CHAPTER I

CONCEPTUAL FRAMEWORK
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1.1 INTRODUCTION

Science is essential for helping us to comprehend and establish connection with the physical and biological world around us. (Narendra Kumar (2008)). Science exhibition makes students develop scientific spirit and scientific temper. Science exhibition provides opportunities to students to witness the achievements of their colleagues and thereby to stimulate them to plan their own projects, to give impetus and encouragement to the student to turn out their ideas and apply their classroom learning into creative – channels and to bring the parents and people of the area into school to meet the teachers and students. Creative students have always been a subject of curiosity for researchers. They were found to be better in abstract thinking, emotional stability, independence, self-sufficiency, self-concept, and intelligence and were more venture some.

This chapter provides the conceptual frame work of the study. It consists of fifteen sections. The first section tells the overview of this chapter. The second section gives the meaning and the significance of the education. The third section explains the meaning of the science. The fourth section gives the meaning and the significance of the science exhibition. The fifth section enumerates the attitude about science exhibition. The sixth section tells the need for the study. The seventh section records the importance of the study. The eighth section records background of the study. The ninth section explains the term and the operational definition of terms of the study. The tenth section point outs the objectives of the study. The eleventh section deals with the hypothesis of the study. The twelfth section states the statement of the problem. The thirteenth section deals the scope of the study. The fourteenth section lists out delimitation of the study and the last section points out the limitation of the study.
1.2 EDUCATION

“Education is the process of development which consists the passage of human being from infancy to maturity and the process whereby he adapts himself gradually in various ways to his physical and spiritual environment” **T. Raymont.**

The word ‘Education’ has been interpreted in various ways. Etymological meaning of education is derived from the Latin root as under Educatum. It means to train, act of teaching or training. Educere means to lead out or to draw out Educare means to bring up, to rise, and to educate. The Latin word ‘Educatum’ means to train. ‘E’ means from inside and ‘Duco’ means to draw out, to lead out, or to bring up. To combine the two we came to mean as to draw from within. Developing this concept further we came to mean that the education is a process which draws from within. Education is to draw out these powers out and develop them to the full. Latin words ‘Educare’ and ‘Educere’ also mean the same thing- to bring up, to lead out and to develop etc., in this way, the word education means to develop the inborn qualities of a child to the full.

Education is the harmonious development of the child. Education is the development of innate and acquired powers of the child. Education is a dynamic process. Education is a process of adjustment with the environment. Education is a life-long process. Education is a bipolar process in which one personality acts upon another in order to modify the development of the other. Education is not a static, but a dynamic process which develops the child according to changing situation and times. According to educationists, education is a purposive activity, which always pursuing some aims of life to which an individual devotes himself fully. Education cannot be confined to the process of giving knowledge to children in schools only. Its programme goes on from birth till death. In other words, every one learns something or the other throughout their life by various experiences and activities.
According to John Dewey “Education as a tri-polar process”, like Adams also regards education is a process of development. The difference of approach between the two is that while accepting the psychological view, Adams emphasizes the importance of teacher and the child, John Dewey emphasizes the sociological view point. Hence, according to John Dewey education has two aspects (1) psychological and (2) sociological. John Dewey accepts the contention that education of the child should be according to their native endowments. It takes place in and through the society in which the teacher and the child both live. Thus, it is the society which will determine the aims, contents and methods of teaching.

In this way the process of education contains three poles namely

1. The Teacher
2. The Child
3. The Society

These three factors actively co-operate in the efficient and successful working of the educational process.

Mahatma Gandhi has laid equal emphasis on the development of all the three aspects of man – body, mind and spirit. In his words: “By Education, I mean an all-round drawing out of the best in man and child – body, mind and spirit”.

The Greek philosopher Plato too accepted the significance of both the body and the soul. According to him: “Education consists of giving to the body and the soul all the perfection to which they are susceptible”.

Aristotle & Plato’s laid emphasis on physical and mental development of man. He believed that man can experience soul only after proper physical and mental development. He has defined education in the following way: “Education is the creation of a sound mind in a sound body” the naturalist philosophers of the western world are also in favour of attainment of materialistic pleasure. In their
view, it becomes possible only when man establishes synthesis between his inherent powers and eternal environment.

**According to Herbert Spencer**, “Education means establishment of co-ordination between the inherent powers and the outer life”. Now there is a majority of such philosophers in the western world who look at human life in the same form in which it exists. The pragmatists consider man as a social being and hold that education should be used to develop the capability in him to adapt in the present society and to construct the future society.

In the words of pragmatist **John Dewey**, “Education is the development of all those capacities in the individual which will enable him to control his environment and fulfill its possibilities”.

Education is a vital institution in our society. It can act as an equalizer for people from many different geographic areas, races, genders, classes, etc. Ideally a person from a very wealthy family and a person from a very poor family will receive an equal education, affording each the opportunity to go on to whichever careers they desire.

**1.3 SCIENCE**

According to **P.Venugopal & Nagarajan** (2008). The word Science is taken from a Latin word ‘Scientia’, which simply means ‘knowledge’ or ‘to know’. The curiosity of man to know about himself and the surroundings has led to an accumulation of a vast body of knowledge, which is called ‘Science’. Science is generally referred as an organized or systematized body of knowledge.

Science is known as a classified and verifiable knowledge of facts. But science is not always about the collection of facts or development of new concepts or ideas. It is all about the passion for the discovery that drives one to explore the environment and the nature on the whole.
Science was basically founded to investigate the nature and its process. Although there are a number of other methods that can be utilized to acquire the knowledge about nature, Science is considered as the only one that results in the acquisition of reliable knowledge.

**Rene Descartes** once said, “Science is a method of investigating nature that discovers reliable knowledge”.

Science also includes the investigation of new phenomena, comparing previous theories, analyzing ideas etc. Science is both a particular kind of activity and also the results of that activity. Science use tools like observation, measurement, and scientific experiment and it’s entirely based on the truth. Therefore science is an amalgamation of observation, identification, description, experimentation, investigation, and theoretical explanation of the phenomena that occur in nature. In common terms, science can be described as the study which attempts to depict and understand the nature of the universe in whole or in part. During early times people perceived science as what the scientist does. There are many definitions available but not a single one, which is universally accepted.

According to **Columbian dictionary** “science is an accumulated and systematized learning in general usage restricted to natural phenomena”. “Science is an attempt to make the chaotic diversity of our sense experience correspond to logically uniform system of thought” – **Einstein**.

According to **Filzpatrick** (2010) “Science is a cumulative and endless series of empirical observations which results in the formation of concepts and theories with both concepts and theories being subject to modification in the light of further empirical observations. Science is both a body of knowledge and the process of acquiring it”.

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Richardson (2007) said “Science is a way of thinking or an attitude towards the solution of problems, a means of solving problems as well as products of the investigation of natural phenomena”

R.C.Sharma (2005) A comprehensive definition of science would be “Science is a body of knowledge, a way of thinking, a way of investigation, a way of experimentation in the pursuit of exploring the nature”.

Scientific knowledge is based on values of objectivity, rationality, and neutrality. Science is universal its facts, concepts, generalizations, theories and laws have universal acceptance and applications. Scientific knowledge is based on assumption accumulated over the years of experience.

In science lessons, students should be taught not only the knowledge that they need in the class hour, but also problem solving skills, rational thinking and developing positive attitude that will enable the students to use what they learn in the class in daily life. The aim of Science and Technology lessons is to enable students to learn about the physical, chemical, and biological phenomenon and events taking place in their environment together with their functionality and meanings - Bahar, 2006.

Demirbas & Yagbasan (2006) emphasize that in Science and Technology lessons, the purpose for the students is not to memorize the scientific information but to transform this knowledge into their everyday lives, to know what to do and how to react when they encounter a situation and to gain thinking skills which are similar to that of a scientist.

According to Bilgin & Geban, (2004) the focus of science education is to enable students to assess the knowledge that they gain in schools with a new perspective and to reflect this knowledge on their future lives.

Sert Cıbık, (2009) reveals the high-quality science education also contributes to the student’s critical thinking skills.
1.3.1 ATTITUDE TOWARDS SCIENCE AND UNDERSTANDING ABOUT SCIENCE:

Altinok (2004) reveals that one of the student features that have an important effect on the learning process is student’s attitude towards the lesson. Magno (2003) says that the attitude is a combination of positive or negative, learned and consistent behaviors towards the specific object.

Turhan, Aydogdu, Sensoy and Yildirim (2008) describes attitude as an individual’s tendency to behave positively or negatively towards any event, object or group of people. They put forward that attitude are not behaviours but that they are tendencies to display some behaviours and they are abstract concepts: However, they stated that attitude are possible to observe as in an individual’s forming a good or bad opinion of an event, reaching a decision, and reflecting it on his behaviours.

As for Demirel and Un (1987), they expressed that an attitude is a positive or negative reaction to an object, an event, or a person. Attitude are related to academic achievement because they develop the learning environment in time -Magno, 2003.

According to Bandura (1977), attitude are often used together with motivation in order to achieve something. According to functional theories, individuals develop attitude towards objects that are in line with their needs. In that case, attitude are the most beneficial ways for individual’s needs Erden, (1995).

Basically, attitude is based on two features. One is that they are long-lasting and the other one is that they are cognitive, affective, and behavioral. These two features are dynamic and they affect each other. In primary education, science and technology lesson is one of the least liked and most feared lessons. In addition, it is one of the lessons that students have problems in understanding it and those they fail -Durmaz & Ozyildirim, (2005).

The purpose of measurement of attitude in education and instruction might be to predict the behaviours that individuals are likely to exhibit in time or in the future; and based on this prediction, change the existing ones, and create new situations –
Nuhoglu (2008). As attitude being a difficult affective variable to define, ‘attitude toward science’ can be defined as a belief system or a set of values that are towards an object that is a product of science, science lesson or reflections of science on the society. Attitude related to science are connected to the student participation in science lessons and exhibition of effective performance – Norby (2003).

While Gardner has described science-related attitude as a learned tendency to evaluate objects, people, events and situations in a specific way or a set of propositions related to science, Martinez, in his studies that aimed at determining the effects of attitude on science education, has put forward that student’s attitude towards science lessons affect their academic achievement, their gaining scientific attitude and their tendency to continue studying in the field of science – Altinok (2004).

In the learning process, teacher’s attitude and behaviors have an influence on student’s attitude. When students meet their teacher in a new class, they are open to any interaction which is likely to come from the teacher. During this process, students get to know their teacher and develop ideas and feelings about him. In teacher-student relationship, teacher’s dominant- obedient or hostile- affective attitude affect student’s attitude related to the lesson Altinok (2004).

According to the literature, the way students perceive and evaluate their acquaintance with any kind of knowledge is very important in their learning process. Bloom, (1976) says that If students are not interested in science, they tend not to make an effort to learn and understand the meaning of concepts that are being taught to them. It was shown that the most effective factor contributing to student’s decisions to study science is their interest in the subject. Milner, Ben-Zvi, & Hofstein, Lindahl, (2003) says that they are suggested that when students feel that they are familiar with concepts or issues from their previous studies, and feel confident enough to explain them; it affects their motivation and achievements. Such data are very important for developing learning materials and for planning teaching strategies Arzi, Ben-Zvi, & Ganiel, (1986). It is assumed that students who are
interested in science and understand the scientific concepts, will have more positive attitude towards science and science studies compared to those who have learning difficulties in the science disciplines.

**Munby** (1988) claimed that an attitude consists mainly of three characteristics: feeling, cognition, and behavior.

**Simpson & Troost** (1982) referred to attitude towards science and science learning and concluded that people are committed to science when they better understand it and want to take more science courses and to continue reading about science.

In addition, **Koballa and Glyn** (2007) in their review of the literature suggested that often attitude are used interchangeably with terms such as interest, beliefs, curiosity, opinions, and other commonly used affective-related variables. Clearly, the concept of attitude towards science (often referred to as constructs) is a conglomerate of several components.

**Shringly** (1990) concluded that in general, research has failed to show a clear alignment between student’s attitude towards the sciences and choosing future careers in the sciences.

**Koballa & Glyn** (2007) says that the science education literature contains hundreds if not thousands of reports and interventions designed to change attitude. Development of programs to influence the likelihood of science related attitude is important because it is assumed that changes in attitude will result in changes in behavior. Unfortunately, few simple and straightforward generalizations can be made about how and why science related attitude change.

International studies have shown that students’ attitude towards scientific disciplines depend on the extent of their active participation in the learning process. When teachers show personal interest in their students and support them, and the
lesson is given with an encouraging attitude, students opt to continue studying science.

According to Fraser (1994) student’s positive perceptions are related to teacher’s support, enthusiasm, innovative teaching strategies, and the opportunity for student’s involvement.

1.4 SCIENCE EXHIBITION
1.4.1. ORIGIN OF SCIENCE EXHIBITION:

Dorothy Dallas in his book on “Teaching Biology Today”, London-(1984) enumerates that back in October, 1828, The American Institute of the City in New York, "Incorporated for the purpose of encouraging and promoting domestic industry in this State and the United States in Agriculture, Commerce, Manufactures and the Arts", held its first industrial fair. The exhibition was held in New York at a time when the 416 "watchmen" that comprised the city's "Finest" were busy keeping the streets clear of stray cows, horses, and pigs. At that first fair, the iron plow had its first public showing, and the exhibits included, among others, a black veil "made by a girl of eight years of age". So, to stretch a point, perhaps this is where the idea of a fair for students had its start.

The science fair as we know it, a collection of exhibits designed by school students of pre-college age, had its origin in 1928 when the American Institute, satisfied that the original purpose of the organization had been accomplished, turned from industrial fairs and sponsored the first Children's Fair, It was so successful that it was scheduled as an annual event, and science clubs, informally organized as a result of this activity, were officially encouraged.

Deepak Dayal, Rijcha Bhatti & Biswajit Ray,(2007).,Modern Methods of Teaching stated that the American Institute found that it could no longer support the non-profit clubs, publications and a Student Science Laboratory. Hence, the science
club movement at the national level was transferred to Science Service of Washington, D.C, a non-profit institution for the popularization of science.

B.Gangali.V.C.Vashishita (1986) Today, a number of organizations present awards to students doing outstanding work in science. In addition to the National Science Fair-International "Wish Awards" and the Westinghouse scholarships, awards are presented by the American Chemical Society, American Dental Association, American Heart Association, American Institute of Biological Sciences, American Medical Association, American Pharmaceutical Association, American Veterinary Medical Association, National Committee for Careers in Medical Technology, Optical Society of America, Society of American Bacteriologists, U.S. Air Force, U.S. Army and the Association of the United States Army.

The first National Science Fair was held in Philadelphia with 13 regional fairs participating. In 1964, finalists from 208 affiliated fairs held in this country and abroad participated in the National Science Fair-International in Seattle, Wash. Their projects represented the best work of almost a million students.

Archana (2005) A science fair experiment is generally a competition where contestants present their science project results in the form of a report, display board, and models that they have created. Science fairs allow students in grade Schools and high schools to compete in science and/or technology activities.

Although writing assignments that take a long time to complete and require multiple drafts are fairly common in US schools, large projects in the sciences other than science fairs are rare. Science fairs also provide a mechanism for students with intense interest in the sciences to be paired with mentors from nearby colleges and universities, so that they can get access to instruction and equipment that the local schools could not provide.
Dr.G.Venugopal, Mrs.N.Nithysri & Prof.K.Nagarajan (2008). In the United States, science fairs first became popular in the early 1950s, then known as the National Science Fair. Interest in the sciences was at a new high after the world witnessed the use of the first two atomic weapons and the dawn of television. As the decade progressed, science stories in the news, such as Jonas Salk’s vaccine for polio and the launch of Sputnik, brought science fiction to reality and attracted increasing numbers of students to fairs.

Narendra Kumar (1985) says that a science fair is an event where people, usually students, present the results of their scientific investigations. Science fairs often are competitions, though they may be informational presentations. Most science fairs take place at the elementary and secondary educational levels, though other age and educational levels may be involved.

Sudha Pahuja, (2007), says that a science fair or an exhibition is a collection and display of models, charts, pictures, posters, experiments and projects in topics related to science. A science fair is organized by the students to develop awareness about science in the people. Science fairs should be an annual feature just like the parents’ day sports day and other functions in the school.

Science fairs are more appealing to the general public and can provide useful knowledge to them. Articles, models and charts prepared by the students under the guidance of teachers are exhibited and demonstrated. Seminars, debates and film shows are also conducted in the science fairs. Science fairs provide a better opportunity for the school to interact with the parents, people, and community at large.

Bindal, V.R. (1984) A study of creativity in relation to experimental attitude & pupils’ perception of parents’ attitude. Fifth survey of Educational Research, 2, 1258, Indian Education Review explains the NCERT has provided the following objectives for organizing science fairs: To give impetus and provide encouragements to students to tryout their ideas and to apply their knowledge of science in to some
creative channel. To provide opportunities to students to see for themselves some achievements of their colleagues and in this way stimulate them to plan their projects. To make science activities more popular amongst the students thereby hoping to improve standards of performance. To encourage bright and enthusiastic students having special science talent. To identify talented students in science and nurture the future scientist. To provide an opportunity to the people of area to interact with school authorities and the students and teachers. To provide a competitive forum to various science clubs in the area.

Science fair possesses social, psychological, intellectual and educational values. The students develop the instincts of curiosity, creativity and construction. Science concepts are better in these fairs than in the classrooms. The skills and talents of the students are recognized and stimulated. Science fairs provide an excellent opportunity to discover and encourage the talented. To develop the scientific temperament in the students the science fairs are organized not only by the schools but also at the state and national level.

Narendra Kumar, (1985) enumerates the following:

1. NATIONAL LEVEL SCIENCE FAIR (NSF):

   It is conducted in the capital cities of different states. The NCERT provides the funds for the fairs. It includes the participation of all the best exhibits from the state level science fairs conducted in various states. The officers of the department of science and mathematics are in charge of the fair. Luminaries in the field of science evaluate the exhibits and maths. The evaluation is based on the originality, the technical skills, the scientific approach and the depth of the knowledge.
2. REGIONAL LEVEL SCIENCE FAIR (RSF):

The venue of the regional fair is the state capital of the region. The funds are provided by the national council of science museums. The best exhibits from different states are displayed in these fairs. Eminent people evaluate them.

3. STATE LEVEL SCIENCE FAIR (SSF):

This science fair is organized in the district headquarters of any district. The SCERT provides the finances for conducting the science fairs. The participation includes the best exhibits from the district level science fairs. The officers of the departments of science and mathematics education are in charge for the science fair. The exhibits are all evaluated taking the parameters of scientific knowledge and attitude, the content knowledge the skill of preparation and dramatic values into consideration.

4. DISTRICT LEVEL SCIENCE FAIR:

A science fair at district level is conducted at the district headquarters. It is financed by the district funds of the state government. The D.E.O is the in-charge of the science fair. Different schools with their best exhibits participate in the science fairs. The exhibits are evaluated and best exhibits are sent to higher level science fairs.

A science fair can be an exciting component for the middle school science curriculum. Students apply science to real life as they tackle investigative questions through hands-on experiments, helping them develop and demonstrate their interest and abilities in science. Science fair, which has become a convention in our education systems, is generally a public exhibition where students present their projects and judges evaluate them.
Grote, (1995); Bunderson and Anderson, (1996); Abernathy and Vineyard, (2001) says that Science fair ensures to students with an opportunity to apply scientific method in conducting research projects and developing certain skills, such as scientific literacy and self-confidence.

According to Grobman, (1993) some researchers reported that student’s projects reflect their parents’ work and students exposed to parental pressure for involving in science fair. For this reason, science teachers have a critical role in influencing students to take notice of science fair and scientific research projects.

Shore et al., (2007) says that teachers are important elements for decreasing or increasing student’s involvement in science fairs. Students, whose teachers and parents encouraged and approved their participation in the science fair competition, demonstrated more positive attitude towards science fair competitions.

According to Fisanick, (2010) Teacher’s attitude towards science fair and their views are shaped with some factors. These are teacher’s motivations of engagement in science fair; conducted projects in the curriculum, expectations of administrators for teacher or students in participating in science fair. For this reason, science teacher’s views on science fairs and attitude towards science fairs are important. In order to measure teacher’s attitude towards science fair, a valid and reliable instrument is needed. There are few studies on developing a science fair attitude scale and on teacher’s attitude.
1.5 ATTITUDE

An attitude is an expression of favour or disfavour toward a person, place, thing, or event (the attitude object). Prominent psychologist Gordon Allport once described attitude "the most distinctive and indispensable concept in contemporary social psychology." Attitude can be formed from a person's past and present. Attitude is also measurable and changeable as well as influencing the person's emotion and behavior. In lay language, attitude may refer to the distinct concept of mood, or be especially synonymous with teenage rebellion.

An attitude can be defined as a positive or negative evaluation of people, objects, event, activities, ideas, or just about anything in your environment, but there is debate about precise definitions. Eagly and Chaiken, for example, define an attitude "a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor." Though it is sometimes common to define an attitude as affect toward an object, affect (i.e., discrete emotions or overall arousal) is generally understood to be distinct from attitude as a measure of favourability. This definition of attitude allows for one's evaluation of an attitude object to vary from extremely negative to extremely positive, but also admits that people can also be conflicted or ambivalent toward an object meaning that they might at different times express both positive and negative attitude towards the same object. This has led to some discussion of whether individual can hold multiple attitudes towards the same object.

Whether attitude are explicit (i.e., deliberately formed) versus implicit (i.e., subconscious) has been a topic of considerable research. Research on implicit attitude, which are generally unacknowledged or outside of awareness, uses sophisticated methods involving people's response times to stimuli to show that implicit attitude exist (perhaps in tandem with explicit attitude of the same object). Implicit and explicit attitude seem to affect people's behavior, though in different ways. They tend not to be strongly associated with each other, although in some cases they are. The relationship between them is poorly understood. On the other
hand, the Iterative Reprocessing (IR) Model takes an integrated approach to understanding attitude instead of distinguishing between implicit and explicit attitude.

The IR model suggests the involvement of numerous interactive neural systems in processing information (Van Bavel et al., 2012). According to the model, information is processed in a form of hierarchy. Iterations will be added to move to the next evaluative processing (Van Bavel et al., 2012). This model provides a greater understanding of how contextual information and motivational factors affect all stages of evaluative system including the prior states. In sum, instead of treating attitude as two independent representations in memory, the model suggests that attitude refers to processing emergent properties in concert with contextual information and goal setting in a hierarchical order.

Jung's definition of attitude is a "readiness of the psyche to act or react in a certain way" (Jung, [1921] 1971:par. 687). Attitude very often come in pairs, one conscious and the other unconscious. Within this broad definition Jung defines several attitudes.

The main attitude dualities that Jung defines are the following.

- Consciousness and the unconscious. The "presence of two attitude is extremely frequent, one conscious and the other unconscious. This means that consciousness has a constellation of contents different from that of the unconscious, a duality particularly evident in neurosis" (Jung, [1921] 1971: par. 687).
- Extroversion and introversion. This pair is so elementary to Jung's theory of types that he labeled them the "attitude-types".
- The rational attitude subdivides into the thinking and feeling psychological functions, each with its attitude.
The irrational attitude subdivides into the sensing and intuition psychological functions, each with its attitude. "There is thus a typical thinking, feeling, sensation, and intuitive attitude" (Jung, [1921] 1971: par. 691).

Individual and social attitude. Many of the latter are "isms".

In addition, Jung discusses the abstract attitude. “When I take an abstract attitude...” (Jung, [1921] 1971: par. 679). Abstraction is contrasted with creationism. “CREATIONISM by this I mean a peculiarity of thinking and feeling which the antithesis of abstraction is” (Jung, [1921] 1971: par. 696). For example: "I hate his attitude for being Sarcastic."

1.5.1. STRUCTURE OF ATTITUDE:

His classic, tripartite view offered by Rosenberg and Hovland is that an attitude contains cognitive, affective, and behavioral components. Empirical research, however, fails to associate with a particular attitude. A criticism of the tripartite view support clear distinctions between thoughts, emotions, and behavioral intentions of attitude is that it requires cognitive, affective, and behavioral associations of an attitude to be consistent, but this may be implausible. Thus some views of attitude structure see the cognitive and behavioral components as derivative of affect or affect and behavior as derivative of underlying beliefs.

Despite debate about the particular structure of attitude, there is considerable evidence that attitude reflect more than evaluations of a particular object that vary from positive to negative. Attitude also have other characteristics, such as importance, certainty, or accessibility (measures of attitude strength) and associated knowledge. There is also considerable interest in inter-attitudinal structure, which connects different attitude to one another and to more underlying psychological structures, such as values or ideology.
1.5.2. FORMATION OF ATTITUDE

According to Doob (1947), learning can account for most of the attitude we hold. The study of attitude formation is the study of how people form evaluations of persons, places or things. Theories of classical conditioning, instrumental conditioning and social learning are mainly responsible for formation of attitude. Unlike personality, attitude are expected to change as a function of experience. In addition, exposure to the 'attitude' objects may have an effect on how a person forms his or her attitude. This concept was seen as the "Mere-Exposure Effect".

Robert Zajonc (1958) showed that people were more likely to have a positive attitude on 'attitude objects' when they were exposed to it frequently than if they were not. Mere repeated exposure of the individual to a stimulus is a sufficient condition for the enhancement of his attitude towards it.

Tesser (1993) has argued that hereditary variables may affect attitude - but believes that they may do so indirectly. For example, consistency theories, which imply that we must be consistent in our beliefs and values. As with any type of heritability, to determine if a particular trait has a basis in our genes, twin studies is used. The most famous example of such a theory is Dissonance-reduction theory, associated with Leon Festinger, which explains that when the components of an attitude (including belief and behavior) are at odds an individual may adjust one to match the other (for example, adjusting a belief to match a behavior). Other theories include balance theory, originally proposed by Heider (1958), and the self-perception theory, originally proposed by Daryl Bem.

Chaube(1985)“Emotion is a common component in persuasion, social influence, and attitude change. Much of attitude research emphasized the importance of affective or emotion components. Emotion works hand-in-hand with the cognitive process, or the way we think, about an issue or situation. Emotional appeals are commonly found in advertising, health campaigns and political messages.
Recent examples include no-smoking health campaigns and political campaign advertising emphasizing the fear of terrorism. Attitude and attitude objects are functions of cognitive, affective and cognitive components. Attitude are part of the brain’s associative networks, the spider-like structures residing in long term memory that consist of affective and cognitive nodes.

By activating an affective or emotion node, attitude change may be possible, though affective and cognitive components tend to be intertwined. Primarily in affective networks, it is more difficult to produce cognitive counter arguments in the resistance to persuasion and attitude change.

Affective forecasting, otherwise known as intuition or the prediction of emotion, also impacts attitude change. Research suggests that predicting emotions is an important component of decision making, in addition to the cognitive processes. How we feel about an outcome may override purely cognitive rationales.

In terms of research methodology, the challenge for researchers is measuring emotion and subsequent impacts on attitude. Since we cannot see into the brain, various models and measurement tools have been constructed to obtain emotion and attitude information. Measures may include the use of physiological cues like facial expressions, vocal changes, and other body rate measures. For instance, fear is associated with raised eyebrows, increased heart rate, and increase body tension (Dillard, 1994). Other methods include concept or network mapping, and using primes or word cues in the era.

Attitude accessibility refers to the activation of an attitude from memory. In other words, how readily available is an attitude about an object, issue, or situation. Issue involvement is the relevance and salience of an issue or situation to an individual. Issue involvement has been correlated with both attitude access and attitude strength. Past studies conclude that accessible attitude are more resistant to change.
1.6 NEED FOR THE STUDY

Uttam Kumar Singh & A. Nayak., (2007) Science is a way of describing and explaining some aspects of the world around us. Science is a broad based human enterprise of thinking in the pursuit of understanding that can be defined differently from different viewpoints. Science should be viewed as a way of thinking in the pursuit of understanding nature as a way of investigation and science as a body of knowledge.

According to the Columbia Encyclopedia (1973) “Science is an accumulated and systematized learning in general uses restricted to natural phenomena”. Science is fundamentally concentrated with exploring and interpreting in the physical world through the three fundamental areas of physics, science, and biology.

Narendra Kumar., (1985) Science is essential for helping us to comprehend and establish connection with the physical and biological world around us.

The progress of science is marked not only by an accumulation of fact, but by the emergence of scientific method and of the scientific attitude. Science can also be defined in terms of what scientists do or in other words,


Narendra Kumar., Teaching of General Science. (1985) P. 8-10. Science is one of those human activities that man has created to gratify certain human needs and desire. Disinterested curiosity has been the greatest motive power of scientific research. The ‘search of truth becomes the dominant motive in the prosecution of science’. “If science is to be pursued with full vigor and zest and is to become a mighty force in the Indian renaissance, it must drive its ‘nourishment’ from our cultural and spiritual heritage and not bypass it. Science must become an integral part of our cultural and spiritual heritage”. Indian Education Commission, 1968.
G.Venugopal & K.Narayanan., (2006) The study of science trains the student in attracting the problems according to ascertain definite and distinct procedure which we may call as the scientific method. This training which they receive in studying science can be applied to solve other problems arising in new situations. In brief, scientific method involves the following steps: Making an accurate survey of the problem, setting up the method of attracting the problem, Collecting data regarding the problem, drawing conclusions from the collected data.

R.C.Sharma., (2003) says that it is due to this scientific method of attacking a problem that has achieved wonders in all the fields of human activity.

Deepak Dayal, Rijcha Bhatti & Biswajit Ray says that (2007) The method of the procedure which the scientists use in the pursuit of science may be termed as scientific method. Basically, the scientific method is a problem solving method, in other words it is a method of solving a problem scientifically. This is one of the important contributions of science and the student should be taught and well-trained in the method of attacking problems.

Scientific method consists of systematic observation, classification and interpretation of data. Scientific method involves reflective thinking, reasoning & results from the achievement of certain abilities, skills and attitude. Present evidence indicates that it needs a continuous training and is the outgrowth of day-to-day work with problems concerning the students is an atmosphere of careful and persistent investigation. For this continuous appraisal of scientific method, the teacher should provide the situations and activities like science fair, science exhibition, science museum; science projects etc are conductive for development and training - R.C.Sharma (2003).

P.K.Kulsethra.,(2008) says that the main goals of scientific method is “learning by doing” and “learning by living”. Different types of co-curricular activities can be organized for supplementing classroom teaching. One of the activities is conducting science exhibition which act as a stimulation to develop the
scientific attitude to the pupils’. Through science exhibition the pupil involves in the activity of exhibits, lecture-demo presentations of new ideas, techniques, discoveries and projects etc. These can help in reinforcing science hobbies, scientific interests, scientific attitude, scientific aptitude & scientific temper. It is a device for acquainting the parents and people of the locality with the science work that is done in the school. It is a place where the pupils submit their projects for assessment.

Science is an interesting subject. The science subject should be made fascinating to the students. This subject cannot merely be taught by chalk and talk. It should be made practical oriented learning. The famous saying of I learn, I forget, I see, I remember and I do I understand is quite relevant to the science subject. The science should be learnt by students on their own. This is possible by experiments, projects, and science exhibition. Having realized this, the schools are organizing science exhibition every year to promote scientific sprit and temper among learners. As a researcher, how far this practice is going on in schools? What is the attitude of teachers, parents, and learners towards Science Exhibition? were the questions before the researcher. The investigator being a science teacher thought of the conduct of the present study entitled “A study on Teachers, Parents and Learners attitude towards Science exhibition at Secondary level in Virudhunagar District”.

1.7 IMPORTANCE OF THE STUDY

The purpose of science education is not simply to produce the next generation of scientists. Today we all face issues on a global scale that are fundamentally technical, climate change, energy resources, food production, genetic modification, and so on and as such demand basic scientific literacy throughout our population so that wise decisions can be reached about how to address these issues. Efforts have been made from both governmental and non-governmental platforms to enhance the public understanding of science. The idea is to help science and a scientific culture penetrate India's socioculturally diverse society, and to transform it into a nation of scientifically thinking and scientifically aware people.

India has an impressive scientific heritage. Scientific research in fields such as mathematics, astronomy, and medicine and material science has been carried out in the Indian sub-continent since ancient times. However, a remarkable gap has persisted between this scientific knowledge and the 'common' man. It is important to build 'Scientific temper' in our country. 'Scientific temper' a phrase taken to mean an enquiring attitude and analytical approach that leads to rational thinking and the pursuit of truth without prejudice. Accordingly, the constitution of India has a special provision “to develop the scientific temper, humanism and spirit of enquiry”.

B.R.Sen (2006) says that research in science education is of prime importance as it leads to 'progress' in science education, which further leads to 'progress in science.' The objective of research in science is essentially to achieve progress in economic growth, social development and environmental protection.

The vision of how 21stCentury skills primarily focuses on student work to solve complex problems, and on multiple forms of learning activity performed by students such as gathering relevant information, collecting data, testing models, learning new concepts needed to understand the problem, etc. for producing an evidence-based solution to a problem rather than to laboratory based science environments. It is important to provide interactive, participatory, hands-on,
innovative and creative learning experiences to our students, as real learning occurs outside classrooms, text books are only facilitators.

**Dr. P. Ameethra** (2007), Science exhibitions intend to provide a medium for popularizing science and increase awareness among the stakeholders about the close relationships between science, technology and society and encourage scientific and technological creativity among students. These exhibitions also entails sharing of cultures other than inculcating a scientific temper among students by providing a common platform to schools, teachers and students to give shape to their innovative ideas and learn from each other's experiences. These exhibitions must be based on creativity by cultivating knowledge and intelligence of the learners as there is no alternate of practical knowledge to gain proper education in the field of science and technology. Science exhibition play an important role in building a progressive nation with scientific mind who has the spirit and will to challenge all religious or cultural evils and practices.

Government organizes science fair every year with this strong belief that something incredible is waiting to happen and become visible through discovery, exploration and experimentation. Every student should be motivated and challenged. Schools are the right place to develop and retain this quest for enquiry. Developing scientific temper in the student is the requirement of 21st century and important for the growth of any nation. Our students are the nations' future and it is very important that they must learn to reason, question and test and analyze problems in the right way.
1.8 BACKGROUND OF THE PROBLEM

Science is a process of finding out. “The scientific method” is a procedure used by scientist and students in science fair. Designing an experiment/project for a science fair may seem complicated, intimidating, or even boring but it does not have to be any of those things. Science experiment can be a lot of fun, as long as you approach them correctly. Successful science fair projects are most often those that focus lesson following a set of instructions and more on figuring out some problem in science. The main objective of the experiment is proving or disproving the hypothesis. The goal of any science experiment is to learn, you can learn just as much from something that seems unsuccessful as you can from an experiment that turns smoothly. Keep your mind open as you do the experiments/projects - B.R.Sen. (2006).

A.J.Grove & G.E.Neweil., (1995) says that the organization of science fair is a combination of activity of the administrators, the teachers, the parents and pupils. Whenever a science exhibition is planned, the students are informed well in advance. The location, time and date of the exhibition are decided. The topics for exhibition and the types of exhibits to be developed are also finalized. Then the suitable location for conducting the exhibition should be decided in advance. Planning for the arrangements of exhibits then follows. The teacher selects and trains some active students as guides to the science exhibition and they display and demonstrate the existing to the visitors. The parents are helpful to conduct the science exhibition through their co-operation.

The science exhibition is an excellent device for scientific minded youths to continue their scientific spirit and to become future scientist. Through this science exhibition the learner’s interest, scientific attitude and scientific aptitude are stimulated and that motivates to progress their academic achievement in the science subject. Now-a-days each and every government, corporation, government-aided
and matriculation schools conduct the science exhibition regularly once in a year. School administrators submit the report to the D.E.O. of their concern districts.

Attitude is the driving force. It is like an ignition to start an engine. Attitude is prime for success of anything. The attitude of parents, teachers, and learners towards Science Exhibition will form as a latent energy for successful Science Exhibition. Are there any differences among teachers, parents, and learners in terms of various sub-samples of the study? is the question before the researcher to take up the present study. This forms as background.

1.9 STATEMENT OF THE PROBLEM

Science exhibition plays an important role in developing scientific spirit among learners. It had been proved. Based on this, science exhibition are being encouraged by state and central government. But nobody has made an attempt to know the attitude of teachers, parents and learners towards science exhibition. The investigator being a science teacher thought of the conduct of the present study entitled “A study on Teachers, Parents, and Learners attitude towards Science exhibition at Secondary level in Virudhunagar District”.
1.10 OPERATIONAL DEFINITIONS OF TERMS

Attitude:

An attitude can be defined as a positive or negative evaluation of people, objects, event, activities, ideas, or just about anything in your environment, but there is debate about precise definitions.

Teachers: refers to teachers who are handling IX and X standard students in Virudhunagar District.

Parents: refers to the parents of IX and X standard students in Virudhunagar District.

Learners: refers to the students who are studying IX and X standards in Virudhunagar District.

Science Exhibition: is an organized and systematic activity involving students to do experiments / projects and display in an organized way to promote excellence in science.

Science: refers to a cumulative and endless series of empirical observations, which results in the formation of concepts and theories, with both concepts and theories being subject to modification in the light of future empirical observation.

Secondary Level: refers to IX & X standard students in 10 +2 +3 System of education in India.
1.11 OBJECTIVES OF THE STUDY

1. To find out the attitude of teachers at secondary level towards science exhibition.
2. To find out the attitude of teachers at secondary level towards science exhibition in terms of sex.
3. To find out the attitude of teachers at secondary level towards science exhibition in terms of age.
4. To find out the attitude of teachers at secondary level towards science exhibition in terms of educational qualification.
5. To find out the attitude of teachers at secondary level towards science exhibition in terms of working experience.
6. To find out the attitude of teachers at secondary level towards science exhibition in terms of type of school.
7. To find out the attitude of teachers at secondary level towards science exhibition in terms of monthly income.
8. To find out the attitude of teachers at secondary level towards science exhibition in terms of social status.
9. To find out the attitude of teachers at secondary level towards science exhibition in terms of locality.
10. To find out the attitude of parents at secondary level towards science exhibition.
11. To find out the significant difference in the attitude of parents at secondary level towards science exhibition in terms of relationship with the student.
12. To find out the attitude of parents at secondary level towards science exhibition in terms of age.
13. To find out the attitude of parents at secondary level towards science exhibition in terms of type of school.
14. To find out the attitude of parents at secondary level towards science exhibition in terms of social status.
15. To find out the attitude of parents at secondary level towards science exhibition in terms of locality.
16. To find out the attitude of parents at secondary level towards science exhibition in terms of educational qualification.
17. To find out the attitude of parents at secondary level towards science exhibition in terms of interest in science related field.
18. To find out the attitude of parents at secondary level towards science exhibition in terms of monthly income.
19. To find out the attitude of learners at secondary level towards science exhibition.
20. To find out the attitude of learners at secondary level towards science exhibition in terms of sex.
21. To find out the attitude of learners at secondary level towards science exhibition in terms of standard.
22. To find out the attitude of learners at secondary level towards science exhibition in terms of type of school.
23. To find out the attitude of learners at secondary level towards science exhibition in terms of social status.
24. To find out the attitude of learners at secondary level towards science exhibition in terms of locality.
25. To find out the attitude of learners at secondary level towards science exhibition among secondary students in terms of fathers’ educational qualification.
26. To find out the attitude of learners at secondary level towards science exhibition in terms of mothers’ educational qualification.
27. To find out the attitude of learners at secondary level towards science exhibition in terms of fathers’ occupation.
28. To find out the attitude of learners at secondary level towards science exhibition in terms of parents’ monthly income.
29. To find out the attitude of learners at secondary level towards science exhibition in terms of parents interested in science related field.
30. To find out the attitude of learners at secondary level towards science exhibition in terms of hobby as doing science project.
31. To find out the significant relationship among teachers, parents and learners at secondary level in their attitude towards science exhibition.

1.12 HYPOTHESIS OF THE STUDY

1. The attitude of teachers at secondary level towards science exhibition is average.
2. There is no significant difference in the attitude of teachers at secondary level towards science exhibition in terms of sex.
3. There is no significant difference in the attitude of teachers at secondary level towards science exhibition in terms of age.
4. There is no significant difference in the attitude of teachers at secondary level towards science exhibition in terms of educational qualification.
5. There is no significant difference in the attitude of teachers at secondary level towards science exhibition in terms of working experience.
6. There is no significant difference in the attitude of teachers at secondary level towards science exhibition in terms of type of school.
7. There is no significant difference in the attitude of teachers at secondary level towards science exhibition in terms of monthly income.
8. There is no significant difference in the attitude of teachers at secondary level towards science exhibition in terms of social status.
9. There is no significant difference in the attitude of teachers at secondary level towards science exhibition in terms of locality.
10. The attitude of parents at secondary level towards science exhibition is average.
11. There is no significant difference in the attitude of parents at secondary level towards science exhibition in terms of relationship with the student.
12. There is no significant difference in the attitude of parents at secondary level towards science exhibition in terms of age.
13. There is no significant difference in the attitude of parents at secondary level towards science exhibition in terms of type of school.
14. There is no significant difference in the attitude of parents at secondary level towards science exhibition in terms of social status.
15. There is no significant difference in the attitude of parents at secondary level towards science exhibition in terms of locality.
16. There is no significant difference in the attitude of parents at secondary level towards science exhibition in terms of educational qualification.
17. There is no significant difference in the attitude of parents at secondary level towards science exhibition in terms of interest in science related field.
18. There is no significant difference in the attitude of parents at secondary level towards science exhibition in terms of monthly income.
19. The attitude of learners at secondary level towards Science Exhibition is average.
20. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of sex.
21. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of standard.
22. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of type of school.
23. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of social status.
24. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of locality.
25. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of fathers’ educational qualification.
26. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of mothers’ educational qualification.
27. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of fathers’ occupation.
28. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of parents’ monthly income.

29. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of parents interested in science related field.

30. There is no significant difference in the attitude of learners at secondary level towards science exhibition in terms of hobby as doing science project.

31. There is no significant relationship among teachers, parents and learners at secondary level in their attitude towards Science Exhibition.
1.13 SCOPE OF THE STUDY

The word science is the intellectual and practical activity encompassing the systematic study of the structure and behaviour of the universe through observation and experiment. The pressing need for a scientifically literate populace is increasingly recognized as critical in most countries, as we together face the consequences of increasing population pressures, limited resources, and environmental degradation. Basic science literacy, coupled with scientific “ways of knowing” – namely drawing conclusions based on observation, experiment and analysis – provides citizens with the tools needed for rational debate and sound decision-making based on scientific knowledge - Narendra Kumar (2008).

Without this preparation, populations are left with the need to make decisions affecting the direction of their country or community on the basis of belief, personal or historical experience, self-interest, and information provided by the media. As it has been noted, “Without a science-literate population, the outlook for a better world is not promising.” (AAAS, 1985). There is a consensus that in many places around the world, science education is facing serious challenges.

Furthermore, as the world has become more dependent on technological innovations and engineering solutions while the population grows and consequences mount, the need for technology and engineering literacy has been recognized.

One of the biggest tasks facing those addressing the challenge of sustainable development, both in developed and developing countries, is the need to generate the capacity to apply science and technology to this goal.- ICSU, (2002).

Van Eijk & Roth (2007) says that there is no doubt that effective education can serve as a vehicle for solving global problems.

Education in the scientific, mathematical, technological and engineering disciplines is coupled and needed for an informed citizenry equipped with the tools required for the global knowledge society.
Those seeking to improve science education face numerous, and sometimes coupled problems. In many places, the lack of resources – both educational and financial – is linked with a dearth of adequately trained teachers (in some instances lacking basic knowledge of mathematics and science) and the growing popularity of non-scientifically-based belief systems.

**Rennie L.J, Williams GF.,** (2000) As countries face the demands of growing populations under economic constraints and political realities, education as a whole is frequently one of the first areas in which funding is cut to free up resources for other, apparently more pressing demands. In the area of sciences, since often those in the political decision-making sector have limited appreciation of scientific disciplines and their importance to the vitality of their country’s economy and future well-being. While science education is clearly inadequate in many places around the world, there are bright spots where innovative approaches seem to be having some success, and which may form the bases for models that can be emulated elsewhere.

There is an urgent need to improve the preparation of the scientists of tomorrow, not only through widespread access to quality instruction, facilities, and research opportunities for all students, but also to improve the motivation and interest of students so that the best of them move toward scientific careers. Although a few countries seem to be having some success in preparing their students in science, based on achievement scores, we do not yet seem to have a successful model for generating interest and motivation of large numbers of students towards careers in scientific disciplines.

According to **Bransford et al. 1999; Kastens & Rivet, 2008; Olson & Loucks-Horsley,** (2000) say that teachers play a key role in inspiring and mentoring future scientists, using constructivism and other recommended teaching practices for effective student learning.

**Shukla.,** (2005) says that unfortunately, in many countries around the world, teachers are not well prepared to teach scientific subjects – and indeed, may be more
effective in driving students away from scientific disciplines than attracting them because of their lack of preparation.

Some teachers lack a basic understanding of the mathematical and scientific concepts that will be the foundation for preparing the scientists of tomorrow. Quality professional development, continuing education and support for teachers are needed to prepare them to help students become scientifically literate, as well as to encourage those students that want to pursue scientific disciplines for their career. Furthermore, in some countries and at some grade levels, it is important to ensure that scientific content is presented in a way that considers cultural context (Aikenhead, 1996; Boulter & Gilbert, 1996), so that appreciation of the material is optimized for teachers, students and their families.

**Ayers R, Melear CT** (1998). Increased learning of physical science concepts via multimedia exhibit compared to hands-on exhibit in a science museum. National Association or research in science teaching, San Diego, California, USA.

Albert Einstein once said that “A person who never made a mistake never tried anything new”. Children should be given freedom and at the same time guided in right direction so that they can experiment, frame hypothesis and challenge existing hypothesis.

Teachers must encourage, motivate, and guide children to perform experiments in the right way without fear of failure. It is important to prepare project under the guidance of a guide - who could be a teacher or parent/guardian or may even be a research scholar / scientist. Science exhibitions are important milestones to develop such scientific temper in our students. Every project guide must ask students to select an appropriate topic for a science project, a topic that interests the student.

Libraries, bookstores and definitely internet can prove to be a great resource under guided supervision. Recording information, making a good work plan and adhering to time frames are other important steps. A well researched and well written explain, exhibit makes all the difference. Presentation of exhibit to judges as
well as to visitors is most important and crucial part of any exhibition. Such exhibitions provide good exposure and platform to learn and exchange ideas hence children should be encouraged to visit all exhibits and learn from others. As a teacher mentor it is very important that the teacher should guide students not to worry or get upset if they are not able to win a prize at the Science Exhibition. The skills they have gained are worth all the effort -Falk JH (2002).

A scientist should be honest and fair to his findings and hence it is not the winning but the participation that also adds value. As a school head one must always encourage, support, and guide students to research on the topic selected.

Effective and stimulating science education is fundamental for both the future of science and the ongoing development of our global knowledge society. Yet there is concern in the majority of countries that the overall level of scientific literacy is poor and that children are not being attracted to scientific studies and eventual careers as scientists.

The status of science education and the aspirations of younger people towards a career in science greatly vary between countries and regions. A number of large-scale surveys involving students from developed as well as the emerging and less developed countries carried out by the Organization for Economic Co-operation and Development (OECD, the PISA study), the International Association for the Evaluation of Educational Achievement (IEA, the TIMSS studies) and the Norway-based international Relevance of Science Education (ROSE) project provide useful data about the quality of science education in many countries, as well as the interest of young people towards science. So the investigator selected this problem in secondary level young pupil alone. This study mainly focuses the importance of science education and to develop positive scientific attitude among the teachers, parents and young learners.
1.14 LIMITATION OF STUDY

This study included only the virudhunagar district which contains eight towns. The investigator focuses mainly on the secondary level alone. The attitude about the science exhibition is temporary because developing situation upon the parent’s attitude may change.

The investigator has concentrated on the teaching faculty only. The co-coordinators of the science exhibition have not been considered. This study mainly covers the learners, teachers, and parents attitude towards science exhibition. But the other population may have an opposite side of the investigator’s attitude.

1.15 EDUCATIONAL IMPLICATIONS OF THE STUDY

This study mainly expresses the significance of the science in the society. Science can change each and every movement in our earth. Science can magnify the world in a successful manner. The young scientist is a backbone of the modern scientific world. Through science exhibition the teachers and parents can produce numerous modification and modernization in this earth. But the attitude of teacher, parents, and learners should be in a positive way. The positive attitude towards science is the channel for developing more scientists in this world. Through this study the investigator wants to create some awareness about the importance of science exhibition and its power among the secondary level teachers, parents and learners in virudhunagar district.