CHAPTER V
CHAPTER V
SUMMARY AND CONCLUSIONS

The previous chapter dealt with analysis and interpretation of data under different sections. In this chapter, researcher presents summary of the study, findings, conclusion, educational implications and suggestions for the further research in the pages to follow.

5.1 Summary:

It is a paradox that India is a rich country but is inhabited by poor people; and that in its ancient past, it made notable contributions in the fields of philosophy, mathematics, astronomy, medicine and agriculture. It then had a long period of stagnation running over several centuries. As a British dependency and all that it implies, it had to miss for historical reasons the first Industrial Revolution. Today, when the second industrial revolution has arrived at the door-step in the west, this country, like an adolescent in fever is trying hard to achieve its past glory by recapturing its traditions of scholarship and original thinking and its great cultural heritage to participate fully in the march of science, which is probably mankind’s greatest expertise in our times.

Education is not preparation for life, but life in itself School is a place where ‘the young rebel” is being shaped into a ‘young citizen’
The school is the most powerful most valuable agency and the most naturally evolved agency for the purpose of proper regulation of the social side of pupil's life.

Education should help the children to express and bring out their talents to limelight. The main aim of education is to help the child to grow to his fullest extent possible using all his potentialities. In this modern society, education is thought to bring about desirable changes in the behaviour of its members.

In education, Curriculum development considered in its widest sense has been recognized as the main generating force not only for quality in education, but also for fostering the ability to assimilate changes, especially those due to rapid scientific and technological evolution now in process.

Science has occupied almost all spheres of human life. The wonderful achievements of science have glorified the modern world, transformed the modern civilisation into a scientific civilisation and illuminated the human creative potential.
Recently, educational researchers have investigated what factors affect the success in learning in science. For this reason, students’ Attitude toward Science have been examined (Oppenheim, 1992). In these fields, Likert-type attitude scales are appropriate to designing-studies.

Students’ knowledge of Science is random and has no plan. One of the factors which affects attitude toward Science negatively is abstraction increased in the other is irregular and heterogen structure of the Science classes. Besides, students’ knowledge, environmental conclusions on their daily behaviours play role on the attitude toward Science negatively. (Stanisstreet, 1993). To develop especially the positive attitude toward Science, more contemporary and more persuasive hypothesis must be made (Crawly and Koala, 1994).

Studies show that, children in many classrooms have spent too much time observing, experimenting and ostensibly doing science, while never really thinking about what they were doing, never articulating ideas and never developing and conceptual awareness the Science (McNay, 2000).

Education shapes and inculcates overall development of the individuality of the child, so that he can make an original contribution to the human life. Education combines both needs and aspirations of the
people and thereby made a powerful instrument of social, economic and cultural transformation.

Attitudes are most important in the field of education. Students have favourable or unfavourable attitude towards their study. The attitude of students towards their study are the intensity of positive or negative affect. It may be for or against the study.

The term science means the same at any level. In one sense, it is a body of information and principles that help us understand the world around us from atoms to stars, from microscopic water life to man. In another sense, science may be regarded as methods of discovery, the methods by which new information is uncovered, new principles arrived at, old principles modified or discarded. It is characteristic of science that it starts with a perplexing problem, proceeds with the trying of different methods of solution, and results in a new discovery.

In the study of science, we learn ways of exploring in order to learn about the world. For children, the study of science consists of their exploring the world around them in order to learn about it and so answer their questions about it, the better to enjoy and appreciate their surroundings. It seems a natural thing to wonder what makes a rainbow,
how magnets can pick up iron nails, how far away the stars are, how a
compass can point north, and how an aeroplane can stay in the air. It
appears natural, too, to try out things to see how they work, to experiment,
to manipulate to be curious, to ask questions, to seek answers. To learn to
think scientifically is to learn those concepts and principles, which will
enable one to make wise choices in deciding how to live with one’s
environment. This is indeed science for the citizen.

Concept of Aptitude:

Human efficiency is not as easily defined as that of a machine and it
is not as easily measured. Some people think of aptitudes as innate
abilities. There is increasing awareness, however, that we inherit structures
with potentialities for functional use rather than abilities and that the
development of one’s potentialities depends upon environmental factors.

Scientific Aptitude:

The world is progressing with an accelerated speed in the space age
trying to probe through the unsolved mysteries of the universe. Ours is a
developing nation. For all-round development of the individual and
progress of science all-round utilization of the latest achievements of
science and technology is essential. For this every individual tries to get
trained to acquire knowledge and skills of science and its application
permeates modern life. So extremely that every citizen has to have a knowledge of science for effective living.

**Concept of Attitude:**

The main aim of education is to modify the behaviour of the child according to the needs and expectations of the society. Behaviour is composed of so many attributes and one of these important attributes is attitude. One's behaviour to a great extent depends upon one's attitude towards the things, ideas, persons or objects in his environment.

**Scientific Attitude:**

Scientific Attitude is the most important outcome of science teaching. Though some people view the Scientific Attitude as the by-product of teaching science, yet a majority of the people consider it as equally important as knowledge aspect. Scientific Attitude is of very significant concern in the process of science education.

**Concept of Achievement Test:**

Achievements of an individual in allied fields provide sufficient information in regard to his aptitude for those fields of knowledge and skills. Achievement in a particular branch of knowledge or skill is
considered as a good indicator of aptitude. Without an aptitude for a particular subject, student cannot achieve highly in that subject.

**Academic Achievement:**

Academic Achievement in the present competitive challenging scenario in the cultural, socio-economic status places great emphasis on achievement right from the beginning of the formal education.

**Genesis of the Problem**

The National Science Foundation was established in 1950 by an act of Congress to develop a national policy for the promotion of basic research and education in the sciences. Fund for the Advancement of education financed for innovation and experimentation in schools.

Science is playing a major role in the present age to satisfy the needs and desires of the people and it has also becomes one of the major human activities.

Science Education by virtue of the fact that it provides more developments of the Scientific Aptitude required of an individual in the Secondary schools is likely to be associated with the Scientific Attitude on Academic Achievement in science of the students. Previous studies have
identified that in Indian students, the scientific aptitudes are related to academic achievement. Studies were made to identify the association between Scientific Aptitude and Academic Achievement tests developed through education. Since Scientific Aptitude is an outcome of science education a study of Scientific Attitude with reference to the Scientific Aptitude may serve a useful purpose.

Scientific Aptitude and Scientific Attitude are the complex behavioural aspect of science. It can be studied at various educational levels say primary to post graduate. In the present study is concerned with the effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in science of Secondary school students, viz., IX class students. It is also concerned with Gender, Type of Management and Medium of Instruction.

Restatement of the Problem:
The problem selected for the present study is restated as “Effect of Scientific Aptitude and Scientific Attitude on Academic Achievement of Secondary School Students in Science.”
Objectives of the Study:

The study was taken up with the following objectives;

1) To study the effect of Scientific Aptitude on Academic Achievement in science among the IX standard students.

2) To study the effect of Scientific Attitude on Academic Achievement in science among the IX standard students.
   i. To study the effect of rationality of IX standard students on Academic Achievement in science.
   ii. To study the effect of curiosity of IX standard students on Academic Achievement in science.
   iii. To study the effect of open mindedness of IX standard students on Academic Achievement in science
   iv. To study the effect of personal confidence of IX standard students on Academic Achievement in science
   v. To study the effect of aversion to superstitions of IX standard students on Academic Achievement in science
   vi. To study the effect of objectivity of intellectual belief of IX standard students on Academic Achievement in science
   vii. To study the effect of suspended judgement of IX standard students on Academic Achievement in science
3) To study the relationship between Scientific Aptitude and Scientific Attitude on Academic Achievement in science among the IX standard students.

4) To predict the influence of Scientific Aptitude and Scientific Attitude on Academic Achievement in science.

5) To study the direct and indirect of independent variables (Scientific Aptitude and scientific attitude) on dependent variable that is Academic Achievement in science.

**Research Design:**

The present study was a descriptive survey study.

**Variables of the Study:**

Variables considered for the present study are as follows:

- **Dependent Variable** – Academic Achievement in Science

- **Independent Variables**
  - Scientific Aptitude
  - Scientific Attitude

- **Moderate Variables**
  - Gender (Male/ Female)
  - Age (15,16,17 years)
  - Type of Management (Government, Aided, Unaided)
  - Medium of Instruction (Kannada / English)
Hypotheses of the Study:

1. There is no significant difference between Type of Management (Government, Aided and Unaided) with respect to Scientific Aptitude of Secondary school students.

2. There is no significant difference between Type of Management (Government, Aided and Unaided) with respect to Academic Achievement in Science of Secondary school students.

3. There is no significant difference between Type of Management (Government, Aided and Unaided) with respect to Scientific Attitude towards Science and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs and Suspended Judgment) of Secondary school students.

4. There is no significant difference between Medium of Instruction (Kannada and English) with respect to Scientific Aptitude of Secondary school students.

5. There is no significant difference between Medium of Instruction (Kannada, and English) with respect to Scientific Attitude towards Science and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs and Suspended Judgment) of Secondary school students.
6. There is no significant difference between Age groups (15, 16, 17 years) with respect to Scientific Aptitude of Secondary school students.

7. There is no significant difference between Age groups (15, 16, 17 years) with respect to Scientific Attitude towards Science and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs and Suspended Judgment) of Secondary school students.

8. There is no significant difference between Boys and Girls of Secondary schools with respect to Scientific Aptitude.

9. There is no significant difference between Boys and Girls of Secondary school students with respect to Academic Achievement in Science.

10. There is no significant difference between Boys and Girls with of Secondary schools with respect to Scientific Attitude towards Science and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs and Suspended Judgment).

11. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of Secondary school students in total.
12. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of Secondary school students in total.

13. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of Government Secondary school students.

14. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of Government Secondary school students.

15. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Scientific Aptitude of Government Secondary school students.

16. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of Aided Secondary school students.
17. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of Aided Secondary school students.

18. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of Unaided Secondary school students.

19. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of Unaided Secondary school students.

20. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of Kannada medium students of Secondary schools.

21. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of Kannada medium students of Secondary schools.
22. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Scientific Aptitude of Kannada medium students of Secondary schools.

23. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of English medium students of Secondary schools.

24. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of English medium students of Secondary schools.

25. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Scientific Aptitude of English medium students of Secondary schools.

26. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of 15 years of Age students of Secondary schools.
27. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of 15 years of Age students of Secondary schools.

28. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of 16 years of Age students of Secondary schools.

29. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of 16 years of Age students of Secondary schools.

30. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of 17 years of Age students of Secondary schools.

31. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic
Achievement in Science of 17 years of Age students of Secondary schools.

32. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Scientific Aptitude of 17 years of Age students of Secondary schools.

33. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of Boys of Secondary schools.

34. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of Boys of Secondary schools.

35. There is no significant relationship between Scientific Aptitude and Academic Achievement in Science of Girls of Secondary schools.

36. There is no significant relationship between Scientific Attitude and its dimensions (i.e. Rationality, Curiosity, Open Mindedness, Personal Confidence, Aversion to Superstitions, Objectivity of Intellectual Beliefs, Suspended Judgment) and Academic Achievement in Science of Girls of Secondary schools.
37. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of Secondary school students

38. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of Government Secondary school students

39. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of Aided Secondary school students

40. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of Unaided Secondary school students

41. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of Kannada medium Secondary school students

42. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of English medium Secondary school students

43. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of 15 years of Aged students of Secondary schools
44. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of 16 years of Aged students of Secondary schools

45. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of 17 years of Aged students of Secondary schools

46. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of Boys of Secondary schools

47. Scientific Aptitude and Scientific Attitude would not be significant predictors of Academic Achievement in Science of Girls of Secondary schools

48. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science of Secondary school students in total.

49. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science of Government Secondary school students.

50. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science of Aided Secondary school students.
51. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science of Unaided Secondary school students.

52. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science of Kannada medium Secondary school students.

53. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science of English medium Secondary school students.

54. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science of 15 years of Aged students of Secondary schools.

55. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science of 16 years of Aged students of Secondary schools.

56. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science of 17 years of Aged students of Secondary schools.

57. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science Boys of Secondary schools.
58. There is no significant direct and indirect effect of Scientific Aptitude and Scientific Attitude on Academic Achievement in Science Girls of Secondary schools.

Population and Sample of the Study:

In the present study the students those who are studying in IX standard for the academic year 2006-2007 constitute the population.

Sampling is a process of selecting a sample from the population. The investigator employed stratified random sampling technique for the selection of schools and simple random techniques to select the students. The total sample for the study were 1000 students from Bangalore city (North and South zone) with 500 Girls and 500 Boys.

Tools Used in the Study:

For the purpose of measuring the variables selected for the study, the following tools were used by the investigator.

- **Scientific Aptitude Scale**: Aptitude test is constructed by the investigator to measure the Scientific Aptitude of students.
- **Scientific Attitude Scale**: A rating scale constructed by the investigator to measure the Scientific Attitude of students.
• **Academic Achievement Test**: An objective type of Questions like multiple-choice type is constructed and standardized by the investigator to measure the Academic Achievement of students.

**Statistical Techniques Used:**

The hypotheses of the study were tested by making an analysis of the collected data with the help of statistical techniques, which are classified as –

1. Descriptive Statistics
2. Differential Statistics
3. Regression analysis of independent variables on the dependent variable (Effect of independent variables on the dependent variable)
4. Path analysis of independent variables on the dependent variable (direct and indirect effects of independent variables on Academic Achievement in Science)

**5.2 Findings of the Study:**

1. **Differential Analysis**

   1. The Secondary school students of Unaided schools have higher Scientific Attitude when compared to the students of Aided and Government schools.
2. The Secondary school students of Unaided schools have higher Rationality when compared to the students of Aided and Government schools.

3. The Secondary school students of Unaided schools have higher Curiosity when compared to the students of Aided and Government schools.

4. The Secondary school students of Unaided schools have higher Open Mindedness when compared to the students of Aided and Government schools.

5. The Secondary school students of Unaided schools have higher Aversion to Superstitions when compared to the students of Aided and Government schools.

6. The Secondary school students of Unaided schools have higher Objectivity of Intellectual Beliefs when compared to the students of Aided and Government schools.

7. The students belonging to Unaided schools are high on Suspended Judgment when compared to Government and Aided school students

8. Kannada medium students are higher in their Scientific Aptitude when compared to English medium Secondary schools students.

9. Kannada medium student are having higher Academic Achievement when compared to English medium Secondary schools students.
10. English medium Secondary school students are little higher in their Open Mindedness than Kannada medium students.

11. Kannada medium Secondary school students are higher in Personal Confidence than English medium school students.

12. English medium Secondary school students are higher on Aversion to Superstitions than Kannada medium school students.

13. English medium Secondary school students are higher on Objectivity of Intellectual Beliefs than Kannada medium school students.

14. Girls of Secondary schools have higher Scientific Aptitude when compared to Boys.

15. Girls of Secondary schools have higher Academic Achievement in Science compared to Boys.

16. Girls of Secondary schools have higher Scientific Attitude when compared to Boys.

17. The Girls of Secondary schools are higher on Rationality when compared to Boys.

18. The Girls of Secondary schools are higher on Personal Confidence when compared to Boys.

19. The Girls of Secondary schools are higher on Aversion to Superstitions when compared to Boys.
20. The Girls of Secondary schools are higher on Objectivity of Intellectual Beliefs when compared to Boys.

21. The Girls of Secondary schools are higher in Suspended Judgment when compared to Boys.

2. Correlation Analysis

Correlation coefficient between Scientific Aptitude, Scientific Attitude with dimensions and Academic Achievement in Science of Secondary school students (Total)

1. The increase in Scientific Attitude increases the Academic Achievement in Science of Secondary school students.

2. The increase in Rationality of Scientific Attitude increases the Academic Achievement in Science of Secondary school students.

3. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of Secondary school students.

4. The increase in Open Mindedness of Scientific Attitude increases the Academic Achievement in Science of Secondary school students.

5. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of Secondary school students.

6. The increase in Aversion to Superstitions of Scientific Attitude increases the Academic Achievement in Science of Secondary school students.
7. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of Secondary school students.

8. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of Secondary school students.

Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and aptitude and its dimensions of Secondary school students (Government schools)

1. The Scientific Aptitude increases the Academic Achievement in Science of Government Secondary school students.

2. The increase in Scientific Attitude increases the Academic Achievement in Science of Government Secondary school students.

3. The increase in Rationality of Scientific Attitude increases the Academic Achievement in Science of Government Secondary school students.

4. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of Government Secondary school students.

5. The increase in Open Mindedness of Scientific Attitude increases the Academic Achievement in Science of Government Secondary school students.
6. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of Government Secondary school students.

7. The increase in Aversion to Superstitions of Scientific Attitude increases the Academic Achievement in Science of Government Secondary school students.

8. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of Government Secondary school students.


Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and aptitude and its dimensions of Secondary school students (Aided schools)

1. The increase in Scientific Aptitude increases the Academic Achievement in Science of Aided Secondary school students.

2. The increase in Scientific Attitude increases the Academic Achievement in Science of Aided Secondary school students.

3. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of Aided Secondary school students.
4. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of Aided Secondary school students.

5. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of Aided Secondary school students.

6. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of Aided Secondary school students.

**Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and Attitude and its dimensions of Secondary school students (Unaided schools)**

1. The increase in Scientific Aptitude increases the Academic Achievement in Science of Unaided Secondary school students.

2. The increase in Scientific Attitude increases the Academic Achievement in Science of Unaided Secondary school students

3. Increase in Rationality of Scientific Attitude increases the Academic Achievement in Science of Unaided Secondary school students.

4. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of Unaided Secondary school students.

5. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of Unaided Secondary school students.
6. The increase in Aversion to Superstitions of Scientific Attitude increases the Academic Achievement in Science of Unaided Secondary school students.

7. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of Unaided Secondary school students.

8. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of Unaided Secondary school students.

Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and Scientific Attitude and its dimensions of Secondary school students of Kannada medium

1. The increase in Scientific Aptitude increases the Academic Achievement in Science of Kannada medium students of Secondary schools.

2. The increase in Scientific Attitude increases the Academic Achievement in Science of Kannada medium students of Secondary schools.

3. The increase in Rationality of Scientific Attitude increases the Academic Achievement in Science of Kannada medium students of Secondary schools.
4. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of Kannada medium students of Secondary schools.

5. The increase in Open Mindedness of Scientific Attitude increases the Academic Achievement in Science of Kannada medium students of Secondary schools.

6. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of Kannada medium students of Secondary schools.

7. The increase in Aversion to Superstitions of Scientific Attitude increases the Academic Achievement in Science of Kannada medium students of Secondary schools.

8. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of Kannada medium students of Secondary schools.

9. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of Kannada medium students of Secondary schools.

10. The increase in Scientific Attitude increases the Scientific Aptitude of Kannada medium students of Secondary schools.

11. The increase in Rationality of Scientific Attitude increases the Scientific Aptitude of Kannada medium students of Secondary schools.
12. The increase in Curiosity of Scientific Attitude increases the Scientific Aptitude of Kannada medium students of Secondary schools.

13. The increase in Open Mindedness of Scientific Attitude increases the Scientific Aptitude of Kannada medium students of Secondary schools.

14. The increase in Personal Confidence of Scientific Attitude increases the Scientific Aptitude of Kannada medium students of Secondary schools.

15. The increase in Aversion to Superstitions of Scientific Attitude increases the Scientific Aptitude of Kannada medium students of Secondary schools.

16. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Scientific Aptitude of Kannada medium students of Secondary schools.

Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and Scientific Attitude and its dimensions of Secondary school students of English medium

1. The increase in Scientific Aptitude increases the Academic Achievement in Science of English medium students of Secondary schools.

2. The increase in Scientific Attitude increases the Academic Achievement in Science of English medium students of Secondary schools.
3. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of English medium students of Secondary schools.

4. The increase in Aversion to Superstitions of Scientific Attitude increases the Academic Achievement in Science of English medium students of Secondary schools.

5. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of English medium students of Secondary schools.

6. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of English medium students of Secondary schools.

7. The increase in Scientific Attitude increases the Scientific Aptitude of English medium students of Secondary schools.

8. The increase in Rationality of Scientific Attitude increases the Scientific Aptitude of English medium students of Secondary schools.

9. The increase in Personal Confidence of Scientific Attitude increases the Scientific Aptitude of English medium students of Secondary schools.

10. The increase in Aversion to Superstitions of Scientific Attitude increases the Scientific Aptitude of English medium students of Secondary schools.
11. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Scientific Aptitude of English medium students of Secondary schools.

12. The increase in Suspended Judgments of Scientific Attitude increases the Scientific Aptitude of English medium students of Secondary schools.

Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and Scientific Attitude and its dimensions of Secondary school students (15 years of age)

1. The increase in Scientific Aptitude increases the Academic Achievement in Science of 15 years of Age students of Secondary schools.

2. The increase in Scientific Attitude increases the Academic Achievement in Science of 15 years of Age students of Secondary schools.

3. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of 15 years of Age students of Secondary schools.

4. The increase in Open Mindedness of Scientific Attitude increases the Academic Achievement in Science of 15 years of Age students of Secondary schools.
5. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of 15 years of Age students of Secondary schools.

6. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of 15 years of Age students of Secondary schools.

7. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of 15 years of Age students of Secondary schools.

Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and Scientific Attitude and its dimensions of Secondary school students (16 years of age)

1. The increase in Scientific Aptitude increases the Academic Achievement in Science of 16 years of Age students of Secondary schools.

2. The increase in Scientific Attitude increases the Academic Achievement in Science of 16 years of Age students of Secondary schools.

3. The increase in Rationality of Scientific Attitude increases the Academic Achievement in Science of 16 years of Age students of Secondary schools.
4. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of 16 years of Age students of Secondary schools.

5. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of 16 years of Age students of Secondary schools.

6. The increase in Aversion to Superstitions of Scientific Attitude increases the Academic Achievement in Science of 16 years of Age students of Secondary schools.

7. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of 16 years of Age students of Secondary schools.

8. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of 16 years of Age students of Secondary schools.

Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and Scientific Attitude and its dimensions of Secondary school students (17 years of age)

1. The increase in Scientific Aptitude increases the Academic Achievement in Science of 17 years of Age students of Secondary schools.
2. The increase in Scientific Attitude increases the Academic Achievement in Science of 17 years of Age students of Secondary schools.

3. The increase in Rationality of Scientific Attitude increases the Academic Achievement in Science of 17 years of Age students of Secondary schools.

4. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of 17 years of Age students of Secondary schools.

5. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of 17 years of Age students of Secondary schools.

6. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of 17 years of Age students of Secondary schools.

7. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of 17 years of Age students of Secondary schools.

8. The increase in Scientific Attitude increases the Scientific Aptitude of 17 years of Age students of Secondary schools.

9. The increase in Rationality of Scientific Attitude increases the Scientific Aptitude of 17 years of Age students of Secondary schools.
10. The increase in Open Mindedness of Scientific Attitude increases the Scientific Aptitude of 17 years of Age students of Secondary schools.

11. The increase in Personal Confidence of Scientific Attitude increases the Scientific Aptitude of 17 years of Age students of Secondary schools.

12. The increase in Aversion to Superstitions of Scientific Attitude increases the Scientific Aptitude of 17 years of Age students of Secondary schools.

Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and Scientific Attitude and its dimensions of Secondary school students (Boys)

1. The increase in Scientific Aptitude increases the Academic Achievement in Science of Boys of Secondary schools.

2. The increase in Scientific Attitude increases the Academic Achievement in Science of Boys of Secondary schools.

3. The increase in Scientific Attitude increases the Academic Achievement in Science of Boys of Secondary schools.

4. The increase in Rationality of Scientific Attitude increases the Academic Achievement in Science of Boys of Secondary schools.

5. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of Boys of Secondary schools.
6. The increase in Open Mindedness of Scientific Attitude increases the Academic Achievement in Science of Boys of Secondary schools.

7. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of Boys of Secondary schools.

8. The increase in Aversion to Superstitions of Scientific Attitude increases the Academic Achievement in Science of Boys of Secondary schools.

9. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of Boys of Secondary schools.

10. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of Boys of Secondary schools.

**Correlation coefficient between Scientific Aptitude, Academic Achievement in Science and Scientific Attitude and its dimensions of Secondary school students (Girls)**

1. The increase in Scientific Aptitude increases the Academic Achievement in Science of Girls of Secondary schools.

2. The increase in Scientific Attitude increases the Academic Achievement in Science of Girls of Secondary schools.

3. The increase in Rationality of Scientific Attitude increases the Academic Achievement in Science of Girls of Secondary schools.
4. The increase in Curiosity of Scientific Attitude increases the Academic Achievement in Science of Girls of Secondary schools.

5. The increase in Personal Confidence of Scientific Attitude increases the Academic Achievement in Science of Girls of Secondary schools.

6. The increase in Aversion to Superstitions of Scientific Attitude increases the Academic Achievement in Science of Girls of Secondary schools.

7. The increase in Objectivity of Intellectual Beliefs of Scientific Attitude increases the Academic Achievement in Science of Girls of Secondary schools.

8. The increase in Suspended Judgment of Scientific Attitude increases the Academic Achievement in Science of Girls of Secondary schools.

3. Regression Analysis

1. Scientific Aptitude (X1) contributes better than the Scientific Attitude (X2) on Academic Achievement of Aided Secondary school students in Science.

2. Scientific Aptitude (X1) contributes better than the Scientific Attitude (X2) on Academic Achievement of Unaided Secondary school students in Science.
3. Scientific Aptitude (X1) contributes better than the Scientific Attitude (X2) on Academic Achievement of English medium Secondary school students in Science.

4. Scientific Aptitude (X1) contributes better than the Scientific Attitude (X2) on Academic Achievement of 15 years of Aged students of Secondary schools in Science.

5. Scientific Aptitude (X1) contributes better than the Scientific Attitude (X2) on Academic Achievement of 16 years of Aged students of Secondary schools in Science.

6. Scientific Aptitude (X1) contributes better than the Scientific Attitude (X2) on Academic Achievement of 17 years of Aged students of Secondary schools in Science.

7. Scientific Aptitude (X1) contributes better than the Scientific Attitude (X2) on Academic Achievement of Boys of Secondary schools in Science.

8. Scientific Aptitude (X1) contributes better than the Scientific Attitude (X2) on Academic Achievement of Girls of Secondary schools in Science.
4. Path Analysis

1. The direct effect of Scientific Aptitude (X1) and Scientific Attitude (X2) on Academic Achievement in Science of Aided Secondary school students is found to be significant.

2. The indirect effect of Scientific Aptitude (X1) through Scientific Attitude (X2) on Academic Achievement in Science of Aided Secondary school students is found to be significant.

3. The direct effect of Scientific Aptitude (X1) and Scientific Attitude (X2) on Academic Achievement in Science of Unaided Secondary school students is found to be significant.

4. The indirect effect of Scientific Aptitude (X1) through Scientific Attitude (X2) on Academic Achievement in Science of Unaided Secondary school students is found to be significant.

5. The direct effect of Scientific Aptitude (X1) and Scientific Attitude (X2) on Academic Achievement in Science of Kannada medium Secondary school students is found to be significant.

6. The indirect effect of Scientific Aptitude (X1) through Scientific Attitude (X2) on Academic Achievement in Science of Kannada medium Secondary school students is found to be significant.

7. The direct effect of Scientific Aptitude (X1) on Academic Achievement in Science of English medium Secondary school students is found to be significant.
8. The indirect effect of Scientific Aptitude (X1) through Scientific Attitude (X2) on Academic Achievement in Science of English medium Secondary school students is found to be significant.

9. The direct effect of Scientific Aptitude (X1) and Scientific Attitude (X2) on Academic Achievement in Science of 15 years of Aged students of Secondary schools is found to be significant.

10. The indirect effect of Scientific Aptitude (X1) through Scientific Attitude (X2) on Academic Achievement in Science of 15 years of Aged students of Secondary schools is found to be significant.

11. The direct effect of Scientific Aptitude (X1) and Scientific Attitude (X2) on Academic Achievement in Science of 16 years of Aged students of Secondary schools is found to be significant.

12. The indirect effect of Scientific Aptitude (X1) through Scientific Attitude (X2) on Academic Achievement in Science of 16 years of Aged students of Secondary schools is found to be significant.

13. The direct effect of Scientific Aptitude (X1) and Scientific Attitude (X2) on Academic Achievement in Science of 17 years of Aged students of Secondary schools is found to be significant.

14. The indirect effect of Scientific Aptitude (X1) through Scientific Attitude (X2) on Academic Achievement in Science of 17 years of Aged students of Secondary schools is found to be significant.
15. The direct effect of Scientific Aptitude (X1) and Scientific Attitude (X2) on Academic Achievement in Science Boys of Secondary schools is found to be significant.

16. The indirect effect of Scientific Aptitude (X1) through Scientific Attitude (X2) on Academic Achievement in Science Boys of Secondary schools is found to be significant.

17. The direct effect of Scientific Aptitude (X1) and Scientific Attitude (X2) on Academic Achievement in Science Girls of Secondary schools is found to be significant.

18. The indirect effect of Scientific Aptitude (X1) through Scientific Attitude (X2) on Academic Achievement in Science Girls of Secondary schools is found to be significant.

5.3 Conclusion:

Aptitude is not totally inherited quality one can modify it if not completely but to a considerable extent. One who has scientific aptitude, not only perceive the knowledge correctly but also apply it in understanding new situations. The application of knowledge in problem solving is another ability of an individual having scientific aptitude.

Scientific Attitude is the most important outcome of science teaching. Though some experts view the Scientific Attitude as the by-
product of teaching science, yet a majority of the people consider it as equally important as knowledge aspect. Scientific Attitude is of very significant concern in the process of science education.

The investigator concluded by this study that Scientific Aptitude and Scientific Attitude highly influences Academic Achievement of students in science. Therefore these variables to be considered as important factors in school Guidance and Counselling.

5.4 Educational Implications of the Study:

The present study is a modest attempt to explore the Scientific Aptitude and Scientific Attitude of the pupils and to find out the association between these two variables, the investigator suggests the following implications in the light of the present research findings.

1. Knowledge about the pupils level of Scientific Aptitude and attitude would help in the modification of existing science curriculum in schools.

2. Scientific Aptitude and Scientific Attitude should be made to establish students career.

3. Teachers should help students to develop rationality, curiosity, open-mindedness, personal confidence, aversion to superstitions,
intellectual belief, suspended judgement etc, as these variables are good predictors of achievement of science students.

4. Scientific Aptitude and Scientific Attitude would help the students to select a course of their own interest.

5. Scientific Aptitude and Scientific Attitude would help the students to identify their work field in future.

5.5 Suggestions for Further Research:

The findings of the present study may serve as basis for future research. Based on the present, a few suggestions are given below:

- The present study can be replicated taking a large sample of students at State level also.
- Studies may be conducted on Scientific Attitude and Scientific Aptitude at various levels of Education.
- Same study can be undertaken involving same variables at the Primary level.
- To investigate the relationship between Intelligence and Scientific Attitude.
- A study of the impact of blind beliefs in the young mind.
- Similar study can be taken by considering other variables like Locality, Type of Management, Medium of Instruction etc.