Further Study

The following suggestions offered for further study may be:

1) The study may be extended to a larger sample drawn from the state of Karnataka, as a whole.

2) The study may be undertaken by incorporating variables like, intelligence, aptitude, interest, adjustment, problem-solving, caste, family, birth order, reading ability, mental health, self-concept and socio-cultural background of the pupils and other psycho-social and demographic variables.

3) Similar study may be undertaken in other subjects like mathematics and social science where there are still some gray areas where there are still some grey areas.

4) A study may be undertaken with in-depth analysis of variables namely cognitive style in terms of its dimensions, classroom environment at different levels, achievement motivation at different levels and achievement in different objectives of cognitive domain.