CHAPTER TWO

REVIEW OF RELATED LITERATURE
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2.1 Introduction

Practically, all human knowledge can be found in books and libraries. Unlike other animals that must start anew with each generation, man builds upon the accumulated and recorded knowledge of the past.

The more one knows about existing investigations related to one’s chosen problem, the more confidently one can approach that problem. Research proposals usually contain a section called the review of the related literature. In conducting such a review the researcher is looking again (review) at the existing literature (reports, journals, books) related to his chosen problem. Since the researcher is deliberately looking for similarities and relatedness, his understanding of the issues involved can become sharper and enable him to choose a path of action more conducive to the solution of the problem on hand.

Research takes the advantage of the knowledge that has been accumulated in the past as a result of constant human endeavour. It can never be undertaken in isolation of the work that has already been done on the problems that are directly or indirectly related to a study proposed by a teacher. A careful review of the research journals, books, dissertations, theses and other sources of information on the problem to be investigated is one of the important steps in any research study.¹

The student should find, analyze, and evaluate critically ever, pertinent research report dealing with his chosen problem. Any thing less than this will be neither sensible nor scientific. In the present chapter first the reasons and objectives of the review of related literature is discussed. Then an account of literature related to the interest in science and achievement in science is presented. Similarly, an account of the previous researches related to the interest and ability is presented and the necessity of the present study in the light of previous researches.
2.2 Importance of the Review

According to Walter, R.Burg,

The literature in any field forms the foundation upon which all future work will be built.

So the review of the research involves locating, reading and evaluating reports of research as well as reports of casual observations, and opinions that are related to the individual's planned research project. It is an important part of the scientific approach and is carried out in all areas of scientific research. It not only gives an understanding of previous work that has been done, but the results of the review actually provide the data used in his research. It forms the foundation upon which all future work must be built.

The keys to the vast storehouse of published literature may open doors to sources of significant problems and explanatory hypotheses and provide helpful orientation for definition of the problem, background for selection of procedure and comparative data for interpretation of results. In order to be creative and original, one must read extensively and critically as a stimulus to thinking.

A summary of the writings of recognized authorities and of previous research provides evidence that the researcher is familiar with what is already known and what is still unknown and untested. Because effective research is based on past knowledge, this step helps to eliminate the duplication of what has been done and provides useful hypotheses and helpful suggestions for significant investigation. Citing studies that show substantial agreement and those that seem to present conflicting conclusions helps to sharpen and define understanding of existing knowledge in the problem area, provides a background for the research project, and makes the reader aware of the status of the issue. Parading a long list of annotated studies relating to the problem is ineffective and inappropriate. Only those studies that are plainly relevant, competently executed, and clearly reported should be included.²
2.3 Purposes of Review

Although the general purpose of the review is to help the research worker develop a thorough understanding and insight into previous work and the trends that have emerged, the review can also help in reaching a number of important specific goals.

1. Delimiting the research problem
   A review of the researches can help in limiting the individual's research problem and in defining it better. It makes possible to limit the problems to an area small enough and sufficiently specific to work satisfactorily. The knowledge of related researches brings the researcher up-to-date knowledge of the work that others have done and to state the objectives clearly and concisely.

2. Seeking new approaches
   In the process of reviewing the researches, the researcher not only learns what work has been done but also becomes alert of the research possibilities that have been overlooked. The unique experience and background of an individual may make it possible for him to see a facet of the problem that other research workers have not seen.

3. Avoiding Sterile Approaches
   While reviewing the researches, the researcher is always on the lookout for research approaches in his area that have proved to be sterile. Thus, by reviewing the related researches, the researcher can avoid unfruitful and useless problem areas. The researcher can select those areas in which positive findings are very likely to add to the knowledge in a meaningful way.

4. Avoiding Duplication
   Through the review of the related researches, the researcher can avoid unintentional duplication of well-established findings. It is of no use to replicate a study when the stability and validity of its results have been established.
5. Insights into Methods

The review can also give the researcher a great deal of insight into the methods, measures, subjects and approaches used by other research workers and can thus lead to significant improvement of her/his design.

6. Recommendations for further research

The authors of research articles often include special suggestions of recommendations for persons planning further research in the field. The suggestions should be considered very carefully because they represent the insights gained by the research worker after experience in the problem area. Specific research topics are often suggested that are practically useful in helping the researchers delimit the research problem.

Synoptic overview of the research in the area of Science Education clearly indicates that there are many researches attempted to search in the area but only few are related to the interest and achievement in science. It is difficult to classify the diverse kind of researches in this field, but still a number of researches pertaining to this field have been reviewed and presented in this chapter. As the present study is aimed at investigating the present status of interest and ability of secondary school students in science and the relationship between interest and ability in science, in this chapter the related literature as well as researches have been reviewed in the light of that. First the literature related to interest in science and achievement in science was discussed which was followed by the researches related to interest and achievement.
2.4 Interest in Science

One of the major aims of teaching science is to create an enduring interest in the subject.

According to Tyron Edwards, “to awaken interest and kindle enthusiasm is the sure way to teach easy and successfully.”

As classroom provides nourishment for the development of democratic attitudes which stimulate the interest, curiosity and motivation in the learning of students forms the base National Education Policy (1986) laid stress to improve the quality of education at all stages. Unless the student and the teacher find meaning in the process of education there is no place for the qualitative improvement of education. Meaningful understanding of the role of teacher and student ultimately leads to the successful attainment of goals of education in line with the national goals.

As it is suggested by National Policy on Education (1986) it could be taken up very well by giving due emphasis for training affective domain of human behavior in the classroom on a par with cognitive and psychomotor domains. Training affective domain of human behavior starts with the development of interest, attitudes and ultimately the values. The learner who is not strongly interested to learn, what he is learning can’t reach the desired goals successfully.

Interest is the key aspect in achieving success in any task we perform. Whatever one learned, interest plays a prevailing role in making one learn that thing. Interest and learning are interdependent. If one wants to learn something one should try to develop interest in that. It is evenly true for learning of science.

Science is for all those people, who are living in this era of science and technology. The proper foundations in the knowledge of the subject science laid at school depends up on the interest of the individual science may be aroused if we provide them opportunities of utilizing their abilities in science which are responsible for their effective learning and achievement in science.

Everyday dawns with scientific invention. This explosive expansion of scientific knowledge has penetrating influence on Nation’s economy. We enjoy today in our life as a result of scientific inventions only.
2.4.1 Importance of Interest in Education

The educators have always emphasized the value of interest in education. According to their view interest is the beginning and end of all education. The whole theory of education is study of psychology of interest and education, in its practical aspect is nothing but a method and process of arousing and interest in the mind of the pupil. Though, the function of interest in modern education is being criticized by some educationists as leading to soft pedagogy, yet the real point is how to arouse the interest of child in the lesson and make it worth while for him. Much of our interest develops out of derived tendencies such as tastes, sentiments, complexes, habits, moods and attitudes.

As has been pointed out above there is a keen controversy over the place of interest in education. Herbart propounded his famous doctrine of interest as an essential element in the formation of character. According to him, the character of a man depends upon the circle of thoughts which depend upon his interest.

The appreciative masses formed by proper education and instruction are the sources of interests are acquired by proper education of the will. Consequently “the view is that the school is a preparation for adult life and since adult life is full of bitter struggle whose knocks are hard and unrelating, discipline in the school should be strict and unsparing and the child’s path should be strewn with trails and tribulations so severe that they may teach him to face hardships and put forth strenuous effort against odds”.

The above views represent two extremes, and they are based on wrong conceptions on the ground that they take interest and effort as mutually exclusive factors. As a matter of fact, ‘Interest’ as defined above, is not a quality which will solve all difficulties. Interest leads to effortful striving or willing, it does not and in entertainment or amusement, rather its end is activity, effort and accomplishment. The play way in education has suitably brought out the significance of interest and it stresses the fact that “Interest leads to effort and induces children to their best from inner necessity”.

The whole problem of education lies in the problem of securing the child's attention to a lesson, for the attention has a great value for efficiency in adjustment and learning let us now deal with the broad principles of teaching by which the child's attention and interest can be secured easily.

A teacher should know the interests of the pupils towards different subjects. Instructions should begin at the point of interest of the pupils and this cannot be accomplished unless the interest is known. Hence, the tests of interests are very useful in planning the method of instruction in any particular subjects.

2.4.2 Historical Background of Interest

The history of interest can be traced back in the writings of Greek Philosopher like Plato, who believed in the concept of “free will” of man. The man was supposed to be an active and free agent capable of choosing the right or wrong course for his action. Interests have been a major concern of educators, but this concern has not always been accompanied by clear thinking. In fact, the literature on interests has been self contradictory, and confusing in a number of respects. The origin of interest has been variously traced to aptitudes, personality traits, experience, with conflicting implications for education.

2.4.3 Definitions of Interest

Interest is the Latin word which means “it matters” or “it concerns”. In studying interest one is concerned with enjoyment or satisfaction. Experimentally, an interest is a response of liking. It is an index of motivation. The term interest can also be interpreted from many angles. It could be treated as a cognitive experience a subjective one depending up on the activity of the particular apperception mass in question and the intensity stimulus arousing it. Interest can also be regarded as a cognitive phenomenon, as much depends upon motivation or drive.
Though, interest patterns, because of the complexity of the individual, are difficult to analyses, different authorities in the field have tried to define the term in various ways. 

In the opinion of MC Dougall,

“Interest being essentially cognitive is a matter of enduring setting of our cognitive tendencies or impulses and is therefore, determined by our instincts and sentiments”

In this connection, Thorndike’s study deserves special mention. According to him:

Baldwin is one of those who sees a considerable influence of the feeling tone or emotion in the field of interest and defines the term as “the intellectual feeling which is the result of the consciousness which accompanies the direction of mental tendencies”. “Interest is the result of past experience, a feeling towards the satisfier”.

B.N. Jha defines: “Interest is that enduring mental system which sustains conation and continues the activity called attention”. Ross says, “A thing that interests us is just some thing that concerns us or matters to us”.

According to Arnold, “Interest is a tendency to behavior, oriented toward certain objects, activities or experiences, which tendency varies in intensity from individual to individual”.

Crow and Crow define interest as, Interest may refer to the motivating force that impels us to attend to a person, a thing or an activity it self. In other words interest can be the cause of an activity and the result of participation in that activity.

According to Bingham, We define interest as an object, a person, an activity or a field of occupation as a tendency to give attention to it. Interest then is not only a symptom; it is of the very essence of aptitude.

John Dewey makes out, genuine interest in short, simply means that a person has identified himself with or has found himself in a certain course of action.
Tasch and Jersild explain, Interest involves a freely chosen activity.

Briggs states that, Interest is the state of sustained curiosity, concern of feeling for some thing which leads to purposeful, activity that is of apparent of immediate work to individual.

Gray (1954) relates interest with enjoyment as, Interest refers to that behavior, which is individual may persist in manifesting because it gives him a feeling of enjoyment.

Fryer (1931) defines, Interest leads to success and Davis (1945) defined that interest as driving force, directive behavior and as emotive phenomenon.

Strong also stresses that interests are acquired through environmental forces is not learned.

Analyzing all the definitions it becomes clear that interest can be explained as the focusing of the sense organ, or giving attention to some person, activity, situation or object. It may be a permanent or a temporary feeling that compels an individual for consistent action in a certain direction without external pressure. It gives motivation and drive. Interest shapes and moulds pattern of the effectiveness, the happiness and the development of human being. So, interest is the enduring mental system, which creates attention, concern, and tendency towards an activity. It is a tendency to behave and also effect of an activity. It is not only tendency to give attention but also the essence of aptitude.

2.4.4. Nature and Characteristics of Interest

Interest is a great motivating force that persuades an individual to engage in a cognitive and cognitive behavior. Interests are the traits of personality of an individual which are significant for justification. The knowledge and understanding of child’s interest are major factors in the field of education. Interest gives dues regarding adjustment and personality. Interests are innate as well as acquired dispositions. It helps an individual to realize the goals and aims set by him. They also
give sufficient strength to an individual to resist fatigue and avoid failure. Interests are not permanent and fixed. They get changed as a result of maturation, learning and the internal as well as internal environmental conditions and factors. If the student possesses interest in many subject especially in sciences he may take initiative and feel confident to do the activities and experiments in science on his own. Interest may also influence their habits like regularity, attention in the classes, and solving the complex and challenging problems in daily life.

2.4.5. Theoretical Concepts

Theoretically interest is the latent attention; rather attention is the interest in action. This is very clear in the ‘law of Readiness’ this law is indicative of learner’s state of mind or disposition to participate in the learning process. According to Thorndike: If the child is ready to learn, he learns more quickly, effectively and with greater satisfaction, than if he is not ready to learn. Thorndike’s law of effect also has something to do with the initial stimulation of attention, i.e., curiosity and wonder stimulates the attention and interest of the learner.

Interest is an aspect of behavior which involves a psychological mechanism dormant or aroused. Strong also supports this view by saying that interest, like attitude and habit are stabilized sets of dispositions resulting behavior. But he admits that though they involve stabilized pattern still they may be modified by reeducation. Thorndike has also endorsed this view as he concludes: “The result of our experiments support the conclusion that a person can be taught new attitudes and interest”.

The primary source of all interest is to be found in our inborn and natural dispositions. i.e., our urges, drive instincts and desires. Our instincts such as curiosity, acquisitiveness, self expression etc., are powerful sources or ultimate basis of interest. Our natural and direct types of interests depend up on those objects which are connected without innate dispositions and the acquired or derived types of interest depend upon our acquired dispositions such as sentiments and our complexes. Our original nature inclines by birth to be interested in
certain things. Children have a derived or acquired interest in their sentiments and complexes, therefore in order to catch and hold their attention we arouse their interest in useful activities. Some of us have a sentiment for patriotism affect the welfare of the country. Thus, our interest is also determined by our attitudes, moods, temperaments and acquired tendencies.

2.4.6. Types of Interest

Based on the theoretical background supper has stated the following most common types of interests.

1. Expressed interests.

This means the verbal expression of interest of an object, activity, task or occupation. This type of interest is quite unstable in children and adolescents but stable to a considerable extent in the adults. That means stability of this type of interest increase with age and maturity.

2. Manifested Interests

This means the actual participation in an activity or occupation. This type of interest can be observed objectively, some times, due to environmental limitations, real interest fails to manifest itself in activity.

3. Tested Interests

This interest can be measured by objective tests. Such objective tests measure interest in various types of activities through specialized vocabularies. It is assumed that interest in a certain variety of activity leads to greater familiarity with the terms related to that type of activities than with the terms related to other types of activities.

4. Inventoried Interests

This type of interest is assessed through interest inventories.

2.4.7. Assessment of Interest

There are so many reliable measures for assessing these interests in varying fields of activity like business, industry, occupations etc. and also for assessing interest of students in the tasks they perform in schools.
Interests should be assessed continuously and co-operatively by pupils, teachers and parents. This should include initial measures at the beginning of the term, process measures during the term and final measures at the end of the school year. For special purposes the interests of pupils may be studied at any time. The interest inventories are the standardized tools to measure objectively the interests of group. Following are few tools used for the assessment of interest.

1. Strong Vocational Interest Blank
2. Kuder Preference Record: Vocational
3. Chatterjee’s Non-language Preference Record
4. Gopalan’s Vocational Interest Inventory
5. Dubey and Dubey’s Science Interest Test

2.4.8 Science Interest Test

Functionally, interest tests are closely related to the aptitude tests. These are used in educational and vocational guidance. An interest test is a questionnaire. It applies the self report technique. The questionnaire or inventory may be regarded as written interview. It has a number of direct or indirect questions.

Educationists consider interest as one of the strongest determinants of learning. Children develop interest in any subject by personal experiences and environment. For successful learning high interest in the subject is essential. A good teacher arouses the interest in the subject before presenting his subject matter. If the children have no interest or the teacher fails to arouse interest in the subject, there will be no learning.

Individual differences in interests are of great practical importance in subject learning. Knowing interest is also vital for educational guidance and counselling. Interest tests enable the teacher to know the level of interest in the subject of the child. The higher interest in the subject is positively correlated with higher achievement.

The objective of Science Interest Test is to measure the level of interest in science of school children. This test may have two advantages, i. e. to know the interest in science subject in order to guide the
student to offer science as one of the optional subjects for higher studies. Secondly the test will enable the guidance worker to know the cause of low achievement is Science. It is possible that the low achievement in Science is due to low interest in science subject. This test will be useful to the teachers in teaching science effectively.  

2.5 Achievement in Science

Achievement in an educational institution may be taken to mean any desirable learning that is observed in the student. Since the word desirable implies a value judgement, it is obvious that a particular learning may be referred to as achievement or otherwise depending on whether it is considered desirable or not. Understood in this way, any behaviour that is learned may come within the scope of achievement. Achievement, according to Smith (1969), and Spencer and Helmrich (1983), is the task oriented behaviour that allows the individual's performance to be evaluated according to some internally or externally imposed criterion, that involves the individual in competing with others, or that otherwise involves same standard of excellence (Morgan, et al., 1986).

There is no gainsaying the fact that learning is not limited to mere acquisition of information, it also includes attitudes, interests, values, etc. Modern personality characteristics of the individual are learned. Therefore, the acquisition of desirable characteristics is as much an achievement as is knowledge of the principles of science or facts world history or language and literature. Although achievement is used in this broad sense it is customary for schools and colleges to be concerned to a great extent with the development of knowledge, understanding and acquisition of skills (Naryana Rao, 1980). This may be in part owing to the fact that in the intellectual field the teacher can be relatively more certain of achieving the objectives he had set for himself than in other areas or domains.

The teacher or the institution has certain objectives which are often stated as the development of desirable characteristics of personality. Though this is undoubtedly a worthy goal, it is doubtful whether anything beyond the most superficial change could be obtained with the small number of hours
contact between the teacher and the taught in the college. Thus in practice, the objectives are necessarily restricted to the imparting of various types of subject matter knowledge. Academic achievement is related to the acquisition of principles and generalizations and the capacity to perform efficiently, certain manipulations of objects, symbols and ideas. Academic achievement is related to the acquisition of principles and generalizations and the capacity to perform efficiently, certain manipulations of objects, symbols and ideas.

2.5.1 Assessment of achievement

Assessment of academic performance has been largely conformed to the evaluation in terms of information, knowledge and understanding. It is universally accepted that the acquisition of factual data is not an end in itself but an individual who has received education should show evidence of having understood them. But, for obvious reasons, the examinations are largely confined to the measurement of the amount of information which students have acquired.

Wood and Learned (1938) concluded from their well known Pennsylvania study that education was unavoidably intellectual in which knowledge was the dominating feature of educational outcomes. It is perhaps the only accepted basis of promotion or fulfillment of requirements for degree or diploma. It is the actual or assumed possession of knowledge that counts for admission into a class or course. Educational measurements may be made with reference to either the aims or the results of education or both. The acquisition of knowledge consists of the registering of data or the making of a datum either more definite and indelible or meaningful. This conception of acquiring knowledge assumes that the student is an active organism in a stimulus-response situation, that the student interprets his experience, that he shows evidence of having registered and interpreted the datum by his appropriate response to it and that in future situations he will be guided by prior experience. Understood in this way measurement can be in terms of subject matter and this does not claim to minimize the importance of the other aspects of education.
Examinations in one form or another were employed by people ever since the days of early civilizations. Paul F. Cressey, a sociologist, attributes the remarkable stability of the old Chinese civilization among other things to her highly organized examination system. Examinations are not only used extensively, they vitally affect and determine the careers of students. From the earliest time teachers have examined as well as taught. Some kind of measurement or evaluation seems suitable in education and it is an essential part of the teaching, learning process.

2.5.2 Achievement Test

The term achievement is often understood in terms of a student's scores in a certain test. Achievement means one's learning attainments, accomplishments, proficiencies, etc. Achievement is directly related to a pupil's growth and development in educational situations where learning and teaching are intended to go on simultaneously. Achievement involves aptitude for learning, readiness for learning and opportunity for learning (Bhatia, 1991). Besides these factors, it also involves health and physical fitness, motivation, special aptitude, and emotional balance.  

Freeman (1965) defines a test of educational achievement as a test designed to measure knowledge, understanding, and skills in a specified subject or group of subject. Thus according to him, an educational achievement test measures an individual's knowledge and understanding or skills in a particular branch of knowledge. Further, freeman is of the view that through educational achievement test, it is possible to ascertain how much does a person know after receiving education or training in a particular branch of knowledge. Standardized achievement tests are used to determine the degree of achievement in a specific subject matter (Smith, Krouse and Atkinson, 1969). Achievement tests (Best, 1982) attempt to measure what an individual has learned his or her present level of performance.
2.5.3 Uses of Achievement Test

Anastasi (1968) has discussed that various uses of achievement test—achievement tests are used to ascertain the attainment of minimum performance standards.

In other words, an achievement test is to find out whether an individual has attained the required ability in a given field of knowledge or activity.

Another important use of an achievement test is to be seen when there is a need for selecting candidates in regard to certain jobs or courses.

An achievement test is also used for purposes of guidance and counselling.

It has been found useful in remedial teaching programs as well as in determining the class to which a student should admitted into.

Administration of these tests at regular intervals is helpful to the teachers in knowing the kinds of difficulties, faced by the students in learning.

Finally it may be stated that the achievement test may be used as an aid in the evaluation of teaching, the importance of instructional techniques, and the revision of curriculum content.

2.5.4 Types of Achievement Test

Among the various types of tests used in schools, achievement tests are the commonest. They propose to measure what and how much pupils have learnt as a result of formal or in formal instruction. They measure the present level of performance of individuals or groups in academic learning. Achievement test scores are used in deciding which grade a student is suitable for or what his strengths and weaknesses are. Frequently, achievement tests are utilized for evaluating courses of study or efficiency of teachers and teaching methods, or other educational factors. 7
Achievement tests may be standardized or non-standardized. Standardized tests are the most commonly used ones because they are considered more reliable, more valid and more objective than the teacher-made tests. Many standardized tests of achievement in different school subjects are available for different grades or age-groups in advanced foreign countries. In India too some standardized tests in specific subjects have been prepared and are being prepared. Science Achievement Tests or Science Ability Tests are used for evaluating students’ achievement in Science.

Following are few standardized tests used for the assessment of achievement in science

1. Sequential Tests of Educational Progress (STEP)- Science,
2. Read General Science Test
3. Anderson Chemistry Test
4. Nelson Biology Test

The non-standardized tests of achievement are usually designed for a particular group of individuals, designed for more general use and are considered ready for use only after

1. A careful analysis of each item,
2. A careful analysis of total Scores,
3. The establishment of their validity, reliability and norms, and
4. The setting up of uniform and objective patterns of administration, scoring and interpretation.

Education Commission (1964-66) stated that Science education must become an integral part of school education; and ultimately some study of science should become a part of all courses in the humanities and special sciences. The quality of science teaching is to be developed considerably so as to achieve its proper objectives and purposes viz. to understand basic principles, to develop problem-solving, Analytical skills, ability to apply them to the problems material environments and social living besides promoting the spirit of enquiry and experimentation. Science strengthens commitments of man to free enquiry and search for truth as its highest duty and obligation. By
its emphasis on reason and free enquiry, it even helps to lessen ideological tensions.

Although science is largely occupied with the understanding of Nature of present, its development is tending more and more to help man to understand himself and his place in the world in such developments. The commission observes that the pursuit of mere material affluence and power would be subordinated to that of higher values and the fulfillment of the needs of individual. This concept of mingling of science and spirituality is of special significance of Indian Education.

It is commonly felt that a child’s education cannot be complete unless he has some knowledge of science irrespective of the field of study he wishes to pursue in latter life. Today the great advances in science rendered it absolutely necessary that a fundamental knowledge of science is essential to each person who was educated and who wished to lead a life which combined in itself something of scientific aspects of existence.

Objectives in any areas of curriculum should be regarded as the directions of growth and not as the ultimate ends to be completely reached. In this respect, science is not different from other branches. It is important that objectives should be selected towards which the growth and development of the individual may be directed from a very practical point of view. Objectives need to be selected and stated in such a way that progress towards their attainment may be appraised (Heiss, Oboum and Hoffman, 1950).

Bloom, Et al. (1959) classified the educational objectives under three domains, viz., the cognitive, the effective, and the psychomotor. The cognitive domain includes those objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills. The affective domain includes objectives which describe changes in interests, attitudes, values, and the development of appreciations and adequate adjustment. The work done in that period on manipulative or motor-skill was very less which includes motor activities.

The National Policy on Education-1986 states that, Science Education will be strengthened so as to develop in the child well defined abilities and values such as the spirit of inquiry, creativity, objectivity, the courage to question, and on aesthetic sensibility.
In Maharashtra science was taught as a compulsory subject since 1977. The education policy 1986 expected that student centered teaching methods should be adopted in science education. From standard I to V science was taught through environmental study. It was expected that curiosity and interest in science should be enhanced through teaching.

According to new curriculum framework (2008) Science is taught through study of environment at standards I and II. It is taught through general science at standards III to VIII. This curriculum is based on three basic aspects- science, technology and society. In this curriculum various units should develop according to age of the students. Up to the standard V, theoretical study and after standard V along with theory, practical part is also included in the curriculum. At secondary level, at standard IX and standard X scientific information, facts, principles and concepts are taught in detail. More stress is given on experimental work. The entire curriculum is designed such that students can get knowledge about different professions and can rightly choose proper profession afterward.

All the above aims and objectives of science stress, directly or indirectly, the importance of scientific attitude, scientific aptitude, skills abilities and interests. And also we can sense that a pupil of science should be in a position to utilize his classroom learning in daily life through proper achievement and application.

Academic achievement is of paramount importance, particularly in the present socio-economic and cultural contexts. Obviously, in the school, great emphasis is placed on achievement right from the beginning of the formal education. The school has its own systematic hierarchy which is largely based on achievement and performance rather than aspiration or quality. Thus, the school tends to emphasize achievement which facilitates, among other things, the process of role allocation for the social system. The school performs the function of selection and differentiation among students on the basis of their scholastic and other attainments and opens out avenues for advancement, again, primarily in terms of achievement.

A considerable number of students from school go to colleges and institutions of higher learning. It is very important to ensure that such students acquire the requisite competence and have interest so as to benefit most out
of higher education. Setting the stage for the achievement of the youth is thus a fundamental obligation of the educational system of the school stage.

Science is one of the compulsory subjects in the school curriculum in Maharashtra. It paves way to the career deciding courses at +2, stage. The acquisition of the knowledge of science terms, principles and concepts, a clear understanding of them, the ability to use such knowledge in different situations in life and in the development of skills should be the outcomes of teaching and learning of science. Moreover, the students should develop abilities in science, proper attitude towards the study of science and an active interest in the subject, besides appreciating the importance of science in human life and civilization. Thus developments of the interest in science, abilities or achievement in science subject are the very important aims of science teaching.

The researcher went through the previous researches related to the interest and achievement. He came across with thirty nine researches related directly or indirectly to the present study. These researches were conducted in India and abroad. To facilitate analysis he has classified them in the following three categories:

1. Researches related to interest
2. Researches related to achievement
3. Researches related to interest and achievement

The number of researches conducted in India and abroad as per their category is given in the following table.

**Table No. 2.1**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Researches related to</th>
<th>Researches conducted in</th>
<th>Total</th>
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<td></td>
<td></td>
<td>India</td>
<td>Abroad</td>
</tr>
<tr>
<td>1.</td>
<td>Interest</td>
<td>09</td>
<td>06</td>
</tr>
<tr>
<td>2.</td>
<td>Achievement</td>
<td>09</td>
<td>02</td>
</tr>
<tr>
<td>3.</td>
<td>Interest and Achievement</td>
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<td>05</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>26</td>
<td>13</td>
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</table>

It can be seen from the Table No. 2.1 that more researches are conducted in the field of interest. The researchers abroad have worked mainly on interest in science.
2.6 Researches related to interest

The first category is the researches related to interest. This category includes total 15 researches, out of which 9 were conducted in India and 6 were in abroad.

2.6.1 Researches conducted in India

The name of the researcher, Title of the research and the year of research conducted in India are given in the following table.

Table No. 2.2
Researches related to interest – from India

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Researcher</th>
<th>Title</th>
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<tbody>
<tr>
<td>1</td>
<td>Bardhan, A.K.</td>
<td>Development of Interests of Boys of Secondary Schools in Calcutta, West Bengal, with reference to four different streams, namely, Humanities, Science, Technology and Commerce in Multilateral School</td>
<td>1965</td>
</tr>
<tr>
<td>2</td>
<td>Singh, R. P.</td>
<td>Interest Patterns of Successful Students in Different Courses of Study at the Secondary Stage in Uttar Pradesh</td>
<td>1965</td>
</tr>
<tr>
<td>3</td>
<td>Singh, N. P.</td>
<td>Hindi Adaptation of Kuder Preference Record (Form C)</td>
<td>1965</td>
</tr>
<tr>
<td>4</td>
<td>Singh, L.</td>
<td>Patterns of Educational and Vocational Interests of Adolescents.</td>
<td>1967</td>
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<tr>
<td>5</td>
<td>Bose and others</td>
<td>An Investigation into the Interest Patterns of the Students in Science, Humanities and Commerce Streams at the Higher Secondary Level, Calcutta.</td>
<td>1970</td>
</tr>
<tr>
<td>6</td>
<td>Singh, K.A.</td>
<td>A Study of the Interest Patterns of School-going Boys and Girls and their Educational Implications.</td>
<td>1972</td>
</tr>
<tr>
<td>7</td>
<td>Sumathykutty Amma, N.</td>
<td>Science Interests of High School Pupils in Kerala and factors Contributing to the Development of these Interests.</td>
<td>1973</td>
</tr>
<tr>
<td>8</td>
<td>Sahay Nayani Ram.</td>
<td>Interest of boys and girls towards science in Bastar schools.</td>
<td>1996</td>
</tr>
<tr>
<td>9</td>
<td>Deo Neha</td>
<td>A Comparative Study of Interest in Science of 9th Standard Students and Activities Arranged by Schools to develop it in Rural and Urban Areas of Haveli Tahasil</td>
<td>2008</td>
</tr>
</tbody>
</table>
A brief account of researches related to interest, conducted in India is given as follows. This account includes objectives of the study, methodology and major findings of the research.


   The investigation was intended to find out some interest patterns that would correspond to particular streams of study in the diversified secondary schools in India, and thereby to develop a tool for measuring interests for predictive guidance in education.

   A tool to measure the development of interests of boys of secondary schools in Calcutta was designed on the basis of Strong's interest measurement technique, with some modifications. To construct suitable items within the vocabulary range and interest patterns of the pupils, interest diaries were collected on a ten item questionnaire. As much as 150 such interest diaries were collected from the same group at intervals of one month. The first trial form of the interest inventory in Bengali consisted of 242 items, selected and translated 8 from the SVIB (Form M) and the interest diaries consisting of four sections. These items were tried on 100 boys of class VIII. In the final form, only 190 items remained. Interests of 100 boys in each grade from VIII to XI and the first year degree class were compared at regular intervals to determine the prognostic value of the inventory. A plus weightage was given to responses preferred by criterion group and a minus weightage to items marked by non-criterion group, the size of the weightage being determined by the degree to which the scores differed. The achievement in the higher secondary examination was taken as the criterion of success. The criterion group consisted of 200 students in the three year degree course. Items were designed in L.I.D. format. The reliability was determined by the Kuder Richardson method and the test-retest technique.
The most important outcome, according to the investigator, was the reestablishment of the fact that, interest measurement was an effective way of educational guidance in the younger boys’ group. The study clearly proved that a good amount of prediction of success could be made on the basis of interest measurement in school boys of class VIII. The point Biserial correlation coefficient between the interests of class VIII boys and higher secondary examination results was found to be 0.657. The study revealed that the boys’ interests were remarkably stable from class VIII onwards. The changes were determined could be interpreted as a favourable crystallisation of interests to fit in desired area of activity and study.

2. Singh, R. P. (1965). *Interest Patterns of Successful Students in Different Courses of Study at the Secondary Stage in Uttar Pradesh (India)*, Ph.D. 9

The study aimed at (i) establishing and formulating some working proposition which related to the various aspects of interest, and (ii) understanding the nature of interest and the various factors which affected its growth and development.

The sample consisted of 1,436 successful candidates of all the streams - arts, science, agriculture, commerce, etc., at the high school examinations. In order to determine the patterns of interest of students successful in different courses of study, an interest inventory was developed by the investigator. A total of 462 items were pooled in the following seven categories- (i) mechanical interest, (ii) business interest, (iii) scientific interest, (iv) aesthetic interest, (v) social interest, (vi) clinical interest, and (vii) outdoor interest. The final draft of the inventory contained 168 pairs of items. Chi-square test and Bhattacharya’s method on measuring divergence between the two multinomial populations were used to determine the extent of sharpness of interest patterns for different, courses of study. The comparison of the two contrasting groups under each course of study brought out significant points in interest patterns under each course of study.
It was found that (i) under literacy course of study successful students were marked by a high score on the scientific and a low score on the business and the clerical interest categories; (ii) students successful in scientific course of study scored higher on the outdoor and lower on the business and clerical interest categories; (iii) the interest patterns of the successful students under the agriculture courses of study were marked by a high score on the outdoor, and a low on the business and clerical interest categories; and (iv) no specific pattern of interest emerged in case of successful students under the commerce course of study.


The present study aimed at developing a Hindi adaptation of the Kuder Preference Record (Form C) in order to serve the need for a standardised test of interests in Hindi.

In the first stage, individual items were selected by administering the test to a sample of 100 college undergraduates to find scores for ten areas of the test, each area being subjected to (i) response frequency and (ii) internal consistency analysis. Seventeen items out of 333 were found to be unsatisfactory, leaving a total of 316 items. In the second stage, reliability was estimated by split-half method by administering the test in its final form on two separate samples of college undergraduates, one from Patna and another from Bhagalpur, each consisting of 100 students. The reliability coefficients of different subtests ranged between 0.68 and 0.84. The test-retest reliability, with a gap of one year in between, was also found. The coefficients of stability ranged from 0.57 to 0.71. In the third stage, validity was ascertained first by administering the Chatterji’s Non-Language Preference Record and the Kuder Preference Record to a sample of 100 undergraduates. The product moment correlation coefficient found between the scores in the common areas of the two tests ranged between .43 and .55, each one being significant at .01 level. The other validity study covered nine different criterion groups, the results of
related; (x) subjects of courses offered and vocational interests are also related.

The entire student population of urban and rural higher secondary schools and intermediate colleges of Agra District was stratified into four groups—urban male students, urban female students, and rural male and female students. Accordingly, stratum wise cluster sampling was done. A group of 500 students consisting of 125 urban boys, 125 urban girls, 125 rural girls, and 125 rural boys was drawn. For measuring educational and vocational interests, an Educational Interest Inventory (ElI) and a Vocational Interest Inventory (VII) were prepared. Reliabilities and validities were ascertained. Age and intelligence were controlled by the matched group technique and as regards the grade variable, only class IX was selected. Hypotheses concerning relationships were tested by correlational techniques and those related to interest differences were tested by Duncan’s Range Test.

The findings revealed that educational and vocational interests of adolescents were not in agreement and thus educational courses of subjects for study and vocational interests were not directly related. The subject courses offered and the educational interests of male students differed significantly with regard to their educational interests in scientific and constructive areas but had more or less similar interests as regards literary, commercial, aesthetic, and agricultural vocations. Significant zonal differences in educational interests of female students existed for the aesthetic and literary groups but in the scientific, commercial, constructive, and agricultural areas. The females of both zones seemed to be equally interested. Significant differences in vocational interests of male students for literary, commercial, constructive, aesthetic, agricultural, social service, and household vocations existed; interest in persuasive vocations was equal. Urban and rural girls differed significantly with regard to vocational interests in literary, Constructive, aesthetic, agricultural, social service, and household vocations, but interest in scientific, commercial, and persuasive areas was equal. Urban males were more interested in
constructive and least interested in the agricultural courses while rural males were most interested in literary and least interested in the aesthetic educational courses. Female urban students were most interested in scientific education and least interested in the agricultural courses while rural female students were most interested in literary education and least interested in agricultural education. Urban males were most interested in literary and rural males in aesthetic vocations and both groups were least interested in household vocations. The urban girls were most interested in persuasive vocations and rural girls in household vocations while both groups of girls were least interested in agricultural vocations. The coefficients of correlation between educational and vocational interests, between educational courses of subjects offered and groups liked most, between groups offered and vocational likings for them were 0.089, 0.10 and 0.60 respectively. In other words, high school students were studying educational courses which they did not quite like and which seemed to be in line with their vocational preferences.


The main aim of the study was to develop typical interest patterns for science, humanities and commerce streams.

For measuring the interest of the students, Chatterji's Non-Language Preference Record (CNPR) was used. All the higher secondary schools of Calcutta were classified into several groups on the basis of area, as north central and south. Then from each area four schools; two boys and two girls were selected at random. Only two other schools were taken in addition for the commerce stream. The sample included 628 students -357 boys and 271 girls - studying in Class XI of the selected schools.

The findings of the study were: (i) Interest patterns for all groups were not identical and the pair-wise comparison indicated that there was a wide variation between the groups in this respect. (ii) There was
much similarity between the interest patterns of the commerce and humanities groups but the science groups were much different from both commerce and humanities groups as far as interests were concerned. These similarities and dissimilarities in the interest patterns for different groups could provide adequate aid in a guidance situation. 

(iii) By using the total marks obtained by the students in the higher secondary as a criterion, three new scales of interest in the humanities, commerce and science streams were developed.


The purpose of the present work was to study the interest patterns of school going children in order to make their interests educative.

The study was conducted on a sample of 720 boys and 360 girls, selected through stratified random sampling technique, from the institutions (six for boys and four for girls) of four districts, namely, Gorakhpur, Gonda, Basti and Faizabad. The variables considered in the study were sex and grade. The seventh, ninth and eleventh grade students were taken up. The study utilised two techniques to measure the pattern of interests. The tools used were the observation, interview with children and with their parents. The test prepared had 165 items each in the area of stimulation and information. The data thus collected were treated with product moment correlation technique. The centroid method was used for factorisation to study the nature of clusters. Six factor solutions for each sex separately had been calculated. The psychological and rational analysis revealed nine areas, viz., aesthetic, play, curiosity, gain motive, altruistic motive, personal acquisitive instinct, social activity, community life and miscellaneous.

The study revealed that (i) the six factors, three for each sex, separately gave the extroverted scientific interest, general gusto for life, and games and amusement for girls; and outdoor useful activity, general gusto for life, constructive amusements and games for boys; (ii) the difference was significant in aesthetic play, curiosity, altruistic,
personal acquisitive instinct and in social activity and community life areas; (iii) Interests cannot be categorised in tight homogeneous groups; interests get balanced through education, social conditioning, cultural forces, etc.; (iv) both the sexes were governed by the general gusto for life, girls showed their feminine temperament in all the factors obtained, boys reflected their masculine temperament, viz., interest in sports, games, scientific, constructive, productive activities, etc.; (v) the age of ninth class was peak age for the expansion of interests in all the nine sets of items; this age was the crucial age for both the sexes.


The aims of the present study were; (i), to enquire into the science interests of the high school children with regard to different school subjects, science subjects, different units in each subject, and their likes and dislikes of topics they already studied with reasons thereof; and (ii) to investigate into the various science competencies, viz., observing, classifying, calculating, and collecting data of the students.

The study was conducted on a sample of 1000 students of standards VIII, IX and X of thirty six high schools and 290 teachers. The data were collected, by employing (i) a questionnaire-cum-inventory for the pupils; and (ii) a questionnaire for teachers.

The study revealed that (i) the science subjects got the third rank among the different school subjects; (ii) girls showed greater interest for botany, human physiology and astronomy while boys gave preference to physics, chemistry and geology; (iii) among the eight units in physics, electricity ranked first and 'Units of measurement' ranked eighth; (iv) among the seven units in chemistry 'laboratory activities' ranked first and 'acids and alkalis' ranked seventh; (v) among the eleven units in botany 'flowers' got first rank and 'stem' got last rank; (vi) among seven units in zoology 'birds' got first rank and 'amphibians' got last rank; (vii) urban pupils showed significantly higher
preference for science than rural pupils; (viii) in physics, rectifying the defect of the eye using lenses, making model cameras and projectors ranked high among the interest in scientific activities; (ix) in chemistry oxygen preparation, answering questions about oxygen, studying life history of the scientist who discovered oxygen ranked high; (x) in zoology stages of evolution, observation of feeding, breathing, structural adaptation for locomotion and studying external details ranked high; (xi) in botany direct observation of natural phenomena, artificial setting, preparation of leaf album, and collection of leaf skeletons were the most liked activities; (xii) in human physiology, giving first-aid, knowing diseases and remedial measures, seeing blood circulation by means of film were the most liked activities; (xiii) the rank order of liking was botany, physics, chemistry while the dislike rank order was physics, chemistry and zoology; (xiv) there were significantly greater 'like' entries for botany, zoology, human physiology and chemistry while physics got significantly greater 'dislike' entries than 'like' entries; (xv) the main reasons for liking a subject were, ease, experiments, functions, processes, and application; (xvi) the main reasons for disliking were difficulty, fear, lack of new experiments, study of inanimate objects and bad teaching; (xvii) availability of material facilities, both at school and home, were mentioned by teachers to be main factors for promotion of interest in pupils; (xviii) the main factors that adversely affected interests in pupils as mentioned by teachers were discouragement at home, parents' ignorance and negligence, lack of facilities at home and school; (xix) scientists were the highest preferred group of great men and non-scientists group the least preferred; and (xx) the parental encouragement and home facilities were significantly related to the total science interest.


The objective of the study was, to find out the attitudes of tribal rural children (boys and girls) towards science in Bastar schools
The sample comprised Bastar schools (Bishrampur Narayanpur, Kondagoan and Kenker) The response fell under the age group of 14 to 18 years with 12th year regular schooling All the boys (100) and girls (50) represented tribal communities They were drawn from an area which had a lower literacy rate in comparison to other tribal areas. The collected data were treated by using Mean, SD and CR

The major findings were (1) Compared to the boys, the girls' interest for science appeared negative in direction. (2) In connection with the nature of science, the inferences derived in the study reflected the impact of curriculum changes introduced in schools (3) At the secondary stage, there was a bifurcation in two major streams of science and humanities.

9. Deo Neha (2008) A Comparative Study of Interest in Science of 9th Standard Students and Activities Arranged by Schools to develop it in Rural and Urban Areas of Haveli Tahasil. The objectives of the study were: (i)To develop an interest inventory to measure interest in science of 9th standard students (ii)To compare the interests obtained by science interest inventory of 9th standard students of rural and urban areas of Haveli Tahasil. (iii)To survey and to compare the science activities arranged in schools and availabilities for science teaching in schools of rural and urban areas of Haveli Tahasil (iv)To study the relationship between the activities arranged in the school and the interest in science of 9th standard students. (v) To study the effect of gender differences on interest in science, and (vi) To give useful recommendations for the science activities arranged in the schools to increase the interest in science.

The sample includes 1265 students and 99 teachers from 27 schools in Rural and Urban Areas of Haveli Tahasil, Pune district. Science interest inventory, questionnaire for science teachers, a rating scale for observing science availabilities and Interview schedule for teachers were the tools prepared and used for data collection. t- test, coefficient of correlation and ANOVA are the statistical techniques used for analysis of data.
The major findings were (i) A significant difference was observed between interest in science of rural and urban students. (ii) No significant difference was observed among the interest in science of students from boys' schools, girls' schools and co-ed schools. (iii) No significant difference was observed between rural and urban area schools regarding science activities arranged by science teachers in and outside the classroom. (iv) There was significantly high correlation between students' interest in science and availabilities and activities in schools regarding science. (v) In urban area no significant effect of gender differences was observed on interest in science. (vi) In rural area a significant effect of gender differences was observed on interest of students in science. (vii) No significant effect of gender differences was found on interest in science of 9th standard students.

2.6.2 Researches conducted in Abroad

There are six researches conducted in abroad related to the interest. The name of the researcher, Title of the research and the year of research conducted in abroad are given in the following table.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Researcher</th>
<th>Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Martinez Michael E.</td>
<td>Gender Differences in Interest</td>
<td>1989</td>
</tr>
<tr>
<td>2</td>
<td>Koszalka, Tiffany</td>
<td>Predictive Relationships among Science Classroom Resources and Middle School Student Interest in Science Careers: An Exploratory Analysis</td>
<td>2002</td>
</tr>
<tr>
<td>3</td>
<td>Markowitz, Dina</td>
<td>Evaluation of the Long-Term Impact of a University High School Summer Science Program on Students' Interest and Perceived Abilities in Science</td>
<td>2004</td>
</tr>
<tr>
<td>4</td>
<td>Ride, Sally K.</td>
<td>Igniting Girls' Interest in Science Careers</td>
<td>2005</td>
</tr>
<tr>
<td>5</td>
<td>Weisgram and others</td>
<td>Effects of Learning about Gender Discrimination on Adolescent Girls' Attitudes toward and Interest in Science</td>
<td>2007</td>
</tr>
<tr>
<td>6</td>
<td>Weisgram and others</td>
<td>Effects of Learning about Gender Discrimination on Adolescent Girls' Attitudes toward and Interest in Science</td>
<td>2007</td>
</tr>
</tbody>
</table>
A brief account of researches related to interest, conducted in abroad is given as follows.

   Educational Testing Service. Males are more likely than females to aspire to and attain careers in science. This pattern might be attributed to differences in the appeal of school science to boys and girls. In this study, middle school students carried out versions of science experiments that differed in their motivational appeal. Findings showed that boys were more attentive to aspects of science experiments that elicit perceptions of control, whereas girls were more attentive to social aspects. Further, attempts to enhance the interest value of science experiments were found to be more effective for girls than for boys. Motivational enhancement of science experiments was found to affect subsequent choices to participate in science: experiments.

   This study investigates the relationships among different types of resources in science and student science career interests. A survey method was used to collect data from over 600 middle school students in several states. Classrooms were classified into resources use types based on teacher responses to six questions indicating the regular use of resources during science class and were coded as: low "sociableness" and low "webnicity"; high sociableness and low webnicity; low sociableness and high webnicity; and high sociableness and high webnicity. The results of the study indicated that the regular use of human resources was a significant predictor of science career interest for both boys and girls. The use of Web resources predicted science career interest scores only for girls. Understanding these relationships can help strengthen the process of
designing science education and support decision-making related to securing resources that may inspire students to pursue science.


Many biomedical research universities have established outreach programs for precollege students and teachers and partnerships with local school districts to help meet the challenges of science education reform. Science outreach programs held in university research facilities can make science more exciting and innovative for high school students and can offer them much more insight into the nature of science and laboratory research than is available in most high school science courses. This paper describes a long-term follow-up study of high school students enrolled in the Summer Science Academy program at the University of Rochester to investigate the program's impact on students' perceived abilities in higher level science courses, on participation in extracurricular science programs, as well as the program's impact on student interest in pursuing a career in science. Students' exposure during SSA to advanced laboratory techniques and their participation in authentic science investigations provided them with a very positive hands-on experience. Students who attended the program indicated that it provided a positive influence on their performance in advanced science courses, as well as their decision to participate in other science programs and their desire to pursue a career in science.


Encouraging students' interest in science has never been more important. Science plays a greater role in everyone lives than ever before and students who have a solid foundation in science are prepared to pursue a wide range of opportunities in high school, college, and the workplace. Yet many students--particularly girls and students from diverse cultural backgrounds--are leaving school without
the confidence or preparation they need in science. Research shows that boys and girls start out their education with equal interest and aptitude in science. However, by about sixth grade, more girls than boys begin to turn away from science—even though they still have the aptitude for the subject. The reasons for this are subtle and rooted in cultural stereotypes. These stereotypes are changing, but still influence how students view science and their relationship to it. This article discusses Sally Ride Science, a company dedicated to empowering girls to explore the world of science—from astrobiology to zoology.


Gender discrimination has contributed to the gender imbalance in scientific fields. However, research on the effects of informing adolescent girls about gender discrimination in these fields is rare and controversial. To examine the consequences of learning about gender-based occupational discrimination, adolescent girls (n= 158, ages 11 to 14) were randomly assigned to either (a) a standard intervention program aimed at increasing girls' interest in science or (b) a nearly identical program that included information about gender discrimination. Girls' interest in, and attitudes toward, science were assessed using a pre/post design. Only girls who learned about gender discrimination showed increases in science self-efficacy and belief in the value of science; interest in scientific fields was unaffected by the intervention programs.


This study draws upon qualitative case study to investigate the connections between the "funds of knowledge" that urban, high-poverty students bring to science learning and the development of a sustained interest in science. We found that youth developed a sustained interest in science when: (1) their science experiences connected with how
they envision their own futures; (2) learning environments supported the kinds of social relationships students valued; and (3) science activities supported students' sense of agency for enacting their views on the purpose of science.

It can be observed from the previous researches related to the interest that they took into consideration various aspects of interest like, Interest Patterns of students, Science Interests of students, Development of interests inventory, Gender Differences in Interest, Igniting Girls' Interest in Science Careers, Developing Interest in Science and Adaptation of Interest Inventory.

In the present study the researcher studied the interest in science of secondary school students. For this purpose he adopted Dubey and Dubeys' Science Interest Test in Marathi.

2.7 Researches related to Achievement

The second category is the researches related to Achievement. This category includes total 11 researches, out of which 9 were conducted in India and 2 were in abroad.

2.7.1 Researches conducted in India

There are 9 researches related to achievement conducted in India. The name of the researcher, Title of the research and the year of research conducted in India are given in the following table.
<table>
<thead>
<tr>
<th>Sr. No</th>
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<th>Year</th>
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<tbody>
<tr>
<td>1</td>
<td>Abraham. P. A.</td>
<td>An Experimental Study of Certain Personality Traits and Achievement of Secondary School Pupils.</td>
<td>1969</td>
</tr>
<tr>
<td>2</td>
<td>Jha. V.</td>
<td>An Investigation into Some Factors related to Achievement in Science by Students in Secondary Schools.</td>
<td>1970</td>
</tr>
<tr>
<td>3</td>
<td>Nayar, P. P.</td>
<td>Some Predictors of Achievements in Science at the Secondary School Stage.</td>
<td>1971</td>
</tr>
<tr>
<td>4</td>
<td>Joseph, T. T.</td>
<td>A Study of Some Predictors of Achievement in Chemistry at the Pre-degree Level</td>
<td>1979</td>
</tr>
<tr>
<td>5</td>
<td>Ansari, A.M.</td>
<td>Construction and Standardization of Achievement Tests in General Science for Standards V, VI and VII for Children Studying through Hindi as the Medium of Instruction in Greater Bombay.</td>
<td>1984</td>
</tr>
<tr>
<td>6</td>
<td>Chhikara, M.S.</td>
<td>An Investigation into the Relationship of Reasoning Abilities with Achievement of Concepts in Life Sciences.</td>
<td>1985</td>
</tr>
<tr>
<td>7</td>
<td>Ghosh, G.P.</td>
<td>A Study of the Achievement of the Students in Chemistry and Finding Relationship with some of its Determinants.</td>
<td>1985</td>
</tr>
<tr>
<td>8</td>
<td>Mehna, V.H.</td>
<td>An Investigation into Some Factors Affecting Academic achievement in Science of Standard IX Students of Greater Bombay.</td>
<td>1986</td>
</tr>
<tr>
<td>9</td>
<td>Usha, P.</td>
<td>A study of certain socio-familial correlates of secondary school science achievement.</td>
<td>1998</td>
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</tbody>
</table>

A brief account of researches related to Achievement, conducted in India is given as follows. This account includes objectives of the study, methodology and major findings of the research.


This study attempts to determine the influence of the basic personality factors on academic achievement.

The sample consisted of pupils from standard X, selected from a twenty percent stratified random sample of schools in the Trivandrum educational district. The personality variables chosen were intelligence,
introversion, extraversion, neuroticism, adjustment, persistence, level of aspiration, personal tempo and variability. The scores obtained by the sample in Malayalam, English, Hindi, social studies, general science and general mathematics and on psychological tests of verbal intelligence, nonverbal intelligence, introversion-extraversion and neuroticism scales of senior MPJ, persistence inventory, personal tempo and school adjustment were taken for the final investigation. Level of aspiration scores on continuous addition test and the variability scores based on the performance levels on the continuous addition test were also included in the study. Since boys were found to be significantly superior to girls on several achievement variables, the data obtained for boys and girls were factor analysed separately.

In general, the major findings were: (i) scholastic aptitude had the maximum influence on academic achievement; (ii) the influence of the temperamental dimensions of neuroticism and introversion-extraversion on academic achievement showed sex differences; (iii) it was found that factor analysis of the personality variables and academic achievement evolved a factor pattern in which three factors could be identified, viz., Scholastic Aptitude, Neuroticism and Extraversion-Introversion; (iv) the personality factors evolved from the analysis of scores obtained from (a) a sample of boys and girls, (b) a sample of boys and (c) a sample of girls, were similar; (v) the personality factors evolved in the analysis had significant loadings on the personality variables and so the influence of the personality on academic achievement could be described in terms of the personality factors; (vi) boys were found to be superior to girls in their achievement and the same trend was noted in the loadings of the dominant personality factors.

The study examined the nature of relationship between intelligence, science aptitude, adjustment, anxiety, extraversion, study habits, and socio-economic status on one hand and achievement in science on the other. Hypotheses tested in the study were: (i) there exists a substantial positive relationship between achievement in science and each of the factors, viz., general intelligence, scientific aptitude, adjustment, study habits, and socio-economic status; and (ii) there exists a substantial negative relationship between achievement in science and anxiety and extraversion.

A random sample of 342 boys and 104 girls was drawn from two boys' and two girls' schools situated in the same locality with identical features. The Mohsin's General Intelligence Test, the Roy Choudhary's Science Selection Test, the Sinha and Sinha's Adjustment Inventory, the Taylor's Manifest Anxiety Scale the Antarmukhi Bahirmukhi Vyakttrtva Prashnavali, the Wrenn's Study Habit Inventory, and the Kuppuswamy's Socio-Economic Status Scale were used as tools of research. Achievement in science was measured by having the average of two preceding annual examination marks in science subjects. Statistical analysis was carried out with the help of correlation, chi-square test, t test, and Mann-Whitney U test.

Following were the findings: (i) there was a significant positive relationship between achievement in science and (a) general intelligence, (b) scientific aptitude and (c) adjustment; (ii) there was a significant negative relationship between achievement in science and anxiety in the case of boys and combined samples, but not so in the case of girls; (iii) there was no relationship between achievement in Science and extraversion; (iv) there was a significant positive relationship between achievement in science and study habits in the case of boys and combined samples, but not so in the case of girls; and (v) there was no relationship between achievement in science and socio-economic status.

This study attempted to predict achievements in science with the help of following six variables: verbal reasoning ability, numerical ability, comprehension and interpretation, problem solving, critical thinking ability and spatial ability. Factor analysis of the correlation matrix of the above variables was also carried out to study the amount of variance that could be attributed to aptitude for science.

The pretesting for conducting item analysis for the tools used was done on 370 students (195 boys and 175 girls) studying in standard X in selected schools in Trivandrum revenue district, Kerala. The tools used were: (i) Verbal Reasoning Test of the NCERT (VR); (ii) Numerical Ability Test Form A of the Differential Aptitude Test (NA); (iii) adapted version of the Comprehension and Interpretation of the Educational Testing Service Cooperative Science Test Form Y (CI), Part III; (iv) the Problem Solving Test based on the Cooperative Sequential Test of Educational Progress Science Test; (v) adapted version of the Watson-Glasser Critical Thinking Appraisal; and (vi) the revised Minnesota Paper Form Board Test AA (FB) to measure spatial ability. Reliability of these tests were established by test-retest (N=135) and split-half (N=441) methods. Standard errors of measurement of test scores were also calculated. Tests were validated against school marks in science. Predictive validity studies were attempted by following up forty two students of first year pre degree class and 180 of second year predegree class taking marks in science as criterion. A stratified sample of 441 students (231 boys and 210 girls) was drawn considering the variables of sex; area (rural or urban) and age.

The main findings were: (i) the differences between the mean scores of boys and girls on Numerical Ability, Problem Solving and Critical Thinking Appraisal Tests were significant at .01 level, boys being superior; (ii) there was however, no significant difference between the mean performance of rural and urban students on the six
experimental and the criterion variables; (iii) the correlation coefficient between the scores on critical thinking criterion, in case of boys, was significant at .05 level; (iv) there were significant differences at .05 level between boys and girls in their correlations in VR and Cl, girls being superior in both the cases; (v) the multiple correlation coefficients were: NA and VR = .6005, NA, VR and Cl = .6383 and NA, VR, Cl and FB= .6525; vi) the variables of the four tests for school science were 15.6 percent (NA), 13.6 percent (VA), 9.5 percent (Cl) and 5.6 percent (FE); (vii) there four tests had highest validity of any combination of tests chosen from the six tests used; (viii) three common factors were revealed in this study, which have been named as General Factor 'g', Conceptual Facility and Numerical Facility; and (ix) the study revealed agreement, to a great extent, between the findings obtained through multiple correlation and through factor analysis.


The objectives of the study were: (i) to find out the association between each of the independent variables and different achievement levels in chemistry (high, average and low achievers) in terms of the ability of each of the independent variables to discriminate between the different achievement levels compared in pairs, (ii) to find out the degree of association between each of the independent variables and achievement in chemistry, achievement in terms’ of correlations and arrange the independent variables in terms of their efficiency to predict achievement in chemistry, (iii) to develop an equation ( or equations) to predict achievement in chemistry using efficient predictors identified, and (iv) to obtain factor structures in terms of the ten variables (one dependent and nine independent) for two extreme achievement levels in chemistry, and see how the structures obtained for the extreme groups differ from the structure obtained for the general sample.

The study was conducted on a representative sample of 560 pre-degree students of Kerala. The ten variables which were measured using tests of accepted validity and reliability were number series,
formulation, spatial ability, verbal comprehension and interpretation and critical thinking under cognitive variables, attitude towards science, science interest, personal adjustment and social adjustment under affective variables and achievement in chemistry as dependent variable. The measures were analysed using t-tests, product moment coefficient of correlation, multiple prediction equations and factor analysis.

The major findings of the study were: (i) All the nine independent variables discriminated between the high achievers and the average achievers, the average achievers and the low achievers and the high achievers and low achievers. (ii) All the nine independent variables correlated significantly with achievement in chemistry at the pre-degree level. (iii) The multiple coefficient of correlation between achievement in chemistry and the best three predictors, namely, spatial ability, number series and formulation was 0.7048, indicating that around 49 per cent of the variance of the criterion could be accounted for by the three predictor variables. (iv) The factor structures for the high achievers, the low achievers and the total sample revealed significant differences between different groups, which implied that achievement differentials affected the factor structures obtained with respect to the ten variables under study.


The objectives of the study were (i) to construct and standardize a battery of achievement tests in general science for pupils of classes V, VI and VII studying through Hindi as the medium of instruction in Greater Bombay, (ii) to compare the achievement in science of children studying in municipal and non-municipal schools in the city of Greater Bombay, and (iii) to compare the achievement of boys and girls in science.
For standardization of achievement tests, the test items were tried out on different samples. The try-out sample was 1200 students. Item statistics were calculated. The final sample for fixing the norms included 1702 students of class V, 1462 students of class VI and 1391 students of class VII. The norms were expressed in stanines, percentiles and standard scores.

The major findings were as follows: 1. The performance of boys was better than that of girls. 2. The students of non-municipal schools had a better performance in general science than those of municipal schools. 3. These findings held good for all the classes, viz. Class V, class VI and class VII.


The hypotheses formulated for the study were: (1) It is feasible to identify the hierarchy of concepts in life sciences into seven levels of organization of biological phenomena and to measure achievement of these concepts through objective tests. (2) It is feasible to identify reasoning abilities that secondary school students possess with the help of cognition and convergent production of semantic classes, relations and implications tests. (3) There exists a definite positive relationship between conceptual achievement in life sciences and reasoning abilities. (4) It is possible to predict conceptual achievement in life sciences on the basis reasoning ability tests.

The tools used in the study were a battery of Concept Achievement Tests and a battery of Reasoning Ability developed by Girish Bala. The subject content of VI to X was analysed and 274 concepts were found out. These concepts were divided under seven of organization of biological phenomena. The ent was further categorized under the seven themes identified by the BSCS for its curriculum model. Five active multiple choice items to measure knowledge, comprehension, or application were constructed or pre-tried out. It was given to ten students of class X, three teachers for criticism. On the basis of their responses the
language and instructions were further fled. All the 280 items were divided into seven (tests). This battery of seven tests was administered to 370 students for try-out. The discrimination and difficulty values of each item were calculated and 175 items were selected for the final form of the battery. The KR-20 reliability coefficient for the Concepts Achievement Tests of life sciences was found to be 0.848 while split-half reliability was 0.886. Nearly 200 students selected from four government boys' senior secondary schools of South Delhi constituted the sample.

The findings of the study were: 1. A slight modification was made in the hierarchy levels of organization of biological phenomena when concepts in secondary school life sciences were identified and the concept achievement test was found reliable and valid. All these supported the first hypothesis, i.e. it was feasible to identify the hierarchy of concepts into seven levels of organization of biological phenomena and to measure achievement of these concepts through objective tests. 2. The results of factor analysis of reasoning ability supported that it was possible to identify reasoning abilities that the secondary school students possessed, with the help of cognition and convergent production of semantic classes, relations and implications tests. 3. Indian children did not differentiate as clearly as inferred according to the structure-of-intellect theory. 4. A definite positive relationship between conceptual achievement in life sciences and reasoning ability was found. 5. The fourth hypothesis, i.e. the possibility to predict conceptual achievement in life sciences on the basis of the reasoning ability test, was supported to a large extent by the results Of regression analysis.
Ghosh, G.P. (1985) A Study of the Achievement of the Students in Chemistry and Finding Relationship with some of its Determinants, Ph.D.

The main purposes of the study were (i) to appraise the achievement of the students in physical science, (ii) to appraise the extent of academic motivation, (iii) Intelligence and socio-economic status of the students, (iv) to determine sex-wise and strata-wise differences, if any, in achievement in physical science, (iv) to determine relationships among the scores of the Achievement Test Physical Science, the intelligence Test, the Academic Motivation Test and the Socio-economic Status Scale, (v) to develop regression equation of the achievement in science on intelligence academic motivation, socio-economic status.

An achievement test in chemistry was standardized 450 boys and girls (just promoted to class X) reading nine schools in West Bengal. Test-retest reliability, t-test, predictive and concurrent validity and T-score rms were developed. Bhattacharya’s Academic Motivation Test and Group intelligence Test, Kuppuswamys’ (Urban) and Pareek’s (Rural) SES Scale are used along with the achievement test. Mean, SD, ANOVA test, Mann-Whitney U-test, correlation etc. were used. Two multiple regression equations were developed.

Some of the major conclusions were: 1. Urban students did not show better performance in the achievement Test in Chemistry (ATC) than rural students, 2. Boys did not show superiority in ATC over girls. There was a positive correlation between the scores in C and Academic Motivation Test, ATC and Group Intelligence Test, urban and rural students’ scores in C and ‘income of the Parents’, rural students’ scored ATC and ‘Education of the Parents’ as well as ‘Occupation of the Parents’. 4. Scores in ATC could be predicting from the scores in Academic Motivation Test, Group Intelligence Test and SES of the parents through multi-regression equation. 5. The ATC was reliable and the Norms were also satisfactory.

The major objective, of the study were (i) to find out the predictors of achievement in science as a whole, physics, chemistry and biology, and (ii) to study sex differences in case of predictors of achievement in science as a whole, physics, chemistry and biology.

The independent variables selected for the study were nonverbal intelligence, verbal intelligence, abstract reasoning, mechanical comprehension, numerical ability, scientific aptitude, interest in medicine, engineering, commerce, arts, fine arts, motivation for learning science, physics, chemistry, biology and students' liking for teachers of science, physics, chemistry and biology. The criterion variables were achievement in science, physics, chemistry and biology. The various tools used were Nafde's Nor-verbal Test of intelligence, OTIS Self-Administering Test of Mental Ability, Bennett's Mechanical Comprehension Test-Form A A, Abstract Reasoning Test-Form A of the D.A.T., Numerical Ability Test of D.A.T., Mascarenhas Interest Inventory, Chattarjee and Mukherjee Test of Scientific Knowledge and Aptitude-Form 1064, Students Liking Scale by S.P Malhotra and P.K Passi, Rating Scale on Motivation for learning science and achievement tests in physics, chemistry and biology constructed by the researcher. The sample comprised 308 girls and 376 boys of class IX of English medium school of Greater Bombay selected through the cluster sampling method. Step-wise multiple regression analysis was applied for data analysis.

The major findings of the study were: 1. Six variables, viz. verbal intelligence, motivation for learning general science, scientific knowledge and aptitude, numerical ability, liking for teachers of science and interest in medicine were significant predictors of achievement of class IX students in general science(R=0.5773). The significant Predictor variables for boys were scientific knowledge and aptitude, motivation for general science, verbal intelligence, interest in commerce, numerical ability and liking for science teachers.
The significant predictors of achievement in general science for girls were verbal intelligence, motivation for general science, scientific knowledge and aptitude, liking for teachers of general science and numerical ability (R=0.6500). 2. The significant predictor variables for achievement in physics for students of class IX were the same as those found in the case of general science with the addition of one more variable - abstract reasoning. The significant predictors of achievement in physics in the case of boys were scientific knowledge and aptitude, motivation for learning physics, verbal intelligence, interest in commerce, motivation for learning general science (other than physics), and numerical ability (R=0.5798). In the case of girls, the predictors for physics achievement were scientific knowledge and aptitude, motivation for learning general science other than physics, verbal intelligence, numerical ability and liking for physics teachers (R=0.6184) 3. The significant predictor of achievement in chemistry of students of class IX were verbal intelligence, motivation for learning chemistry, scientific knowledge and aptitude, numerical ability, interest in medicine, liking for chemistry teachers and interest in fine arts(R=0.5573). In the case of boys, all the above variables with the exception of interest in medicine were found to be significant predictors of achievement in chemistry (R=0.5283). In the case of girls, the predictor variables were the same with the exception of numerical ability and interest in the fine arts (R=0.6026). 4. Six significant predictors of achievement in biology in the care of students of class IX were verbal intelligence, liking for biology teachers, motivation for general science subjects other than biology, scientific knowledge and aptitude, interest in medicine, interest in commerce(R = 0.4938). Significant predictors of achievement in biology in the case of boys were verbal intelligence, motivation for learning biology, liking for biology teachers and interest in commerce (R=0.4191). In the case of the girls the predictor set included verbal intelligence, liking for biology teachers, motivation for general science subjects other than biology, scientific knowledge and aptitude and interest in medicine (R=0.6066) 5. Abstract reasoning war found to be a significant predictor only for
physics achievement. Numerical ability was a significant predictor of achievement in physics and in chemistry but not biology.

The research findings imply that the pupils' performance in science subjects can be improved, (1) if teachers succeed in generating a feeling of liking for them among pupils, (2) if teachers develop aptitude for science among children by providing scientific information, and (3) if teachers can motivate children to learn science subjects. This needs adequate training for teachers in making science teaching interesting and in training them in the techniques of amusing pupils' motivation for learning science.


The objectives were (i) To estimate the extent of relationship between achievement in physical science and each of the social and familial variables for the whole sample, (ii) to find out the best predictors of achievement in physical science from among the set of social and familial variables, and (iii) to identify the best correlates of achievement in physical science from the group of social and familial variables.

Eight hundred fifty pupils studying in Standard IX of the secondary schools, selected from four revenue Districts of Kerala, namely Kasaragod, Kannur, Kozhikode and Malappuram served as the sample of the study. They were selected through proportionate stratified sampling method. General data sheet, Kerala Socio-Economic Scale, Socio-familial Inventory, Family Acceptance of the Child Rating Scale, Parents' Sex bias in Education Questionnaire and Achievement Test in Physical Science were used as tools to collect the data of the study. The collected data were treated with correlational analysis and regression analysis.

The major findings were: (1) Parent's (both father and mother) educational level, occupational level and income level of father were, significantly associated with physical science achievement. (2) It was found that pupils, whose parents showed less sex bias, attained higher
scores in the test of achievement in physical science. Therefore, the social-familial conditions of secondary school students of Kerala may have a cumulative impact on their school experiences.

2.7.2 Researches conducted in Abroad

There are only two researches conducted in abroad related to the interest. The name of the researcher, Title of the research and the year of research conducted in abroad are given in the following table.

Table No. 2.5
Researches related to achievement- from abroad

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Researcher</th>
<th>Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>House, J. Daniel</td>
<td>The Effects of Classroom Instructional Strategies on Science Achievement of Elementary-School Students in Japan: Findings from the Third International Mathematics and Science Study</td>
<td>2006</td>
</tr>
<tr>
<td></td>
<td>Antonijevic, Radovan</td>
<td>Achievement of Serbian Eighth Grade Students in Science</td>
<td>2006</td>
</tr>
</tbody>
</table>

A brief account of researches related to Achievement, conducted in abroad is given as follows.

1. Antonijevic, Radovan (2006) **Achievement of Serbian Eighth Grade Students in Science**

The paper considers the main results and some educational implications of the TIMSS 2003 assessment conducted in Serbia in the fields of the science achievement of Serbian eighth grade students and the science curriculum context of their achievement. There were 4264 students in the sample. It was confirmed that Serbian eighth graders had made average scale score of 468 points in the science, and with this achievement they are placed in the zone of the top of low international benchmarking level, very close to the point of intermediate benchmark. The average science achievement of the Serbian eighth graders is somewhat below the general international science
achievement. The best results were achieved in the science content domain of "chemistry," and the lower results in the content domain of "environmental science." Across the defined science cognitive domains, it was confirmed that the Serbian students had achieved the best results in cognitive domain of "factual knowledge" and weaker results in "reasoning and analysis." The achieved results raise many questions about contents of the science curriculum in Serbia, its overall quality and basic characteristics of its implementation. These results can be used to improve the science curricula and teaching in Serbian primary school.


This article deals with the Third International Mathematics and Science Study (TIMSS). TIMSS has provided a comprehensive assessment of educational contexts and mathematics and science achievement (National Research Council, 1999). The initial TIMSS assessment was conducted in 1995 (TIMSS 1995) and several studies have examined factors related to science achievement. Several types of data were collected on the TIMSS student questionnaire, including information regarding instructional activities, student characteristics, out-of-school activities, learning resources, and science achievement. Students included in these analyses were from the TIMSS Population 1 International Sample (9-year-olds) from Japan. There were 7,941 students (3,946 females and 3,995 males) who completed all of the measures used in this study. This study examined the effects of several classroom instructional strategies. Several procedures were used in this study, such as: (1) jackknife variance estimation procedure; (2) computation of correlation coefficients; and (3) multiple regression procedures. There were several significant findings from this study. Students who more frequently did an experiment in class also tended to earn higher science achievement test scores. In
addition, students who more frequently used cooperative learning strategies (we work together in pairs or small groups) during their science lessons also showed higher science test scores. Among other things, this study presents a number of directions for additional research.

It can be observed from the previous researches related to the achievement that they took into consideration various aspects of achievement like, Personality Traits and Achievement, Factors related to Achievement, Predictors of Achievements in Science, Relationship of Reasoning Abilities with Achievement, Achievement of the Students and Finding Relationship with some of its Determinants, Socio-familial correlates of secondary school science achievement, The Effects of Classroom Instructional Strategies on Science Achievement and Construction and Standardization of Achievement Tests in general science.

In the present study the researcher studied the ability in science which leads in to the achievement in science of secondary school students for this purpose he constructed Science Ability Test for secondary school students in Marathi.
2.8 Researches related to interest and achievement

The final category is the researches related to Interest and Achievement. This category includes total 13 researches, out of which 8 were conducted in India and 5 were in abroad.

2.8.1 Researches conducted in India

The name of the researcher, Title of the research and the year of research conducted in India are given in the following table.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Researcher</th>
<th>Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rastogi, K. G.,</td>
<td>A Study of the Relation between Intelligence, Interest and Achievement of the High School Students.</td>
<td>1964</td>
</tr>
<tr>
<td>2</td>
<td>Makhija, G.K.,</td>
<td>Interaction among Values, Interests and Intelligence and Its Impact on Scholastic Achievement.</td>
<td>1973</td>
</tr>
<tr>
<td>3</td>
<td>Zacharia, T.,</td>
<td>Impact of Attitude and Interest on Achievement of Secondary School Pupils in Social Studies.</td>
<td>1977</td>
</tr>
<tr>
<td>4</td>
<td>Chatterjee, S. and others</td>
<td>Higher Secondary Science Achievement as related to Scientific Interest and Aptitude</td>
<td>1978</td>
</tr>
<tr>
<td>5</td>
<td>Pande, M. B.,</td>
<td>Interest, Aptitude and Personality Factors as Predictors of Scholastic Achievement</td>
<td>1978</td>
</tr>
<tr>
<td>7</td>
<td>Muthumanickam, R.</td>
<td>A study of academic achievement of students of higher secondary commerce group in relation to their reasoning ability, socio-economic status and interest in commerce,</td>
<td>1992</td>
</tr>
<tr>
<td>8</td>
<td>Shrivastava, Priyambada</td>
<td>Cognitive style in relation to educational interest, learning style and academic achievement.</td>
<td>1992</td>
</tr>
</tbody>
</table>

A brief account of researches related to interest and Achievement, conducted in India is given as follows. This account includes objectives of the study, methodology and major findings of the research.
The present investigation aimed at studying the relationship between intelligence, interest and achievement in English and science of high school students.

Standardization sample for the test of interest in English comprised 1,600 students of class X from seventeen institutions while for the test of interest in science there were 1,626 students of the same classes and institutions. Sample for the relationship study consisted of 560 students. Intelligence was measured by the Jalota’s Test of Mental Ability and achievement was measured by taking marks obtained in the U. P. Board Examination.

Results revealed that: (i) the reliability coefficients calculated by split-half and test-retest methods for the test of interest in English were found! to vary from 0.66 to 0.80, whereas in case of the test of interest in science, they varied from .68 to .82; (ii) validity indices for the first test ranged from 0.60 to 0.69, whereas in case of the latter, they varied from 0.66 to 0.70; (iii) the relationship between interest and achievement in English (r = .50) and that between interest and achievement in science (r = .37) in the present study were not found to be so high that interest could be said to be the major predictor of achievement; (iv) the relationship between intelligence and interest in English and that between intelligence and achievement in science were found to be significantly positive; (v) interest and intelligence were found, more or less, equally correlated with achievement in English and with that in science; (vi) interest and intelligence were found to be related more with achievement than between each other; (vii) the relationship of intelligence with achievement in English and that of intelligence and achievement in science were found nearly to be the same; and (viii) a combination of intelligence and interest was a better predictor of achievement in English and in science than either interest or intelligence alone.
2. Makhija, G.K. (1973) Interaction among Values, Interests and Intelligence and Its Impact on Scholastic Achievement, Ph. D.  

The study was undertaken to inquire into the interaction among values, interests and intelligence and its impact on scholastic achievement. In addition to the main effect of each variable, the effects of first order interaction between the three possible pairs and second order interaction among the triads of variables were also examined. The study consisted of sixty experiments, each dealing with a triad of one of the ten interests, one of the six values and intelligence.

A stratified random sample of 310 first year male students studying in the faculties of arts, science, commerce and agriculture was drawn. The tools used were Ojha’s Hindi adaptation of Allport-Vernon-Lindzcy Study of Values, Chatterji’s Non-language Preference Record, and Jalota’s Group Test of General Mental Ability. Analysis of variance and Hest were used for data analysis.

The major findings of the study were: (i) Intelligence had a significantly positive influence on scholastic achievement. (ii) Students who were not oriented to political value exploited their mental ability to much less extent than those who were highly oriented to it. (iii) Students who valued beauty, form, symmetry and grade in their life developed vocational interests in literary pursuit and avoided, as far as possible, sports and outdoor activities. (iv) Students who were oriented to practical and utilitarian view of life tended to exert their intellectual capacities more in the mechanical fields of vocations. (v) Students who valued power, competition, renowned, etc., in their life utilized their mental abilities to excel in crafts and scientific studies. (vi) Students whose ideal of life was to probe into the mysteries of God, exploited their intelligence in the fields of science and medicine. (vii) Adolescent boys motivated by affection, friendship and love of people used their intelligence in household activities. (viii) Those, who cherished search of a truth as the dominant ideal of life would not divert their capacities to mechanical occupations. (ix) None of the six values had any significant influence on scholastic achievement. (x) The motive to gain power as a means dominate, control and influence others accelerated
scholastic achievement. (xi) Intelligent students interested in science and medicine found religious value helpful in their performance but obstructive if they were interested in recreational activities. (xii) Students highly interested in sports seldom proved high achievers in schools. Interest in the medical field had no relevance to scholastic achievement; their interest was mostly induced extraneously by family and society. There was affinity between religious value and technician interest and they jointly influenced the caliber of the student in respect of his scholastic achievement.


The main objectives of the study were: (i) to find out the general nature of pupils’ achievement, attitude and interest in social studies for the total sample, (ii) to compare the scores of achievement, attitude, interest and intelligence of the different sub-samples, and (iii) to find out the effect of attitude and interest on the social studies achievement for the whole sample and sub-samples classified on the basis of intelligence, sex, age and socio-economic status.

The sample consisted of 800 pupils drawn from standard X of different schools in the Alleppey revenue district of Kerala, selected on the basis of the proportionate stratified sampling technique. A standardized achievement test in social studies for Standard X, attitude scale, interest inventory and Standard Progressive Matrices were used for the collection of data.

The major findings of the study were; (i) There was high positive correlation between the secondary school pupils’ achievement in social studies and their attitude. (ii) The pupils’ interest in social studies was closely related to their achievement in the subject at all levels. (iii) The pupils’ intelligence was a major factor in influencing their achievement in social studies. (iv) The pupils’ attitude and intelligence Scores were more or less equally correlated with their achievement in social studies. (v) The pupils’ intelligence was not a prominent factor in influencing
their attitude and interest in social studies. (iv) Socio-economic status had a facilitating effect on the creative ability of the pupils.


The investigation aimed at finding out the effect of scientific interest at different levels of potential ability with respect to science and to study the predictive values of interest in science and scientific aptitude in predicting success in higher secondary science.

The sample consisted of 115 students studying in Class IX in three different schools in Calcutta, selected at random from Bengali-medium higher secondary boys' schools and with ages ranging from 15 to 17 years. The tools used were Scientific Knowledge and Aptitude Test (SKA) and Chatterjee's Non-Language Preference Record (CNPR). Product moment coefficient of correlation and multiple regression analysis were the statistical techniques used for analysing the data. The students were classified into three groups on the basis of their scores on SKA. They were further classified into groups according to three levels of scores on CNPR.

The major findings were: (i) There was systematic positive relationship between science interest and probabilities of success in science at different aptitude levels except in the highest aptitude level. (ii) The relationship between aptitude in science and probabilities of success in science and achievement in science was positive. (iii) At the lower level of aptitude, interest played an important role in enhancing the probability of success in science. (iv) The product moment coefficient of correlation between the scores on CNPR and SKA was found to be 0.14, that between CNPR and higher secondary examination marks was found to be 0.36 and that between SKA and higher secondary examination marks was 0.51. (v) The multiple correlation with marks in the higher secondary examination as the criterion was 0.59 by adding interest score (with proper weightage) to the aptitude scores. (vi) The prediction of achievement in science was significantly
improved by considering the scores in scientific scale in CNPR along with the scientific aptitude score.

5. Pande, M. B., Interest, Aptitude and Personality Factors as Predictors of Scholastic Achievement, Ph.D. 38

The main objective of the study was to find out how far certain interest, aptitude and personality variables predict the scholastic achievement of students and to develop a battery of tests for the same purpose.

An interest inventory, in which curricular activities from both humanities and science courses were grouped in twenty boxes of five items each, was constructed on the lines of the Devon's interest test. Neurotic tendency or emotional stability and 'confidence in oneself' were the two traits of personality selected from the six traits measured by the Bernreuter's personality test which was translated into Marathi. Only the N, V, IR and DR factor tests from the Varma's battery of differential scholastic aptitudes were selected to measure cognitive abilities. The eight tests of the battery were administered to 640 students of class IX in twelve secondary schools of Vidarbha. The eight variables were factorized by the centroid method and four factors were extracted. They were General Scholastic Temperament, a general power factor with a dichotomy of science and humanities interest, Personality (non-intellective) factor which contrasted the non-intellective dynamic side of mind with the intellective functions and formation of interests, Interest (acquired or curricular) factor and the 'weaker' factor. The four centroid factors were rotated by the varimax method of rotation. The first rotated factor was General Scholastic Ability with the highest positive loadings of cognitive abilities on it. The second and third rotated factors were respectively Personality (non-intellective) and Interest (curricular).

This battery of eight variables has offered a single classification battery which, by means of differential weighting procedures, enables one to measure differentially the scholastic developments and predict, from the scores on variables at the beginning of secondary schooling,
the scholastic achievements at the end of class IX (if students offering humanities and science courses in secondary schools.


The objectives of the study were (i) to compare the science achievement, science interest and mental health status of secondary school pupils in the English medium and Malayalam medium classes, and (ii) to determine the relationship between the medium of instruction and science achievement, science interest and mental health for the total sample and sub-samples. The main hypothesis was that the pupils studying in the English and Malayalam medium classes differed significantly in their science achievement, science interest and mental health status.

The study had a sample of 890 secondary school pupils chosen by the application of stratified random sampling method. The tools used were the Achievement Test in Biology by Chandrika (1981), the Achievement Test in Physical Science by Vimala, the Science Interest Inventory by Muthu Pillai, Mental Health Status Scales by M. Abraham, Raven's Standard Progressive Matrices, and the Socio-economic Status Scale of Kuppuswamy. The statistical techniques applied included calculation of means and standard deviations, testing the significance of the differences between means, for correlated and uncorrelated groups, and calculation of the point biserial correlation coefficient.

The main findings of the study were: 1. Science achievement, science interest and mental health status of pupils of English medium classes were higher than those of pupils of Malayalam medium classes. 2. Science achievement, science interest and mental health status of pupils of English medium classes were higher than those of pupils of Malayalam medium classes for sub-samples equated on the basis of intelligence, interest and mental health status. 3. For sub-
samples equated on the basis of high socio-economic status and high mental status, the differences between English and Malayalam medium classes in science achievement and science interest were not significant.

The study suggested that the choice of medium of instruction for science should be made on the basis of individual assessment of pupils.


The objectives of the study were: (i) To find out the levels of commerce achievement of plus-two students, (ii) to study the reasoning ability, socio-economic status and interest in commerce of plus-two commerce students, (iii) to find out the relation ship, if any, among commerce achievement, reasoning ability, socio-economic status and interest in commerce, and (iv) to find out the difference, if any between boys and girls, urban and rural students and among the students belonging to different types of management of schools with regard to their mean commerce achievement scores.

The sample comprised 377 plus two commerce students (195 boys and 182 girls) belonging to the academic stream of the 14 higher secondary schools (eight urban and six rural) who were selected as subjects. The random sampling technique was used in the selection of the sample. The relevant data were collected using school marks register. the Verbal Reasoning Test developed and used as a part of Intelligence Test by Kumaraswamy Pillai, the Socio-economic Status Scale prepared by the investigator and the Commerce Interest Questionnaire developed by the investigator. Descriptive analysis, differential analysis, correlational analysis and multi-variate analysis were used to treat the data.

The major Findings were: (1) Boys and girls did not differ in their achievement in commerce. Sex was not found to be an influencing
factor of achievement in commerce. (2) There was a positive, significant correlation between achievement in commerce and reasoning ability, socio-economic status and interest in commerce. (3) In the case of high achievers, the variable reasoning ability alone had the linear influence on commerce achievement. (4) In the case of low achievers, the variable interest in commerce alone had the linear influence on commerce achievement.

Shrivastava, Priyambada. (1992). **Cognitive style in relation to educational interest, learning style and academic achievement**

The objective of the study was, to study the relationship between cognitive styles, educational interest, learning style and academic achievement.

The sample of 600 students studying in Class X in different higher secondary, schools of Raipur City was 'selected randomly in the present study. Instruments used were Group Embedded Figure Test (GEFT) by Oltman Ruskin and Witkin. Educational Interest Record by Kulshrestha, Hindi adaptation of Inventory of Learning Processes by Schmeek, Ribich and Ramnaiah and scores obtained in the last Board Examinations Grade X. Mean, SD and two-way ANOVA were used to treat the data

The major findings were (1) Subjects showing high interest in science and fine arts tended to be more FI them those showing low interest. (2) Students showing high and low interest in agriculture, commerce, humanities, home science and technology did not show any significant difference in their FD - I cognitive style. (3) Students with high deep processing learning style tended to be more F I than those with low deep processing. (4) Students displaying methodical study, fact retention and elaborative processing learning style did not show any significant difference in their FD-I cognitive style.
2.8.1 Researches conducted in Abroad

The name of the researcher, title of the research and the year of research conducted in abroad are given in the following table.

**Table No. 2.7**

Researches related to interest and achievement- from abroad

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Researcher</th>
<th>Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lee, Courtland C. and others</td>
<td>Predicting the Career Choice Attitudes of High School Students with Interest and Ability in science and Mathematics</td>
<td>1986</td>
</tr>
<tr>
<td>2</td>
<td>Hamrick, Linda; Harty, Harold</td>
<td>Influence of Resequencing General Science Content on the Science achievement, Attitudes toward Science, and interest in Science of Sixth Grade Students.</td>
<td>1987</td>
</tr>
<tr>
<td>3</td>
<td>Cuccio-Schirripa, Santine</td>
<td>Science Question Level and Its Relationship to Seventh Graders' Interest and Achievement in Science.</td>
<td>1999</td>
</tr>
<tr>
<td>4</td>
<td>Hammrich, Penny and other</td>
<td>The Sisters in Science Program: Building Girls' Interest and Achievement in Science and Mathematics</td>
<td>2000</td>
</tr>
<tr>
<td>5</td>
<td>Chang, Chun-Yen; Cheng, Wei-Ying</td>
<td>Science Achievement and Students' Self-Confidence and Interest in Science: A Taiwanese Representative Sample Study</td>
<td>2008</td>
</tr>
</tbody>
</table>

A brief account of researches related to interest and Achievement, conducted in abroad is given as follows.


Recent developments in science and technology challenge educators to understand variables that may influence the career development of students with focused or developed interest and ability in science and mathematics. This study was conducted to investigate the relationship among selected
psychosocial variables and attitudes toward career choice processes of high school students with interest and ability in science and mathematics. The study tested the unique contributions of socio-economic status, self-esteem, parental influence, and the influence of significant people outside of home and family in predicting the maturity of career choice attitudes of 147 high school students participating in a summer science and engineering apprentice program. Subjects completed the Rosenberg Scale to measure self-esteem, the Career Maturity Inventory, and a student data form. A stepwise regression analysis was used to examine the relationship of the independent variables to the dependent variable of career maturity. The results of the analysis revealed that the independent variables of self-esteem, parental influence, socio-economic status, and mentor influence had significant relationships with career maturity.


Repons on a study designed to determine the influence of resequencing general science content on sixth grade students' science achievement, attitudes toward science, and interest in science. Results suggest that students experiencing the resequencing exhibited significantly higher science achievement, more positive attitudes toward science and a greater interest in science.


Describes a study of students' (n=106) written questions about topics they considered extremely interesting and not very interesting. Finds that there were significant positive relationships for questions written for high and low interest levels. There were also significant
positive relationships between question level and achievement in reading, mathematics, and science.


The Sisters in Science program seeks to increase elementary school girls' interest and achievement in science and mathematics, to create a more positive learning climate for minority school girls and their families on academic and community/social levels, and increase the knowledge base and understanding of parents with respect to their influence in promoting girls' interest and achievement in science and mathematics. This paper reports on how 577 fourth grade girls in year one of the program and 627 fourth and fifth grade girls in year two of the program changed their interest and achievement in science and mathematics. Findings show that the girls started the program with positive attitudes and perceptions of science and about science career possibilities. The girls did significantly (p<.001) increase their science and mathematics skill levels after having participated in the program in both years one and two. It could be stated that the girls' achievement scores on the skills test increased significantly because the girls' attitudes and perceptions were positive before program implementation.


The interrelationship between senior high school students' science achievement (SA) and their self-confidence and interest in science (SCIS) was explored with a representative sample of approximately 1044 11th-grade students from 30 classes attending four high schools throughout Taiwan. Statistical analyses indicated that a statistically significant correlation existed between students' SA and their SCIS with a moderate effect size; the correlation is even higher with almost large effect sizes for a subsample of higher-SCIS and...
lower-SCIS students. Results of t-test analysis also revealed that there were significant mean differences in students' SA and their knowledge (including physics, chemistry, biology, and earth sciences subscales) and reasoning skill subtests scores between higher-SCIS and lower-SCIS students, with generally large effect sizes. Stepwise regression analyses on higher-SCIS and lower-SCIS students also suggested that both students' SCIS subscales significantly explain the variance of their SA, knowledge, and reasoning ability with large effect sizes.

It can be observed from the previous researches related to the achievement that they took into consideration various aspects of achievement like, Personality Traits and Achievement, Factors related to Achievement, Predictors of Achievements in Science, Relationship of Reasoning Abilities with Achievement, Achievement of the Students and Finding Relationship with some of its Determinants, Socio-familial correlates of secondary school science achievement, The effects of Classroom Instructional Strategies on Science Achievement and Construction and Standardization of Achievement Tests in General Science.

In the present study the researcher studied the relationship between interest and ability in science. For this purpose, first he studied the secondary school students' interest in science and then their ability in science with the help of adopted Science Interest Test and constructed Science Ability Test in Marathi.

The review makes it clear that the relationship between interest and ability in science was not studied. Therefore this study was a felt need. In order to fulfill the gaps in previous researches, the researcher has planned and executed this study.
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19. Ibid. EJ744863

20. Ibid. EJ721639

21. Ibid. EJ772001

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