SUMMARY
INTRODUCTION

Science education occupies a very eminent place in curriculum both at school and university stages. Continuous advances in scientific and technological research have led to the growth and greater application of science in contemporary society. Accordingly science becomes a priority area in education both at the compulsory education level as well as the level of specialization. The prime objective, in individualistic perspective, is the cultivation of scientific temper, which includes a spirit of inquiry, a disposition to reason logically and dispassionately a habit of judging beliefs and opinions on available evidence, readiness to reject unfounded theories and principles, the courage to admit facts, however unsettling or disagreeable they might be, and finally recognizing the limits of reasoning power itself. It is also expected of science education that it would give individuals a firm group of the concept and processes of science and impart to them the ability to use the scientific method of problem solving and the techniques of observation and experimentation in handling problem of life.

Several studies have been undertaken to explore the different aspects of science education. JOSHI (1981) found that environment outside the class is potent enough to initiate learning. Gupta et.al (1981) studied the awareness of environment among rural and urban school as non-formal education centre. MISHRI (1982) studied the effect and relationship of home and school environment on scientific creativity. SOOD (1974), Shrivastava (1980) found that the amount of scientific knowledge or general exposure to science courses made an impact on scientific attitude. Saxena (1985) found that science students have a favourable attitude towards physics. SHINDE (1982) found that scientific attitude of secondary school children is not related to involvement in non-informal activities. SARAH (1983), SHRIVASTAVA (1983) and YADAV (1987) also studied attitude and achievement. PATOLE (1967) studied the teaching of science in rural primary school and found that science teaching was in miserable condition, teachers are not qualified, ten percent of school possessed complete science equipment none of school had separate science-room. SWARNAMA (1978) and SACHDEVA (1986) found almost similar conditions. MUDDU (1978)
and DESAI (1986) found text-books are attractive and suitable and experiments were conducted by the teachers the climate for motivation for teaching and learning of science was not there. Rajput et. al (1978), MUDDU (1978) and SINGHAL (1983) found highly disappointing teaching science without practical or laboratories. KAMALANKATHAN (1968) found that problem solving method was in no way more effective than traditional method. SUSHMA (1987) found that the concept attainment model in biology and PILLA (1987) found Gagne’s conditions of learning is more effective than traditional method of teaching science, Kumar (1981) and Sharma (1982) compared the three methods, found multimedia method the most effective. DESAI. SHANTA DEVI.S.(1986) and BHATTACHARYA (1979) found that science education is not in a sound condition. Teachers are not qualified, most of the schools have not science laboratories. BHATTRACHARYA, R.K. (1986) found that the existing curricular objectives are unsystematic and insufficient NATARAJAN, M.R. (1983) found that science fairs and educational exhibitions are helpful to increase the teacher student interaction, DEOPURIA (1984) found that environment approach gave more achievement cognition, gain in knowledge, understanding GHOSH.S. (1986) compared the scientific attitudes of urban and rural students. In this nuclear age, we are in great demand without present education. To present a good scientific , we should make our teachers well equipped mentally, morally, physically and give them a sound education of recent facts of science. During the last twenty years or more, attempts have been made by educationists through systematic observations to make the teacher aware of his performance. They have provided (Mirror’s) for a teacher to have a glance at his performance in the class-room.

The enrichment of science education depends upon the science environment provided in the school. So the cognitive behavior of the teacher in the class room include the students behavior is very important in the development of scientific attitudes. The investigator attempted to investigate the cognitive behavior of the class room, school scientific environment and how far these are related to the development in the scientific attitudes. The survey of related literature gives clear indicating that no such type of work has been done so far.
STATEMENT OF THE PROBLEM

A STUDY OF SCIENTIFIC ATTITUDE AMONG SECONDARY SCHOOL STUDENTS IN RELATION TO CLASS ROOM COGNITIVE BEHAVIOR AND SCHOOL SCIENTIFIC ACTIVITIES.

DEFINITIONS OF TERMS:

Scientific Attitude :- An attitude may be defined as learned emotional response set for or against something. Attitude is a tendency of an individual to react in a certain way towards a particular stimulus, object, situation, process or phenomenon. Scientific-attitude of a person is defined as open mindedness, a desire for accurate knowledge, confidence in procedures for seeking knowledge and the expectation that the solution of the problem will come through the verified knowledge.

Class Room Cognitive Behavior :
Cognition is a process of knowing, It includes becoming aware, understanding and modifying one’s understanding on the basis of new information. It is important to realise that cognition is an ongoing process. Class room cognitive behavior may be defined as the behavior takes place in the class room among teacher and students, which includes teacher talk, teacher questions, teacher activities and pupil’s responses and questions and pupil’s activities, and other activities taking place in class room. It would tell the observer a great deal about the cognitive quality of thinking which takes place in the class room.

School Scientific Activities :
In literal meaning the activities pertaining to the school curriculum may be referred to as curricular activities. Such activities are part and parcel of the instructional and other educational programmes. Scientific activities may be defined as those activities of Sec. School students which are related to science. These activities inculcate scientific environment.
OBJECTIVES OF THE STUDY:

**Main Objectives:** The following were the main objectives of the study:

-- To develop the School-Scientific-Activities test for Sec. school students.

-- To study the relationship between Scientific-Attitude and Classroom Cognitive-Behaviour in Sec. School students, as well as in Urban & Rural Sec. School students.

-- To study the relationship between Scientific-Attitude and School-Scientific-Activities in Sec. School Students, as well as in Urban & Rural Sec. School Students.

-- To investigate the combined effect of Classroom Cognitive-Behaviour and School Scientific-Activities on Scientific-Attitude in Sec. School Students as well as, in Urban & Rural Sec. School Students.

-- To study the significance of difference, if any, in the Scientific-attitude of Urban & Rural Sec. School Students.

-- To examine the significance of difference, if any, in the Classroom-Cognitive-Behaviour patterns in Urban & Rural Sec. School students.

-- To investigate the significance of difference, if any, in the School-Scientific-Activities of Urban & Rural Sec. School students.

**Secondary Objectives:** Following are the secondary objectives of the study
To appraise the extent of Scientific-Attitude of Sec. school students, as well as in Urban & Rural Sec. school students.

To explore the level and quality of Classroom-Cognitive-Behaviour of Sec. school students, as well as of Urban & Rural Sec. School students.

To investigate the level of School-Scientific-Activities of Sec. school students, as well as of Urban & Rural Sec. School students.

**HYPOTHESES** : Under the plan and procedure of the present investigation the following research hypotheses have been formulated.

There is no significant relationship in Scientific-Attitude and Classroom-Cognitive-Behaviour of Sec. school students.

There is no significant relationship in Scientific-Attitude and Classroom-Cognitive-Behaviour of Urban Sec. School Students.

There is no significant relationship in Scientific-Attitude and Classroom-Cognitive-Behaviour of Rural Sec. school students.

There is no significant relationship in Scientific-Attitude and School-Scientific-Activities of Sec. School students.

There is no significant relationship in Scientific-Attitude and School-Scientific-Activities of Urban Sec. School students.

There is no significant relationship in Scientific-Attitude and School-Scientific-Activities of Rural Sec. School students.

There is no Significant relationship among Scientific-Attitude, simultaneously with Classroom-Cognitive-Behaviour and School-Scientific-Activities of Sec. school students.
There is no significant relationship among Scientific-Attitude, simultaneously with Classroom-Cognitive-Behaviour and School-Scientific-Activities of Urban Sec. school students.

There is no significant relationship among Scientific-Attitude, simultaneously with Classroom-Cognitive-Behaviour and School-Scientific-Activities of Rural Sec. school students.

There is no significance of difference in Scientific-Attitude of Urban & Rural Sec. school students.

There is no significance of difference in Classroom-Cognitive-Behaviour of Urban & Rural Sec. school students.

There is no significance of difference in School-Scientific-Activities of Urban & Rural Sec. school students.

**SIGNIFICANCE OF THE PROBLEM:**

The main aim of education is to modify the behaviour of the child according to the needs and expectancy of the society. Behaviour is composed of so many attributes. One of these important attributes is attitude. One's behaviour to a great extent depends upon his attitude toward the things, idea, person or object in his environment. The entire personality and development of child is influenced by the nature of his attitudes. Learning of the subject and acquisition of habits, interest and other psycho physical dispositions are all affected by his attitude. Therefore it is important to understand the meaning and nature of attitude, the factors responsible for their formation and development and techniques of their measurement. So, by knowing the factors forming, influencing and developing the attitudes can bring the change in behaviour in particular direction.

The study will fill a vacuum. Since no such study has been conducted in this aspect, findings of the study are of the immense help to
science teachers, educators, administrations to improve the quality of classroom teaching, developing science attitude and creating scientific activities which are remarkable and of great importance in science education. The study appears to be useful for teachers of science, guidance workers and research scholars. It can be used by the curriculum specialists to measure the outcomes of teaching science. The students of Psychology and Education can also use it to study the development of their attitude.

**DELIMITATIONS OF THE STUDY** : The proposed study is delimited with respect to area discipline, method, sample and tools. However some of the delimitations are listed below : -

**Area** :
The study was confined to 20 Govt. & Non-Govt. secondary school situated in Urban & Rural areas of Gurgaon & Rewari District.

**Grade** : The Study was delimited to Xth grade students.

**Discipline** : The study was confined to only science discipline.

**Sex** : No gender distinction was considered.

**Tools Used** : The study was confined to following tools :

- **Classroom Observations** : Based on Bloom’s Taxonomy.
- **Schedule**
- **School-Scientific-Activities** : Constructed by the investigator.
- **Test**
- **Science-Attitude-Scale** : By Dr. Avinash Grewal.
DESIGN AND PROCEDURE OF THE STUDY:

-- **Methodology**: Descriptive survey method is adopted in the present investigation.

-- **Sampling**: Out of total 104 Govt. & Non-Govt. Sec. Schools situated in Urban & Rural Areas of Rewari Distt. Only ten institutions were selected randomly for the study, out of which five were selected from each Urban & Rural area of Rewari Distt. Similarly out of total 160 Govt. & Non-Govt. Sec. Schools situated in Urban & Rural Areas of Gurgaon Distt. Only ten institutions were selected randomly for the study, out of which five were selected from each Urban & Rural area of Gurgaon Distt. Out of all available Xth grade students, only sixty students were selected randomly from each institution. In this way random sampling technique were used. Thus total 20 institutions were selected randomly by lot system from two districts viz. Gurgaon and Rewari. 10 institutions from each district were selected out of which five from Urban & five from Rural areas. Thus in the present study the sample consists of 1200 Xth grade Science students selected randomly. In this way random sample technique was used. The lay out of the sample is as follows:

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Institution (20)

Distt. Rewari (10) Distt. Gurgaon (10)

Urban (5) Rural (5) Urban (5) Rural (5)
Sec. Schools Sec. Schools Sec. Schools Sec. Schools
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**PROCEDURE OF THE STUDY**: The random sampling by Lot System was used in this investigation. The investigator administrated the tests with necessary instructions and class room cognitive behaviour of secondary
school students were systematically observed by investigator. The scoring was done systematically by investigator and the data thus obtained were submitted to statistical analysis.

**STATISTICAL TECHNIQUES:** The statistical techniques employed for data analysis were -

-- Descriptive statistical included the measures of central tendency, dispersion and inferences were drawn for different comparisons by means of parametric t-test.

-- To study the significant relationship between two variables Karl Person’s Product Moment method of correlation was employed.

-- To study the significant relationship between two variables, while partialed out the effect of third variable. Partial-Correlation Co-efficient was calculated.

-- To study the simultaneous significant relationship of two variables with the third variable Multiple-correlation coefficient was calculated.

**CONCLUSION AND FINDINGS:** Any research is much more meaningful if it has some practical applications. In the present study, the attempt was made to find out the relation among Scientific-attitude, class room cognitive-behaviour and school scientific-activities of secondary school students. Analysis and interpretation of data leads to discussion. On the basis of discussion following conclusion can be drawn:

-- There exists a significant-relationship between Scientific-Attitude and Class-Room-Cognitive-Behavior in all secondary school students. But in Urban & Rural Sec. School students no significant relationship was found.
There is a significant relationship between Scientific-attitude and School Scientific-Activities in all secondary school students. The same is true in Rural Sec. School students. But no significant relationship was found in Urban Sec. school students.

Scientific-Attitude in secondary school students can be developed individually by Classroom-Cognitive-Behavior & School-Scientific-Activities. Scientific-Attitude can be developed by School-Scientific-Activities in Rural secondary school students.

There exists a significant relationship among Scientific-Attitude concomitantly with School-Scientific-Activities & Classroom-cognitive-behaviour in all secondary school students. Where as significant relationship was found in Urban & Rural Sec. School Students.

The Scientific-Attitude can be developed jointly by School Scientific-Activities & Classroom-Cognitive-Behaviour in Sec. School students. The same is true in case of Urban and Rural Sec. School Students.

There exist significant difference in Scientific-Attitude between Urban & Rural Sec. School students.

There exists significant difference in Classroom-Cognitive-Behaviour between Urban & Rural Sec. School Students.

There is no significance of difference in School-Scientific-Activities between Urban & Rural Sec. School Students.

The Scientific-Attitude of all Secondary school students is favourable. Same is true in Urban and Rural Sec. School Students.

The Classroom-Cognitive-Behaviour of all Sec. School students is satisfactory. Same is true in Urban and Rural Sec. School Students.
The Classroom-Transactions are dominated by Teacher's-Activities and Students participation is poor in Sec. School Students. Further Classroom-Teaching is mainly due to Exchange of Information Activities and Management related Activities are negligible.

Total transactions taking place during Classroom-Teaching in Urban Sec. School is more than that of Rural Sec. Schools. The Quality of Classroom-Cognitive-Behaviour in Urban Sec. School is better than that of Rural Sec. Schools due to more Higher-Cognitive-Level/ Stimulating Activities.

The School-Scientific-Activities of all Sec. School Students are satisfactory. Same is true with Rural & Urban Schools.

**Suggestions for further Research:**

Some suggestions, with regard to further possibilities in the field, may be offered as follows:

- A similar study can also be conducted with reference to different religions & on college level.
- A correlative study can be conducted between Scientific-Attitude in relation with Occupational choices or vocational interest areas and Science-Laboratory facilities.
- A correlation study can be conducted between Scientific-Attitude in relation to adjustment differences and anxiety of Secondary School Students & college level students.
- In this study the students of similar Socio-Economic status were taken. An attempt could be made to include students from various economic and cultural backgrounds.
- The study in special groups of children could be studied such as physically handicapped and mentally retarded subjects. Though
some works are going on in developing countries, these areas are yet to explored significantly in India.

The present study, no doubt, is influenced by a number of environmental factors including psycho-Social factors. In India, studies on different cases including scheduled caste and non-scheduled caste may through light on the differences in scientific-Attitude, if any, with regard to the study factor.

Scientific-Attitude as related to the child rearing practices and the role of family in the development of Scientific-Attitude capacities could be studied.

Comparative & correlative study could be done on tribal missionary, central, CBSE school students. This would help to understand the differences, if any, between such students.

The Scientific-Attitude could be analysed by having subjects from different countries in non-cultural studies, which may throw light on some unified aspects of Science-Attitude.

A comprehensive programme for nurturing Science-Attitude could be developed for Class room situation using multimedia approach (Audio-Visual Cuds like films, closed circuit T.V., tape-recorders computers etc.). One of the studies of this kind could be design controlled experiments to see the effect of exposure of film or short story on Scientific-Attitude of the children.