CHAPTER II

REVIEW OF RELATED LITERATURE AND RESEARCHES
## CHAPTER II

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CHAPTER II

REVIEW OF RELATED LITERATURE AND RESEARCHES

Review of Related Research is an essential part of any research due to various reasons. It helps the researcher to find out what is already known and what is left to be known in the area of research undertaken by the researcher. It forms the foundation upon which all future work will be built; it forms one of the early chapters of a research report orienting the readers.

While conducting any research, the researcher has to undertake a survey of literature which is related to his/her problem of research. Also, he/she has to undertake the survey of related research. The undertaking of survey of related literature and research is important for many purposes. The literature is surveyed from different sources like related portions of Encyclopaedias, research abstracts, and study pertinent pages out of comprehensive books as well as going through related manuscripts. The researcher has to be sufficiently familiar with his/her research problem. He/she becomes well acquainted with the research problem and gets up-to-date information through review of related literature and research. Through review of related literature, the researcher gets some clues/hints/guidance about the design of research, sample, research tools etc. (Best J.W, 1986)

The related literature shows the way to the sources of significant ideas, theories and hypotheses and valuable information regarding problems and evaluation of current practices and empirical researches. “A brief summary of previous research and writings of recognized experts provide evidence that the researcher is familiar with what is already known and with what is still unknown and untested” (Best J.W, 1986)

In this chapter effort has been taken to undertake an extensive Review of Related Literature. This chapter includes objectives of review of related literature, Questions to be posed before review of related literature and steps of review of related literature given by Cresswell (2012). Review of related has been divided into two parts namely, A) Attitude measurement and B) Development of programme. Studies on scientific attitude measurement, activity based approach, science attitude measurement, programmes for enhancement of scientific attitude. Chronologically presentation of review of related literature for each part. Review of related literature
includes objectives, methodology in brief and main findings related to present research.

2.1 OBJECTIVES OF REVIEW OF RELATED LITERATURE

The following are the objectives of the review of related literature.

1. To understand various aspects and scope of the research thoroughly.
2. To study the researches which have been done before the current research.
3. To decide proper hypotheses, objectives, methodology of the research.
4. To have a proof on the part of the investigator to show that the investigator knows what type of study is done in the same field.
5. To have proper guideline to implement the practical work.
6. To have appropriate guidance to complete the present research.
7. To provide a vast outlook regarding the subject.
8. To avoid repetition of the researches done.
9. To broaden the researcher's horizon of knowledge.
10. To find out the novelty of the present research.

2.2 QUESTIONS TO BEPOSED BEFORE REVIEW OF RELATED LITERATURE

Creswell (2012) has given a list of questions which researcher should take into consideration before he/she start review of related literature,

1. What is literature review?
2. Where do I begin in conducting a literature review?
3. What are the best materials to include in my review and how do I locate them?
4. Is the worth my time to search the Internet for the literature?
5. Are there my shortcuts for identifying journal articles on my topic?
6. Should I gather and summarize both quantitative and qualitative studies?
7. How long should my literature review be?
8. Do you have an example of a literature review that I might examine?

Getting answer of these questions was an exercise for researcher. This activity was proved useful in knowing concept of relatedness of literature, recentness of related literature, various sources of related literature etc.

2.3 STEPS IN CONDUCTING A LITERATURE REVIEW

Following are steps in conducting a literature review given by Cresswell (2012).

1. Identifying key terms to use in your search for literature.
2. Locate literature about a topic by consulting several types of material and data bases, including those available at an academic library and on the internet.
3. Critically evaluate and select the literature for your review.
4. Organize the literature you have selected by abstracting or taking notes on the literature and developing a visual diagram of it.
5. Write a literature review that reports summaries of the literature for inclusion in your research report.

**Explanation of Each Step**

Researcher followed these steps in conducting a literature review. Detailed explanation of each step is given below.

**2.3.1 Identifying key terms to use in your search for literature**

While taking review of related literature and research researcher identified a few key terms using one or two word or short phrases. Following are key terms which were used for the searching literature and research through libraries and on internet.

**Objective 1: To assess scientific attitude of adolescents**

1) Measurement of attitude  
2) Measurement of scientific attitude  
3) Scientific attitude  
4) Science attitude  
5) Attitude  
6) Scientific temper  
7) Science education  
8) Measurement of scientific attitude  
9) Enhancement of scientific attitude  
10) List of scientific attitude  
11) Science and development  
12) Seek evidence  
13) Objectivity  
14) Suspended judgement.

**Objective 2: To develop scientific attitude improvement programme**

1) Development of scientific attitude  
2) Development of attitude programmes  
3) Activity based teaching  
4) Programmes for enhancement of scientific attitude
5) Enhancement of scientific attitude
6) Activities for seek evidence

Objective 3:
   a) Effectiveness of scientific attitude programme
   b) Usefulness of activities to enhance scientific attitude
   c) Science skills.
   d) Effect of activity based approach for enhancement of scientific attitude

2.3.2 Locate literature about a topic by consulting several types of material and data bases, including those available at an academic library and on the internet.

Researcher visited following libraries during process of review or related literature
a) Department of Education & extension, University of Pune, Library
b) Jaykar Central library, University of Pune, Pune
c) SNDT library, Pune
d) SCERT library, Pune
e) Pune vidyarthi gruha, Pune
f) Maharashtra state secondary board, Pune
g) Dnyan prabodhini, Pune
h) IUCCA, Pune
i) Balbhararti, Pune

Researcher identified following primary and secondary sources from these libraries.

I. Primary sources
   1) Ph.D Theses
   2) M.Phil and M.Ed. Dissertations
   3) Research papers
   4) Journals
   5) Magazines
   6) References books
   7) Encyclopaedias
   8) Dictionaries

II. Secondary Sources
   1) Newspapers
   2) Text books
3) Handbooks

In addition to this researcher also visited Internet websites like ERIC.

2.3.3 Critically evaluate and select the literature for review.

This was a major step in conducting review of related literature and research. By identifying key terms and locating resources researcher determined whether it is a good source to use, whether it is related to topic and finalized the literature to be included in the research report.

2.3.4 Organize the literature you have selected by abstracting or taking notes on the literature and developing a visual diagram of it.

For this step researcher organized the finalized literature according to topic as Attitude measurement and development of programme and sources as Thesis and Dissertations, Journal papers, websites. And framed a review matrix which is given below:

<table>
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<th>Parts of Review of Related Literature &amp; Research</th>
<th>Sources of</th>
<th>Total</th>
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<tr>
<td></td>
<td>Thesis &amp; Dissertations</td>
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<tr>
<td>Attitude measurement</td>
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<td>Development of programme and its effectiveness</td>
<td>08</td>
<td>01</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>02</td>
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2.3.5 Write a literature review that reports summaries of the literature for inclusion in your research report.

For this step researcher summarized selected literature and it is presented part wise

Part I: Attitude Measurement

Part II: Development of Programme and its effectiveness
PART I: ATTITUDE MEASUREMENT

In part I review of related literature and research regarding Attitude Measurement is taken as below:

Ghosh, S. (1989) carried out a study for Ph.D. course in Education on problem entitled, “A critical study of scientific attitude and aptitude of the students and determination of some determinants of scientific attitude.” The main objective of this study are (1) To find out the extent of academic motivation of the students sex and strata wise difference in scientific attitude and aptitude.(2) To find out the relation between scientific aptitude the above stated independent variables and a regression equation of the scientific aptitude on the other independent variables. This study was conducted on 613 students from rural and urban schools. The data was collected by using scientific attitude scale, scientific interest scale, Bhattacharya’s Educational reinforcement test, Krupaswami’s socio economic test, and interview. The statistical technique ANOVA was used to analyse the collected data. The main findings of this study are ;(1) Scientific interest is related to scientific attitude and educational reinforcement.(2) Scientific attitude does not depend upon socio economic status or surrounding.

Rao, Digumarti Bhaskara. (1990) carried out a Ph.D. work in Education entitled, “A comparative study of scientific attitude, scientific aptitude and achievement in Biology at secondary school level.” The main objectives of this study are; (1) To find out the scientific attitude, scientific aptitude possessed by the secondary school pupils along with their achievements in Biology. (2) To find out the association among scientific attitude, scientific aptitude and achievement in Biology of secondary school pupils. The study was conducted on 600 students of IX standard. The statistical technique Mean, S.D, t test, correlation was used to analyse the data collected. The data was collected by using scientific attitude scale, scientific aptitude scale and achievement test. The main conclusions of this study are; (1) Secondary school students are having average Science attitude. Also there is no effect of gender on attitude.(2) There is average achievement in Biology.(3) There exists correlation between Science attitude, scientific aptitude and biology achievement skill.

Shrivastava, V. (1992) had undertaken a Ph.D. study in Education on problem entitled, “A study of creativity among higher secondary students in relation to scientific aptitude and attitude towards Science.”The main objectives of this study are;(1) To test the significance of difference of creativity scores of the
boys of the two groups having more scientific aptitude and less scientific aptitude. (2) To test the significance of difference of creativity scores of two groups having favourable unfavourable attitude towards science.(3) To test the significance of difference between the Mean of creativity scores scientific attitude scores, scientific aptitude scores of boys and girls. This study was conducted on 1200 higher secondary students (600 boys and 600 girls) of Agra city. The statistical techniques like Mean, SD and Correlation were used to analyse the data collected. The data was collected by using Chauhan & Tiwaris Creativity test, Bottary’s Scientific interest test, Avinash Grewals Science attitude scale. The main findings of this study are ; (1) Scientific attitude, Scientific interest and Creativity are more in science faculty students of higher secondary level than other students. (2) Those students having positive attitude towards Science are more creative than others.(3) Girls are more creative than boys.(4) Boys are having more scientific interest than girls.(5) Girls are having more positive attitude towards Science than boys.

Kadlaskar, S. (1994). had undertaken a Ph.D. level study in education entitled “Development and standardization of scientific attitude scale for secondary school students” The main objectives of this study were:(1) To write down statements of scientific attitude scale.(2) To select final scale by question analysis.(3) To measure validity of scale.(4) To standardize scientific attitude scale. This study was conducted on a sample of XIII, IX and X standard Marathi medium students in Pune city. The main findings of this study are; scientific thinking is a mental process. Cause & effect, openness, objectivity is one dimension of human behaviour. Total effect of all these things is scientific attitude.

Richard W. Moore, Rachel Leigh Hill Foy. (1996). Investigated The Scientific Attitude Inventory: A Revision (SAI II).The Scientific Attitude Inventory (SAI) was developed and field tested 25 years ago. It has been used extensively throughout the world, and it continues to be used. Reports of its use and suggestions for revision provide impetus for revision. The revision retains the original position statements of attitudes assessed and the original attitude statements with changes made only to improve readability and to eliminate gender-biased language. Also, in response to critical analysis, the SAI II uses a five-response Likert Scale. The new version is shorter, 40 items instead of 60 in the original. The SAI II was field tested with 557 students in Grades 6, 9, and 12. The top and bottom 27% of scorers for the total inventory were compared for the subscales. A statistically significant difference
was obtained for each t-test comparison. Face validity for the SAI II is claimed on the basis of the original judgments of a panel of judges regarding the attitude position statements which have not been altered. A split-half reliability coefficient of .805 was computed for the entire group of 557 respondents. Cronbach’s alpha reliability coefficient is .781.

**Patil, C. (2005)** carried out a study for M.Ed. course in Education on problem entitled, “Correlational study of scientific attitude between IX standard students and their parents.” The main objectives of this study are; (1) To study correlation of scientific attitude and family atmosphere of IX standard students. This study was conducted on sample of 40 students. The statistical technique correlation was used for analysis of collected data. The data was collected with the help of scientific attitude scale and family scale. The main conclusion of this study is that, there exists positive correlation between scientific attitude and family atmosphere.

**Deo, N (2007)** had undertaken study on Ph.D level in education, entitled” Comparative study of scientific interest in rural and urban students of Haveli tehsil and programmers implemented in schools for enhancement of scientific interest “. The main objectives of the study are 1) To develop scientific interest test 2) To compare scientific interest of rural and urban students. 3) To check scientific interest of IX standard students 4) To access scientific interest genderwise. Methodology used for research was descriptive survey method. Sample selected were 1265 IX standard students. Statistical tools used were percentage, t-test, Pearson’s coefficient of correlation, ANOVA. The main objectives of the study are 1) There is significant difference in scientific interest in rural and urban students 2) There is no significant difference in scientific interest of boys and girls of Haveli tehsil.

**Rodger Bybee, Barry McCrae & Robert Laurie. (2009).** Conducted a study on **PISA 2006: An Assessment of Scientific Literacy.** This article introduces the essential features of the science component of 2006 Program for International Student Assessment (PISA). Administered every 3 years, PISA alternates emphasis on Reading, Mathematics, and Science Literacy. In 2006, PISA emphasized science. This article discusses PISA’s definition of scientific literacy, the three competencies that constitute scientific literacy, the contexts used for assessment units and items, the role of scientific knowledge, and the importance placed on attitude toward science. PISA 2006 included a student test, a student questionnaire, and a questionnaire for school administrators. The student test employed a balanced incomplete block design
involving thirteen 30-minute clusters of items, including nine science clusters. The 13 clusters were arranged into thirteen 2-hour booklets and each sampled student was assigned one booklet at random. Mean literacy scores are presented for all participating countries, and the percentages of OECD students at the six levels of proficiency are given for the combined scale and for the competency scales.

Yasar & Anagun. (2009). conducted a study on the topic entitled Reliability and Validity Studies of the Science and Technology Course Scientific Attitude Scale. Science is a basic course that improves the individuals in terms of cognitive aspects and increases their creativity. In this course, students acquire the habits of thinking objectively and making right decisions about the phenomena and events by examining their environment with scientific methods. In this process, an effort is spent to make students gain scientific knowledge, cognitive process skills and scientific attitudes. Scientific attitudes have an important role in developing scientific literacy. The purpose of this study is to bring up the results of reliability and validity studies of an instrument which is developed for determining scientific attitudes of fifth grade students. The data were collected from 887 students of randomly selected 14 elementary schools in the city of Eskişehir. As a result of factor analysis, the scale grouped in with three factors accounted for 42.08% of total variance with 28 items.

Patil, G.V. (2011). carried out a study on title entitled Comparative Study of Scientific Attitude about secondary and Higher secondary level Students. The present study was conducted on the comparison of scientific attitude of secondary and higher secondary level students. Survey method was used for present study. The sample for the present study was 120 students. Mean, S.D and t-test was used for the analysis of data. The main conclusion of the study were difference is found in the Scientific attitude between male and female students of secondary level and higher secondary level. Scientific attitude of female students of secondary level is more than male students of secondary level. Scientific attitude of male students of secondary level is more than female students of higher secondary level.

Sunday Olufemi Adodo1 and L. O. Gbore. (2011). had undertaken a study entitled Prediction of attitude and interest of science students of different ability on their academic performance in basic science. The aim of this study was to measures and predicts the effect of attitude and interest of students on academic performance in science. Its aim is also to find out which one of the variables is influenced first under a particular teaching method. Three instruments were used for
data collection in the study are, Science Oriented Attitude Scale (SOAS), Science Vocational Interest Inventory (SVII) and Achievement Test in Integrated Science (ATIS). The research method was a quasi-experimental type. The sample of the study consisted of 30 Junior Secondary School Students in Nigeria. Multiple regressions was used to analyze the data and the outcome shows that Science Interest possessed the strongest strength for predicting performance than attitude among the students in their different ability level group. It is therefore recommended that, teachers should use good innovative methods that will stimulate students’ interest in an attempt to make learning of science more meaningful to the learners and thereby generating improved leaning outcomes that will lead to a change of attitude to science.

According to Amjad Islam Pitafi & Muhammad Farooq. (2012). in his paper entitled Measurement Of Scientific Attitude Of Secondary School Students In Pakistan. The aim of this paper was to measure the scientific attitude of secondary school students. Objectives of the study were To measure the scientific attitude in the students of grade 10 and to find out as to what extent the scientific attitude is being developed in the grade 10 students. Survey method of research was used. Total samples of 100 students were drawn randomly. The data collection tool used was questionnaire. The questionnaire contains eight main elements of scientific attitude which are: curiosity, rationality, willingness to suspend judgment, open mindedness, critical mindedness, objectivity, honesty and humility. This study was being made to know the development of scientific attitude of Grade 10 students. The collected information was analyzed with the help of computer software package SPSS (version15). The mean score for each items, eight parts and over all were calculated. The analysis shows that the attitude of the students is slightly scientific. Recommendations given were. The attitude to be taught must be identified and planned. Pleasant emotional experience should accompany the learning of attitudes. Pupils should be free to attempt their own patterns of exportation. Learning experiences must be selected on the basis of knowledge, skills and attitudes to be learned. Emphasis should be laid upon the teaching of science along with homemade cheap material for different experiments. The students should be encouraged to construct new equipment for the experiments.

Jancirani, R., Dhevakrishnan, R., S.Devi.(2012) carried out a study entitled A Study on Scientific Attitude of Adolescence Students in Namakkal District. The present study was aimed at investigating the scientific attitude of adolescence
students and to study the influence of gender, locality, medium of instruction and type of school management on scientific attitude of adolescence student. Survey method was used for present study. A sample of 300 adolescence students was selected using random sampling technique. Data was collected by using standardized tool scientific attitude questionnaire, which was constructed and standardized by Dr. D. N. Dani. Data was analyzed using mean, S.D and t-test. Findings of the study revealed significant differ in their scientific attitude of gender, locality, medium of instruction and type of management. The findings of this study were, Boys and girls differ significantly in their scientific attitude. Boys have high level of scientific attitude than girls. There is significant difference in the scientific attitude of students according to the locality of the school. Urban students have high level of scientific attitude than rural students. There is significant difference in the scientific attitude of students according to the medium of instruction. English medium students have high level of scientific attitude than Tamil medium students. There is significant difference in the scientific attitude of students according to the type of management. Self finance school students are better than government and aided school students in their scientific attitude. Also educational implications were mentioned such as ,The increase in the degree of consistency of the environment helps is developing and inculcating scientific attitude and Academic Achievement in the pupil, The scientific attitude can be inculcated in a pupil by providing him more opportunities for making satisfying adjustments to attitude situations, The scientific attitude can also be developed in the pupil by providing him opportunity for the analysis of problem or situation that pupil may understand and then rest intellectually in desirable attitude, The science teacher should provide opportunities for independent extra reading, laboratory works, improvisation of apparatus, problem solving etc., This will also develop in them open minded and critical thinking and they learn not to take the things for granted unless evidenced by proofs, Laboratory works help in forming and practicing good attitudes, The students should perform the experiments themselves and find out the truth and facts of their theory learning, They should be taught to suspend in judgment till sufficient evidence is found.

Kaya, H. (2012). had undertaken a study entitled An investigation into upper elementary students attitudes towards Science. Students may gain scientific knowledge, scientific process skills, and attitudes during their science learning process. This study aimed to determine upper elementary students’ attitudes towards
science outside school, science and technology, school and plans for the future. Method of the study was survey method. A questionnaire is used for data collection. The sample of the study is 191 students. The questionnaire was 5-point Likert-type scale, and its Cronbach Alpha reliability coefficient is 0.83. The data have been analyzed by using SPSS 16.0 software. It was also examined whether general attitude of the students towards science outside school, science and technology, school and plans for the future varied with respect to gender, grade and age variables. It was found that students’ attitude scores varied with respect to gender in favour of girls and attitude scores for only science and technology section. It was found out there was statistically significant difference in favour of 8th grade students for attitudes towards only science and technology section. Moreover, it was found out there was significant difference in favour of 15th years old students towards science outside school, science and technology and school.

Pillai, K.P. (2012). Had undertaken research entitled An analytical study on scientific attitude of higher secondary school students in virudhunagar district. The main objectives of the study were To study the difference between male and female students in respect of their Scientific Attitude. The difference between Government and Private school students in respect of their Scientific Attitude. The difference, if any, between rural and urban area students in respect of their Scientific Attitude. Survey method was used for present study. The Scientific Attitude Scale constructed and validated by Asokan 2004. Sample of the study was 300 Higher Secondary School students selected randomly. Thus the present study has shown that Male and Female students had no significant difference in respect of their Scientific Attitude. Government and Private school students, Rural and Urban area students differ significantly in their Scientific Attitude.

Kaur, Gurpreet.(2013). Published paper entitled Scientific Attitude In Relation To Critical Thinking Among Teachers. The present study aims that to scientific attitude and critical thinking among teachers and to study relationship of scientific attitude and critical thinking among teachers in present study descriptive survey method was used. Sample of the study was 100 teachers of government primary schools. Data collection tool used were Scientific attitude Scale by Bhagwat and Critical thinking test prepared by researcher. Statistical tools used were Mean, Median, Mode, Standard Deviation, t-test and correlation. Findings revealed that there had been significant difference among the male and female teachers on scientific
attitude and critical thinking favoring the female teachers; signifying more scientific attitude and critical thinking than their male counterparts. Both the variables signified positive co-relation meaning that there is strong co-relation between two variables signifying the dependency of one on the other.

P. Sekar, Mani S. (2013). carried out a research on “Science Attitude of Higher Secondary Students” The present study was designed to make out the status of science attitude of biology group students of higher secondary stage. Objective of the study was to find out the significant difference in science attitude of higher secondary students with respect to the location of permanent residence and type of management of school. Survey method was used for present study. The sample consists of six hundred and twenty one XI standard biology students randomly drawn from Thiruvannamalai District. Science attitude scale prepared and validated by Avinash Grewal was adopted by the investigator. The findings indicate the existence of significant difference between rural and urban higher secondary school students in science attitude. Further, the unaided schools have some influence on developing science attitude among the students when compared to the government and aided schools.

Srivastava, Stuti. (2013). had conducted a study on the problem entitled A Study of Relationship between Environmental Moral Reasoning and Scientific Attitude among Secondary Students. The present study is an attempt to study the relationship between environmental moral reasoning and scientific attitude among secondary students; to compare the environmental moral reasoning and scientific attitude between grade 9 and grade 11(arts) students, to compare the environmental moral reasoning and scientific attitude between grade 9 and grade 11 (science) students; to compare the environmental moral reasoning and scientific attitude between grade 11 (science) and grade11 (arts) students. Sample consisted of 154 students of Allahabad city. 69 students of class 9 general, 56 and 29 students of class 11 (science) and class 11(arts) respectively. The tools used for the study were environmental moral reasoning questionnaire and scientific attitude questionnaire of K. S. Misra. Product moment coefficient and t-test were computed for the analysis of data. The findings of the study revealed that Findings of the present study revealed that environmental moral reasoning is positively related to scientific attitude among secondary students. This finding implies that efforts should be made by teachers and science curriculum to develop scientific attitude among students so that they can take
informed decisions about environmental issues. Moreover, this study reveals that exposure to science education from lower secondary to higher secondary tend to develop scientific attitude among students but it does not help in development of environmental moral reasoning ability.

**Utibe C. Ataha1 Augustine E. Ogumogu. (2013).** carried out a research on An Investigation Of The Scientific Attitude Among Science Students In Senior Secondary Schools In Edo South Senatorial District, Edo State. The purpose of this study was to investigate the levels of scientific attitudes possessed by science students in secondary schools and find out level of scientific attitude of science students differ by sex. The survey research design was used to carry out the study. A sample of 250 science students from senior secondary schools three were randomly drawn from 10 sampled public schools. The research instrument used for data collection was the Inventory of Scientific Attitudes (ISA) which was a slight modification of the one developed by Emina (1986). The data collected were analyzed using the mean statistics and t-test. It was revealed from the study that the level of scientific attitudes among science students in senior secondary school was average and this level of scientific attitude was not significantly influenced by sex. Based on these findings, it was recommended among others that continuous experimentation and laboratory activities are urgently needed; hence the dichotomy between theory and experimentation should be stopped in the texting of science in secondary schools.

**Deshpande, L(2004).** presented her views about scientific attitude in article entitled Challenges in Measurement of Scientific attitude. This paper is aimed at making teacher educators, teachers, research students in the field aware of these challenges; conceptualizing, domain decision, content validity, selection of right type of measuring instrument, objectivity, teachers training. Description of each challenge is given. And according to challenges precautions while measuring scientific attitude are given.

**Kamisah Osman & Lilia Halim.(n.d).** worked on the research entitled Anchoring Science Education Towards Scientifically Literate Malaysian Society: An Exploration of Children’s Affective Psyche. This paper aimed that children’s scientific attitudes as well as their attitudes towards science should be nurtured. Theoretical framework is given attitudes towards science involve feelings, opinions, beliefs, and appreciation, which individuals have formed as a result of interacting directly or indirectly with the various aspects of the scientific enterprise. The term
scientific attitudes on the other hand is perceived as desirable attributes of scientists in professional work and could be categorized as interests, adjustments, appreciation as well as values. These attributes include open-mindedness, critical mindedness, suspended judgment, curiosity, intellectual honesty, scepticism, rationality, objectivity, and questioning attitudes (Kozlow and Nay, 1974; Krynoiwsy, 1985). Survey method was used for present study. Sample consists of 493 secondary school students. Questionnaire was used for data collection. Questionnaire, includes: i) an adaptation of attitude towards science questionnaire developed by Gogolin and Swartz (1992) and ii) an adaptation of scientific attitude questionnaire developed by Kozlowand Nay (1976). Conclusions of the study were, it was found that students’ attitude towards science is high and there exist significant difference in terms of students’ attitude towards science with respect to level of educational experiences. As for the scientific attitude, Malaysian students possess strong inclination towards respect for evidence and honesty. However, their objectivity and suspended judgment very low

CONCLUSION:

After reviewing various related literature and researches related to Attitude Measurement it found that:
1. Scientific attitude is measurable.
2. There are different researches related to development of Scientific Attitude Scale for measurement of scientific attitude.
3. There is significant difference in scientific attitude of rural and urban students.
4. Importance of Scientific attitude for national development.
5. Different components of scientific attitude are given in different researches.

PART II: DEVELOPMENT OF PROGRAMME

Vidhate, S. (1990). carried out a study for M.Ed. course in Education on problem entitled, “Development of training programme to improve scientific attitude in XIII standard students and its effectiveness.” The main objectives of this study are: (1) To measure students scientific attitude. (2) To develop training programme to improve scientific attitude. (3) To implement training programme. (4) To check effectiveness of training programme. This study was conducted on a sample of 50 students studying in XIII standard. The statistical techniques like Mean, S.D, t test were used to analyse the data collected. The data was collected by using Dr. Sanyogita
Kadlaskars Scientific attitude scale. The main findings of this study are:
(1) Developed programmes improves scientific attitude of the XIII standard students.

Aloni, A (1993). conducted a study entitled “An experimental study of effectiveness of inquiry training model for developing scientific attitude among school children.” The main objectives of the study 1) To check whether with traditional method of teaching enhances scientific attitude 2) To study effectiveness of inquiry training model for enhancement of scientific attitude. The experimental method of research was used. The sample of the study was 300 IX standard students from Nagpur city. The data collection tool was scientific attitude scale. The statistical tools used were Mean, S.D, t-test. The main conclusion of study are 1) Traditional method of teaching is not useful for enhancement of Scientific attitude 2) Inquiry training model enhances scientific attitude of students.

Vidhate, S. (1996). studied on the problem for Ph.D course, in education entitled, “Development of syllabus based teaching programme to improve scientific attitude in 8th standard students and its effectiveness.” The main objectives of this study were-1) To develop syllabus based teaching programme to improve scientific attitude in 8th standard students.2) To check the effectiveness of developed programme. This study was conducted on a sample of 240 students studying in XIII standard. The statistical technique like Mean, S.D., Covariance were used to analyse the data collected. The data was collected by using Scientific Attitude Test, Questionnaire. The main findings of this study were ; (1) Programme developed by researcher improves scientific attitude of students.(2) There was no difference in scientific attitude of girls and boys.

Shirode, S. (2004). undertook a Ph.D. level study in Education entitled “Development of teaching programme to improve scientific attitude in B.Ed. students and its effectiveness.” The main objectives of this study are; (1)To develop programme to improve scientific attitude(2)To check effectiveness of developed programme. This study was conducted on 138 students studying in B.Ed. College of SNDT Womens University, Karve road, Pune. The statistical technique Covariance were used to analyse the data collected. The data was collected by using Kadlaskars Scientific Attitude scale, Tests based on Educational Psychology,Observation schedule. The main findings of this study are;(1) Programme developed by researcher to improve scientific attitude is effective and significant.
Phapale, D. (2004). carried out an action research on a problem entitled, “Absence of scientific attitude of primary school students of rural area in Science subject and solution on superstition.” The main objectives of this study are;(1) To find out reasons behind lower scientific attitude.(2) To develop different material. The study was conducted on III standard students of Parner. The data was collected with the help of Interview, Questionnaire, Experiment, Discussion with parents. The main conclusion of this study was superstitions destried because of objectivity and cause and effect.

Akinsola M.K., Animasahun, I.A.( 2007). had undertaken a study entitled, “The Effect Of Simulation-Games Environment On Students Achievement In And Attitudes To Mathematics In Secondary Schools” This study aim to determine the effect of simulation-games environment on students’ achievement in attitudes to mathematics in secondary school. Research method used for present study was experimental method. Data was collected from a sample of 147 students in senior secondary school in Osun-State, Nigeria. They were all exposed to 3 consecutive weeks of teaching by one of the investigators with the assistance of the subject teacher in the respective schools. A 40 minutes duration representing a period was used per day for the consecutive weeks of teaching. t-test and analysis of variance was used to analyze the data collected for the study. The finding reveals that students’ poor academic achievement in mathematics is partly due to the method of teaching used. Also, the findings revealed that, the use of simulation-games environment led to improve achievement and positive attitude towards mathematics. The study conclude that teachers’ use of stimulating teaching methods would go a long way in sustaining and motivating students interest in learning mathematics.

Sharma, I. (2007) had undertaken a study on problem entitled, “Problem solving ability and scientific attitude as determinant of academic achievement of higher secondary students.” The main objectives of the study are;(1) To study the scientific attitude of higher secondary students in relation to sex and three levels of achievement.(2)To study the relationship among academic achievement scientific attitude and problem solving ability of higher secondary students. The statistical techniques like Mean, S.D and t test were used for analysis of collected data. The data was collected by using P.A.Grewals Scientific attitude scale, L.N.Dube’s Problem solving ability test, Marks of X board exam. The main conclusions of this study are
Scientific attitude and problem solving ability improves on average level from science subject. (2) There is no genderwise difference in scientific attitude.

Kolhatkar, M. (2007) had undertaken a M.Ed. level study in Education on problem entitled, “Development of programme to improve scientific attitude and its effectiveness.” The main objectives of this study are: (1) To select proper subcomponents of scientific attitude components. (2) To implement developed programme. This study was conducted on a sample of 41 students of XIII standard ‘SNDT Kanya Vidyalaya’. The statistical techniques Mean, SD, t-test were used for analysis of data. The data was collected with the help of Questionnaire and observation. Main conclusion of this study is that students’ scientific attitude increases significantly with the help of developed programme.

Adesoji, F.A. (2008), conducted a study entitled Managing Students’ Attitude towards Science through Problem – Solving Instructional Strategy. The study was aimed to further clarify the claim by several authors that methods of instruction could change student’s attitude positively towards Science. Method of the study was experimental method of research. Sample of the study was 360 senior secondary school class. Two treatments 1. Problem solving technique procedure (PSTP) based on electrolysis. 2. The self learning material called, programmed text for Chemistry (SLT) were developed for the present study. The instrument An attitude measuring scale used for pre and post-attitude measure for data collection. The findings in this study showed that students in the experimental group developed more positive attitude towards chemistry after the treatment. It was then recommended that teachers should adopt problem solving strategies in their teaching in order to win many more students to Chemistry. Besides giving students the content, the process is equally important for them to comprehend some scientific concepts and principles. This could make them develop more positive attitude toward the learning of science.

Akporehwe J.N. (Mrs) & Prof. F.A. Onwioduokit (2009). carried out a work on a problem entitled, “Enhancing Scientific attitudes through Activity based approach.” The main objectives of this study are: (1) To determine the effects of activity based approaches on students scientific attitude. (2) To assess the relative effects of demonstration, project and guided discovery methods on students scientific attitudes such as objectivity, critical mindedness, honesty and positive approach to failure. (3) To find out the influence of gender on students enhancement of scientific attitude. (4) To determine the joint effect of gender and activity based approaches on
students scientific attitude. The study was conducted on a sample of 86 students. The instrument for data collection was a scale tagged “Scientific Attitude Enhancement Scale” developed by the researcher and validated by a team of experts in Science education. The statistical techniques ANOVA and ANCOVA were used for analysis of data collected. Main conclusions of this study are:(1) Guided discovery approach is the most facilitative in enhancing students scientific attitudes.(2) Gender had no significant effect on enhancing students scientific attitude. It was only significant for enhancing critical mindedness.(3) The interaction between gender and activity based approaches do not yield any significant effect.

Ahmad Nurulazam Md Zain, Mohd Ali Samsudin, Robertus Rohandi, Azman Jusoh. (2010). conducted a study entitled “Improving Students’ Attitudes Toward Science Using Instructional Congruence”. The objective of this study was to improve students’ attitudes toward science using instructional congruence. The study was conducted in Malaysia, in three low-performing secondary schools in the state of Penang. Data collected with an Attitude in Science instrument were analysed using Rasch modeling. Qualitative data based on the reflections of teachers and students were also collected, since they provide valuable insight of the impact of instructional congruence on student learning. The results show that instructional congruence in science education promotes positive students’ attitudes toward science, especially in the constructs of the practical work of science, science outside of school, future participation in science, and a combined interest in science. The results suggest that more effort should be made to integrate science learning in school with science-related experiences outside of school. Additionally, science teachers should concentrate more on making students feel more confident about their abilities in science.

Meltan Duran, Oguz Ozdemir. (2010). undertook a study entitled The effects of scientific process skills-based science teaching on students attitudes towards science. The aim of this objective is to investigate the effects of scientific process skills approach-based Science and Technology course on the sixth and seventh grades students attitudes towards Science. Experimental method was used for research. The sample of this study was 108 student attending sixth and seventh grades. ‘Scientific Process skills set’ and ‘scale of attitudes towards science’ were used as the data collection tool. Main findings of this study; experimental group students subjected to learning experiences enabling them to improve and display their scientific process
skills enhanced their scientific process skills more significantly than the students in the control group. The descriptive analysis of the students responses to open ended questions revealed that the number of positive responses of the experimental group did not change but they reduced the number of negative responses by 25%. Hence it can be argued that though no statistically significant reduction occurred in the experimental group students attitude towards science, significant reduction occurred in their negative attitude towards science.

According to Harun Nasrudin, Utiya Azizah. (2010) had undertaken a study entitled “Improvement Thinking Skills And Scientific Attitude Using The Implementation of “Group-Investigation Cooperative Learning” Contextual Oriented At Acid, Base And Salt Topic In Junior High School.” The main aim of the study is to increase the quality of thinking skills and scientific attitude in science, contextual oriented using “Group-Investigation Cooperative learning”. A classroom action research in three cycles has been done to know the improvement thinking skills and scientific attitude in science learning. Sample of the study was students who were studying science at Junior High School seventh Year Student. There are some important points can be drawn from the result of analysis: (1) Implementation of “group investigation Cooperative learning” contextual oriented in science, can be done by teacher well and relevant with model’s syntax was implemented are preparation, topic selection, cooperative planning, implementation, analysis and synthesis, presentation of final product, and evaluation by teaching material; (2) Implementation of “group investigation Cooperative learning” contextual oriented can improve students activeness in learning science. Teaching-learning process centered to students, as indicated by the improvement of students interactions and teacher’s-students interactions by teacher ask questions 12.8%, teacher responses 17.3%, discussion within students 9.1%, teacher’s students discussion 10.9%, doing investigation (theory/observation/experiment) 13.5%, presentation of final product 12.6%, and volunteer (student express their opinion and responses) 12.9%; (3) Implementation of “group investigation Cooperative learning” contextual oriented can improve thinking skills and scientific attitude students in learning science, as indicated by the student’s achievement mastery for first cycle is 43.6%, the second cycle is 61.5%, and the third cycle is 74.4% and scientific attitude significant; (4) Most of students are willingly to joint to this teaching-learning activity, and the improvement of students cooperate in essential concepts finding so learning not
boring. Students can be done analysis and evaluation investigation result with their ideas, observation environment their self, make report investigation and presentation of final product.

**Aparna.N and Raakhee.A.S. (2011).** Conducted a study entitled **Life skill education for adolescents: its relevance and importance.** Adolescents are considered to be the productive members of a society due to their physical and intellectual capacity. But unfortunately most of the adolescents are unable to utilize their potential to maximum due to inappropriate environment. They are always engaging in antisocial activities and spoiling their life. To make life of adolescents valuable and to convert them to individuals with high potential, educational system should be reformed giving due importance to life skill education. Life skills are those abilities which will help in the promotion of general well being and psychosocial competence of the individual. Life skills empower young people to take positive action to protect them and promote health and positive social relationships. It also entails being able to establish productive interpersonal relationships with others. In the present paper the investigator goes through the importance of life skills, various life skills, life skill education and the benefits imparting life skill education in our curriculum.

**Uplane, M.M. (2011).** Carried out a study for Ph.D. course in Education on problem entitled, “**Development of Textbook based computer multimedia software package for school children to enhance their academic achievement in Physics – A study**”. The main objectives of this study are (1) To identify low achievers in Physics. (2) To test the effectiveness of the developed software package for enhancing the academic achievement of low achievers in Physics. (3) To find out the retention of the content by the sample after a gap of one month. (4) To find out the opinion of the participants students regarding software. Multimethod research was used in the research. Sample selected for research was VI, VII, and VIII standard English medium students. Both qualitative and quantitative methods were used for this study. Mean, Standard Deviation, t-test were used for analysis of quantitative data. Qualitative analysis for analyzing the opinion of the participant students. The main conclusions of this study are 1) The results of this study proved that Computer multimedia Software Packages developed by sound research methodology can be effectively used for the enhancement of academic achievement of upper primary school students in Science. 2) Most of the students opined that they found easy to
learn and remember Physics content because of effect of colours, sound and pictures, explanation and diagrams.

Borate, M.K. (2011). had undertaken a Ph.D level study in Education entitled, “Development of Emotional maturity programme and study effect of this programme on stress, family relationships and academic achievement of student teachers.” The main objectives of this study are (1) To check present status of emotional maturity in student teachers of D.Ed. college. (2) To develop programme for enhancement of emotional maturity of student teachers. (3) To test the effectiveness of developed programme. Multimethod research was used in the research. Sample of this research were 50 students from D.Ed. college. The statistical tools used for analysis of data were Percentage, Frequency, Mean, Standard Deviation, and t-test. The main conclusions of this study are 1) The programme developed for enhancement of emotional maturity is effective for enhancement of emotional maturity. 2) Developed programme is useful for stress reduction.

Lizabeth Ann Townsend (2012) presents paper on the topic “The Effects Of Laboratory-Based Activities on Student Attitudes Toward Science” The purpose of this action research was to study the effects of laboratory-based activities on student attitudes toward science. For the purpose of this study, fifth grade students were taught science over a five month period which included the regular science curriculum for the school district, labs from the science series, and additional labs corresponding to the topics in the curriculum that were developed by the teacher or other professionals. Students were given questionnaires and surveys at the beginning and end of the five month period. Surveys and questionnaires included questions about favorite subjects, what was best about science, and how the student understands science. Comments on what kind of lab/activity was most beneficial to increase understanding and what type of lab or activity was preferred were examined. Pre and post data were compared to determine whether or not student attitude toward science changed after the five month period. Although students entered this fifth grade classroom with a good attitude toward science, there was a noticeable increase in science attitude in regard to favourite subject and understanding of science at the end of the time period. The importance of using labs/activities to inspire and increase understanding of science in fifth grade was evident not only in survey results but from statements students made as well.
Duncan D., L. Arthurs. (2012). had undertaken a study entitled, “Improving Student Attitudes about Learning Science and Student Scientific Reasoning Skills.” In this study Student attitudes about learning science and student ideas about the nature of science were compared at the end of two astronomy courses taught in Fall 2007, a course with a traditional astronomy curriculum and a transformed course whose traditional astronomy curriculum was supplemented by an embedded curriculum that explicitly addressed the nature of science and student metacognition (i.e. thinking about one’s own thinking). The embedded curriculum in the transformed course gave students practice at evaluating examples of valid science and pseudoscience found on the Internet; it also provided students opportunities to discuss what they think about learning science. Student attitudes and ideas were assessed using the Epistemological Beliefs Assessment for Physical Science (EBAPS) survey, interviews, and written responses to an open-ended exam question. Study results indicate that the embedded curriculum led the majority of students in the transformed course to think that anyone can learn science, whereas a majority of students in the traditional course thought that only individuals with innate abilities can learn science and think scientifically. Students in the transformed course also reported much more confidence in their ability to evaluate the scientific validity of information found on the Internet. Furthermore, students from the transformed course valued making sense of science more than students from the traditional course. The embedded curriculum could readily be used in any course for non-science majors, not just introductory.

Gandhi, D & Emanuel, S. (2012). had undertaken a study on topic entitled Effectiveness of Tasks in Developing Scientific Attitude Using Scientific Method. The main objective of the present study was to focus on development of scientific attitude with the help of different science related tasks. The sample of the present study was 35 student teachers. The method of present study was experimental method. The tool used for the data collection was achievement tests namely pre-test and post-test based on scientific attitude and feedback. The data was analyzed qualitatively and quantitatively using t-test and content analysis. In the experiment a series of tasks based on scientific thinking were given to student teachers in group. The tasks were mainly based on day today life problems related to environment, superstition, traditions etc. The experiment was carried out over a period of 15 days for 30 hours. The main conclusion of the study were 1.Scientific attitude can be developed by using pictures, situations, problems, tasks, critical thinking activities, scientific problem
solving cum logic tasks. 2. Student teachers feel interesting working with the different tasks and describe situations, problems etc using scientific method. 3. Student teacher found these tasks interesting and challenging.

Palani, K.K. (April 2012). carried out a study on a problem entitled Promoting Reading Habits and Creating Literate Society. According to author Reading habit is an essential and important aspect for creating the literate society in this world. It shapes the personality of an individual and it helps them to develop the proper thinking methods and creating new ideas. At present, due to the influence of the Mass Media, people could not show much interest in reading the books, magazines and journals etc, Therefore, there is the urgent need to develop the reading habit among the individuals in the society. In this paper, the author has discussed the various methods and benefits in improving the reading habits.

Amees Tuhasaif Aezum, Nisar Ahmad Wani. (2013). presents a study entitled Comparative Evaluation Of Scientific Temper And Academic Achievement Among Adolescent Students (J&K). The present research work aims to study and evaluate the scientific temperament and academic achievements among adolescents in J & K (Anantnag). Sample was 180 adolescents (100 boys and 80 girls) from both government and private institutions in the study via a stratified random sampling technique. Survey method was used. The data were collected using a scientific attitude questionnaire and analysed using mean, S.D and t-test. The findings of the study indicated that the scientific attitude and academic achievement of the boy and girl students (gender) as well as the students from rural and urban areas (locality) and from government and private institutions differed significantly. Boys were found to be a more efficient scorer than girls. Adolescents from urban areas were found to be more efficient than rural ones. Adolescents belonging to Private colleges showed better mean score than government colleges. The students should be provided with sufficient facilities and opportunities so as to develop critical thinking and perform simple experiments which results in their higher mental ability. The government and management should show cooperation with the teachers, organise seminars and workshops, so that the scientific attitude can be inculcated among the students which in turn help them to achieve better academic results. Recommendations were made upon the conceptualization of scientific temper as well as a plan of action to promote it in better academic achievements among all adolescents. Educational implications suggested were; The increase in the degree of consistency helps in developing and
inculcating a scientific attitude and academic achievement among the students. The scientific attitude can be inculcated among the students by providing them the opportunities for making good adjustments to different situations and to achieve better results. The students should be helped in performing laboratory works which results in developing a scientific attitude and in educational achievement. The teacher/guide should provide the students open environment, using different methods so that they analyse the problem in their own perspective so that they deal intellectually with the problem and also improve their knowledge. The students should be given proper guidance and instruction about the problems so that they will not commit any mistake regarding their observation.

Bibin Rubini1, & Liliasari. (2013). had undertaken a study entitled Basic Natural Sciences Contribution for Scientific Attitude Development and Values of Life. Science education aimed at concepts achievement and science process skills. Moreover, science education is also aimed at scientific attitudes and positive values inherent in science learning. The lecture was oriented only to concepts understanding. The research is aimed to develop the learning-model, which enable to develop students’ scientific attitude in addition to concept understanding and process skills. After one semester model implementation, assessment on scientific attitude has been done. The research method was an analytical descriptive method. The sample of the study was 92 students of Accounting department and 94 students of English education department and 3 lecturers. The data collection tool used was questionnaire with observation format and interviews. The result showed that students’ scientific attitude and positive values can be developed through implementing the multi models of learning, which placed student as a focus of learning. By the research it was also showed that increase occurred gradually. Interest should be created in science teaching by organizing science exhibitions and science fairs. The modern scientific magazines, journals, films, video films, should be provided to the school for students use. Science classes should not consist of more than thirty five students. Discovery approach should replace the conventional method in science teaching.

Insaf George Salameh Al Rabadi, Heyam Oqla Salem Al Momani1 Khetam Isa Salem Al Rabadi. (2013). Conducted a study entitled The Effect of Using Process Approach on Science Achievement and Scientific Attitudes among Jordanian Basic Stage Students. This study aimed to investigate the impact of teaching students using operational-oriented in their achievement in science and the
trend towards science. Sample of the study consisted of (64) students at the eighth grade enrolling at Ajlune City schools at Ajlune. Experimental method was used for present study. A multiple choice test, achievement test, Science attitudes scale was also used. For analysis of data, Co- variance analysis (ANCOVA) was used. A significant difference at was found between student means scores on the achievement test due to the instructional method used and in favor of experimental group students (Process Approach). A significant difference was found between student means scores on the science attitudes scale due to the instructional method used and in favor of experimental group students (Process Approach).

Ndirika, Maryann Chinwe. (2013) worked on the problem entitled Game-Based Learning: A Panacea for Better Attitude and Academic Achievement in Basic Science. This paper reviews the potency of Game-based learning as a tool in enhancing attitude and performance of science students. Research studies reporting poor performance of students and efficacy of game-Based learning are reported. The paper discusses vital aspects of Game-Based learning; such as elements which define an activity as a game like competition, Engagement, immediate rewards, efforts are explained, its rules, objectives of game-based learning such as1. To make learning meaningful to students. 2. to create a learning culture that is more in correspondence to students interests and learning styles. 3. to create learning environment that actively involve students in the problem and enable them to understand the complex situation, importance and guidelines of games in learning Science were given. Some examples of useful games in science are given as well as the website for details, the study revealed that when games are used in teaching Science, students become lively and actively involved in learning. This paper is just one small part of a very important message that all parents and science educators need to hear which is that Video games, computer games and other games are not to be avoided, but are part of the best opportunities available to engage the present generation students in real and interesting learning, especially in sciences. Game-Based learning could prove useful in addition to traditional teaching, learning methods especially for students, who lack motivation to adopt new attitudes towards learning of science. Recommendations are made among which is the need to encourage science teachers to use games in science teaching.

According to Nirmalavathi, V. (2013). In her paper entitled Effectiveness of multimedia for the development of scientific attitude. present study aimed to find
out the effectiveness of multimedia for the development of scientific attitude of secondary school students. The sample of the study consisted of 60 students studying in ninth standard under state board syllabus at thiruvannamalai district. Experimental method was used for present study. The tool used for the present study to collect the data was Scientific Attitude scale constructed and standardized by investigator. Data was analyzed by using statistical tool mean, standard deviation and t-test. The finding of the present study was, multimedia package prepared by the researcher for teaching science was found more effective for the scientific attitude of ninth standard students.

Steven Nisbet & Anne Williams.(n.d) worked on a problem entitled Improving students’ attitudes to chance with games and activities. Two combined Year 7 classes in a Queensland primary school participated in a unit of chance lessons involving six games and activities over a period of two weeks. Evidence was found for significant short-term improvements in students’ enjoyment and motivation relating to chance, decreases in anxiety about chance, and improvements in students’ perceptions about the usefulness of learning about chance.

Adelakun, S.A.(n.d) in his article entitled The Relevance of Scientific Skills And Attitudes In The Education of The Visually Impaired. In this article information about scientific skill and attitude is given also information of scientific processes and skills is given as According to Opong (1981) the scientific process involves some steps or a series of operations undergone by scientists during their investigation. They are observation, Problem identification, communication, formulating hypothesis, experimenting and classification. Scientific skills were mentioned such as; observation, problem identification, communicate ideas with other, formulate hypothesis, design experiments, ask questions, control variables, keep record, analyse data, make inference, make prediction, classify. These attitudes, according to James (1995), include honesty, open-mindedness, patience, curiosity, humility and skepticism. According to Abdullahi (1982), through science teaching certain social ethics and values such as honesty, rationality, objectivity and making judgement on the basis of reliable information can be developed in our youths. He also listed open-mindedness, curiosity and an optimistic approach to failure as values that are closely related to scientific training. The writer also relates the importance of the skills and attitudes to national development and finally makes valuable suggestions for parents and teachers with regard to the education of the Visually-Impaired.
CONCLUSION
After reviewing various related literature and researches related to scientific attitude it is found that-
1. There were different studies conducted in the field of Science for improvement of scientific attitude in students.
2. Studies have varied objectives, methodology and conducted in different age groups eliciting varied results.
3. Scientific attitude Improvement programme is effective for enhancement of scientific attitude.
4. Review gave base for the selection of activities of Scientific Attitude Improvement Programme like Games, Stories, experiment, demonstration, collection of scientific facts, use of multimedia, projects etc for the improvement of scientific attitude.

2.4 JUSTIFICATION FOR UNDERTAKEN THE PRESENT RESEARCH
There are research studies which are directly or indirectly related in the present research. These research studies vary in objectives, research design, sampling technique and sample, data collection tools, procedure of data collection, mode of development of programme, implementation of programme. The researcher has focused on Scientific Attitude Improvement Programme for adolescents. There are no studies resembling the objectives and research methodologies used for present study have been earlier.

Through Science subject with the help of scientific skills and activities one can inculcate scientific attitude in the students. Therefore, schools and science teachers should conduct scientific attitude improvement programme for improvement of scientific attitude.

Hence there is a need for this study.

The Plan and Procedure used for this research is given in the next chapter.