INTRODUCTION

It is observed during past ten years or more that bulk of good pupils choose Engineering or Medicine as their career. Hardly any talented pupils choose to be a Research Scientist. Several Director of National Research Institutes have expressed this concern. Therefore it is necessary to measure the aptitude of pupil to choose the career. If the bulk of the good pupil chooses science as their career than in future there is much more development in the field of Science and Technology.

We live in world of science. Every citizen knows the wonders of science. Science gives us countless manifestations. Science, now totally changed the life of mankind.

In recent times, there has been rapid addition of knowledge to the world of science. The achievements of science and technology and the use of these scientific achievements in promoting the well-being of mankind through their application in the field of industry, communication, transport, engineering, agriculture and medicine have made science more important than ever before. Science has, in fact, radically transformed the material environment of the citizens of the modern world, and, of course, it has its significant role in promoting culture and spiritual either directly or indirectly.

Teaching of every day science for everybody has become an unavoidable part of general education. Nobody questions its inclusion as a
subject in the school curriculum. It is included in a schools’ curriculum for the same reasons as any other subject, but in addition, science inculcates certain specials values peculiar to it and which no other subject can provide. Besides satisfying the usual needs for its inclusion as a subject in the curriculum, science learning helps to develop scientific aptitude in the learner. Therefore, science is now a compulsory subject in every system of school education right from the elementary level.

5.1 SUMMARY OF CHAPTER FIRST

In the First Chapter the investigator gave the background of the study. Importance of science subject in the school curriculums. The impact of science on modern living, impact of science on Agriculture, Health, Industry, Modern Civilization and Democracy. Then the place of science in school curriculum.

The Indian Education Commission of 1964 appointed by the Government of India submitted its Report in 1966, in which the commission made a strong recommendation of conducting surveys in the field of education without conducting such surveys, a picture of particular parts of the education field will not be clear. These surveys are also useful to find out the reasons creating problems in the various fields. Most of the surveys are conducted with the popular tools like questionnaires and interviews. These tools have their own limitations. Hence, different types of test developed scientifically are comparatively better tools to collect information in the surveys Aptitude Tests are one of them which became more popular than other tests. These tests can be used in internal and external examinations of schools, to find out the achievement level of pupils.
UNESCO’s International Education Commission and its recommendation about teaching of Science and Technology. The inclusion of science in school curriculum and its different value like intellectual value, vocational value, Aesthetic value, Practical value, Psychological value, Cultural Value, Adjustment in modern life and moral value explained in first chapter.

Aptitude means the present ability of pupils. The definition of aptitude, Applications of aptitude test, Scientific Aptitude and it’s meaning. Need of the study, statement of the problem, functional definitions of important terms, objectives of the study, hypotheses of the study, scope of the study and limitations of the study. At the end of the chapter the place given for Historical perspective of Nashik District.

5.2 SUMMARY OF CHAPTER TWO REVIEW OF RELATED LITERATURE AND RESEARCHES.

Every worthwhile research study in any field of knowledge requires an adequate familiarity with the work which has already been in the same area. A summary of the writing of recognized authorities of previous research provides evidence that the research is familiar with what is already known and what is still unknown and untested since effective research is based upon past knowledge, this steps helps to eliminate the duplication of what has been done, and provides useful hypotheses and helpful suggestions for significant investigation (Best, 2003).

In searching related literature, the researcher should note certain important elements. They includes (1) Reports of closely related studies that have been investigated; (2) Design of the study, including procedures
employed and data gathering instruments used; (3) Population that were sampled and sampling method employed; (4) Variables that were defined; (5) Extraneous variables that could have affected the finding; (6) Faults that could have been avoided; (7) Recommendations and suggestion for further new research. After studying the review of related literature, the investigator came to conclusion and decided the structure of third chapter.

5.3 SUMMARY OF CHAPTER THREE RESEARCH DESIGN.

Chapter three included the detail explanation about the Scientific aptitude test, Method of research, Sampling, Statistical method used, Item analysis of the test, Discrimination power, Validity and reliability of the test, Scoring scheme of Scientific Aptitude Test and Data collection.

5.3.1 Scientific Aptitude Test

Scientific aptitude test is a test for the assessment of the ability of an individual’s performance in science. Here, in the present study, it is meant for the measurement of secondary school pupil’s aptitude in science.

The following variables were considered for the study. They are (i) Boys versus Girls (ii) Aided School versus Non-aided schools, (iii) Rural schools versus Urban schools (iv) Urban schools versus Tribal Schools (v) Rural schools versus Tribal Schools, (vi) Residential schools versus Non-residential schools.

5.3.2 Research Method

The present research is survey type research which falls under descriptive method.
5.3.3 Sample

The sample consists of 1000 tenth class student. The area of sample taken for the study was Nashik district. Nashik district contains 15 Talukas out of which six Talukas was selected for study. The two Talukas selected for from Urban, Rural and Tribal region. A source list of all high schools present in these three regions was prepared. Care was taken to see that the list was as exhaustive as possible, and included up-to-date information. From each Taluka five schools were selected. Random sampling is done with the help of many methods. The lottery method as suggested by Best was used. In this method the names of all high schools were written on the slips of equal size, the slips were folded round, mixed well and kept in a container. It was decided to select two from aided schools and two from unaided schools. One is select from residential school.

Total five schools are selected from each Talukas as aided and unaided and residential schools. From each school fifty tenth class pupils taken for sample. Fifty tenth class pupils from each school were taken as sample giving equal importance to both boys and girls.

5.3.4 Tools

A research tool or instrument plays a major role in any worthwhile research, as it is the sole factor in determining the sound data and in arriving at perfect conclusions about the study in hand, which, ultimately, helps in providing suitable remedial measures to the problem concerned.

For the present study the scientific aptitude of tenth class pupils of Nashik district could measure by Kerala University Science Aptitude Test.
The test standardized by A. S. Nair, K. Ramanandan and N. P. Pillai, et al, was designed for the collection of data regarding science aptitude of secondary school pupils.

The Kerala University Scientific Aptitude test includes the test components (1) Number series (2) Science information (3) Formulation (4) Spatial ability (5) Verbal Comprehension and interpretation.

The two objectives of the study were to study the view of teachers towards science teaching and other is to study the effect of the teaching aids /experiments on scientific aptitude of pupils. To test these objectives the investigator was prepared a teachers Questionnaire. The questionnaire includes simple 25 questions including the personal information, opinion about the present syllabus, use of teaching aids in teaching and suggestion for increase the interest of pupils towards science subject etc. questions are included in the teachers’ questionnaire.

5.3.5 Statistical Method

The $x^2$(Chi-square) is one of the simplest and most widely used non-parametric test in statistical work was used for the analysis and interpretation of data.

$$X^2 = \sum \frac{(fo-fe)^2}{Fe}$$

In which fo = frequency of occurrence of observed facts.

fe = expected frequency of occurrence on hypothesis.

The difference between observed and expected frequencies are squared and divided by the expected number in each case, and the sum of these quotients is $x^2$ to evaluate chi-square, Table-E (Garrett, p. 362) was used. The number of degree of freedom of calculated as df = (r-1) (c-1) in
which r is the number of rows and c is the number of columns in which data are tabulated.

5.3.6 Validity and Reliability of the test

Before the collection of data the Researcher goes through the pilot study of the sample. Researcher checked suitability of test by checking the validity and reliability of test.

5.3.7 Validity

To calculate the validity the content validity ratio used. The investigator requested to 10 expert from the education field, they given the opinion as ‘essential, ‘ useful or ‘not necessary.

Then investigator tallies the number of ‘essential rating for the question. By using the formula, using the total number of experts (N) and the number who rated the questions as essential (E)

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CVR = \left( \frac{E - \frac{N}{2}}{\frac{N}{2}} \right)
\]

Interpret the result –CVR can measure between -1.0 and 1.0 the closure to 1.0 the CVR is more essential and closer to -1.0 the CVR is more non essential it is.

5.3.8 Reliability

A pilot study is small scale implementation of a larger study. Plot study involving the administration of preliminary test and its scoring for item analysis. For pilot study from urban, rural and tribal region 20 pupils sample taken, out 60 pupils finally 25 pupils selected for to test the reliability. The reliability calculated by Kuder Richarson 21 formula.
5.3.9 Scoring Scheme

One score is given to each correct answer and zero to incorrect answer. The total of these marks is taken and is considered as the score of science aptitude of each subject. The maximum and minimum score of the Aptitude Test is 90 and 0.

5.4 SUMMARY OF CHAPTER FOUR DATA ANALYSIS AND INTERPRETATION.

In Chapter Four the investigator tested the hypothesis with statistical tools. The all hypotheses are tested by calculating their mean, standard deviation, mean difference, standard error deviation, critical ratio, chi-square value and skewness. The statistical chi-square methods applied for testing the hypotheses.

5.5 ANALYSIS OF TEACHERS’ QUESTIONNAIRE

One of the objectives of the study was, to study the view of teachers towards science teaching and second to study the effect of teaching aids/experiments on scientific aptitude of pupils. For that Researcher prepared teacher’s questionnaire. Questionnaire contains yes/no type of questions, multiple choice questions, ranking questions, intensity scaled questions Researcher taken 200 teachers’ samples from Nashik district. In which 40% sample taken from urban area schools, 30% from Rural Area schools and 30% from Tribal Area schools.

The analysis of teachers’ questionnaire carried out by the response given in the teacher’s questionnaire. The % method applied for analysis of questionnaire and interpretations of data.
5.6 CONCLUSIONS

Scientific aptitude is a complex of interacting hereditary and environmental determinants producing predispositions or abilities in science. It is a potentiality for future accomplishment in science without regard to past training and achievement. It appears to be dependent upon a variety of factors such as study skills, motivation, and persistence in learning a subject, socio-economic factors, cultural background, interests, and attitudes.

Scientific Aptitude is necessary for pupils to pursue science education. Without having sizable amount of scientific aptitude, one cannot pursue science education properly, and of course even one cannot adjust in the daily life properly. It plays major role in moulding a child's character and in selecting a career deciding course in science. So, every pupil of school education must possess good scientific aptitude.

The present study has resulted in drawing the following conclusions:

(1) The Scientific aptitude in the 10th class pupils, as a whole, was average. The distribution of it in the whole sample was normal. The development of scientific aptitude is dependent on a variety of factors. Presence of certain study skills, persistence in learning and motivation, satisfaction obtained from learning a subject, evaluation procedures that are followed in education, cultural background, socio-economic factors, interests of pupils, attitudes are some of the important factors that promote scientific aptitude.

(2) The scientific aptitude in boys and girls was average and boys are holding high scientific aptitude than girls.
Now-a-days parents are treating either sex equally there was little
difference in the level of scientific aptitude possessed by both boys and
girls. Boys are holding more scientific aptitude than girls.
The scientific aptitude was average in the aided schools the pupils of
unaided schools possessed about high scientific aptitude than those of
aided schools. The scientific aptitude concentration was towards high
scientific aptitude in unaided schools than aided schools.

(3) The pupils studying in unaided school have a little bit high scientific
aptitude than aided schools pupils. This may be due to facilities such
as well equipped laboratories, good libraries, quality teaching,
conducive learning atmosphere, better teacher pupil relationship,
greater exposure of pupils to audio visual teaching aids, smart class
rooms, proper implementation of curriculum, better supervision in
unaided schools, greater exposure of pupils to science exhibition,
lecture’s on self development.

(4) The scientific aptitude of rural pupils was more than that of tribal pupils.

(5) The scientific aptitude in the pupils of urban and rural school was
average, but the urban pupils possessed a little bit high scientific
aptitude than rural pupils.

(6) The scientific aptitude in the pupils of urban and tribal schools was
average, but the urban pupils possessed high scientific aptitude than
tribal pupils.

It was found that the scientific aptitude of urban schools pupils was
more than that of rural schools pupils and rural schools pupils
possessed more scientific aptitude than tribal schools pupils. In urban
Schools the infrastructural facilities was very good. The schools are run by private managements. Besides having good laboratories and libraries, good teaching atmosphere, the urban pupils are exposed to science fairs, science exhibitions, and science clubs. Because of these differences the urban pupils may be superior in possessing high scientific aptitude than the rural pupils.

(7) The scientific aptitude was average in residential and non-residential schools. But the pupils of residential schools were superior to those of non-residential schools.

The facilities available in residential schools were better than non-residential schools. In addition to the facilities, the cream of the student’s community is selected through a screening test by these residential schools. The pupils admitted in these schools are stay under guidance of good staff. Their life, in all respect, is regularized and most of time will be meant for studies. Their doubts regularly clarify by the staff. The better student, teacher relationships, parent’s teacher relationships, helps to cultivate and promote scientific aptitude. From the above results, it seems clear that better facilities and good teaching learning atmosphere share a major part in inculcation and promotion of scientific aptitude.

5.7 RECOMMENDATIONS

In the present study, the investigator had explored the –

1) From the data analysis it was fond that the tenth class pupils holding average scientific aptitude. It is necessary to develop scientific aptitude in pupils. Development of scientific aptitude is
dependent on a variety of factors. Such as presence of certain study skills, persistence in learning and motivation; satisfaction derived from learning a subject, cultural background of the pupils, socio-economic factors, interest, attitude, aptitude are some of the important factors that promote scientific aptitude. Hence, positive side of these factors may be utilized in developing and promoting scientific aptitude.

Science teacher plays important role in the development of scientific aptitude of pupils from the analysis of teacher’s questionnaire shows that teacher’s from the urban area teacher given the positive response than the rural and tribal area. The teacher with proper scientific attitude and aptitude can motivate to the pupils properly.

2) There was no difference in level of scientific aptitude possessed by both boys and girls. Boys are holding little more scientific aptitude than girls. So there is need to pay more attention towards girls for the development of scientific aptitude. The lady science teacher’s role important for the development of scientific aptitude in girls. The science teachers must give the equal chance to the both boys and girls.

3) The scientific aptitude in the pupils of urban schools have high scientific aptitude than rural and tribal the facilities that are available in the schools may be the causes for this difference in the scientific aptitude possessed by the urban, rural and tribal schools pupils.
The teacher’s questionnaire shows that the most of teachers from tribal schools region, they are staying only limited period in the schools campus after that they are made up-down to the schools places. This factor can also affect the teacher’s efficiency and creativity.

4) In unaided schools facilities given by the management are well equipped laboratories, good libraries, quality teaching, good learning atmosphere, better supervision need to implement in aided schools. The management of aided schools must follow the programmed of unaided schools and try to give the same atmosphere and administrations to the aided schools.

5) The programmed like science fair, science exhibition, science quiz, eminent scientist lectures, and science based movie can be employed in schools by the teachers and the parents in order to cultivate and promote scientific aptitude.

5.8 SUGGESTIONS FOR FURTHER RESEARCH STUDIES

In the present study an attempt was made to explore the progress and problems of a study of scientific aptitude of tenth class pupils of Nashik District. But the investigator, after the completing of this study found that there remains a great deal to be explore in the area. There is a lot of scope to probe further as research is a dynamic process and hence no study is complete in itself. So the investigator may think of the following areas to study in detail for further research in this area some suggestions are provided.
1) Studies on the role of science exhibitions and science clubs in developing scientific aptitude may also be carried out.

2) Studies may be conducted to find out the effect of environment and psychological factor on inculcation and promotion of scientific aptitude.

3) Studies may be conducted on scientific aptitude either independently at various levels of education areas and variables.

4) Studies may be conducted on the use of audio-visual teaching aids, laboratory and library facilities available in the schools as these have greater influence on cultivation and promotion of scientific aptitude.

5) Studies may be undertaken to identify the factors affecting the lesser levels of possession of scientific aptitude in the cases of variable studies in study.

6) Studies can be taken up to identify the factors affecting the lesser levels of average scientific aptitude by the pupils found in this study.

7) Studies may be conducted to find out the influence of locate of the institution, medium of instruction on the scientific aptitude.

8) Studies may be taken up on the role of psychological variables of teachers in enhancing the scientific aptitude.

9) Studies on scientific aptitude may be extended to other educational levels, viz. primary, secondary, degree, post-graduation, at district as well as state level.