

**CREATIVE ABILITY AMONG SECONDARY SCHOOL STUDENTS  
IN RELATION TO THEIR SCIENTIFIC ATTITUDE AND  
PARENTAL  
ENCOURAGEMENT**

A Dissertation Submitted to the  
School of Education

In partial fulfillment of the requirements for the award of the degree  
Of

Master of Education

By

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## **DECLARATION**

I do hereby declare that the dissertation entitled “*CREATIVE ABILITY AMONG SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR SCIENTIFIC ATTITUDE AND PARENTAL ENCOUREGEMEN*” Submitted in partial fulfilment of the requirement for the award of the degree of M.Ed. is entirely my original work and all ideas and references have been duly acknowledged. It does not contain any work that has been submitted for the award of any other degree or diploma of any university.

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Investgator

## **CERTIFICATE**

This is to certify that *Rekha* has completed her dissertation entitled “***CREATIVE ABILITY AMONG SECONDARY SCHOOL STUDENTS IN RELATION TO THEIR SCIENTIFIC ATTITUDE AND PARENTAL ENCOUREGEMENT***” under my guidance and supervision. To the best of my knowledge, the present work is the result of her original investigation and study. No part of the dissertation has been submitted for any other degree or diploma to any other university. The dissertation is fit for submission for the partial fulfilment of the requirements for the award of M.Ed. degree.

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**Rekha**

## ABSTRACT

*Creative ability is the trend to generate or identify new ideas, alternative or possibility that may be helpful to find out the solution of the various problems including family, society. Scientific attitude makes a man positive and it help him to face many problematic situations. These actions or tendencies include exactness, intelligent, honesty, broad-mindedness, critical thinking and a habit of observing for accurate cause and effect relationships. Parental encouragement has been defined as the process in which parents guide, instruct, concern, care, motivate, encourage their child in order to gain achievement and enhance the performance in various field.*

*The study has been limited to secondary school students of Jalandhar District of Punjab. The sample of the study was taken from secondary school students and study formulated three objectives followed by four hypotheses. A sample of 200 secondary school students. The sample was equally divided into main two group's i.e.100 government secondary school students and 100 private secondary school students of Jalandhar district. These groups are further sub divided into two groups on the basis of gender, i.e. 50 male and 50 female in each group. Stratified random sampling technique was employed in order to select the representative sample. The scale of Creative ability developed by Dr B.K Passi, Scientific attitude scale developed by Dr. Avinash Grewal (1990) and Parental Encouragement Scale by Dr. Kusum Agarwal (1983) has been used for the present study. The data collection was followed by scoring of each construct and then reliability was taken into consideration (split half) for each construct and the values were above the threshold level. The reliability of the scales was followed by analysis and interpretation. These objectives were achieved using different tests including percentage, t test and multiple correlations.*

*In the light of interpretation of data, the researcher has to use all care and cautions in formulating conclusions and generalizations. This final step of research demands critical and logical thinking in summarizing the findings of the study and compares them with the objectives formulated in the beginning. The researcher should not draw conclusion, which are inconsistent among them or with external realities.*

*On the basis of analyses and interpretation of data, following conclusion can be drawn: Majority (54%) of the students are having average creative ability and (18%) of*

students are having high creative ability and (28%) are having low creative ability. Mean score of creative ability between male students was (57.93) and female students was (69.43) of secondary school. There exists significant difference in creative ability of male and female students;  $t$ -value of creative ability was found to be (3.56). Majority (55%) of the students are having average scientific attitude. (22.5%) of students are having high scientific attitude and (22.5%) are having low scientific attitude. Mean score of scientific attitude between male students was (322.39) and female students was (337.71) of secondary school. There exists no significant difference in scientific attitude of male and female students;  $t$ -value of scientific attitude was found to be (1.14). Majority (51%) of the students are having average parental encouragement. (33%) of students are having high parental encouragement and (16%) are having low parental encouragement. Mean score of parental encouragement between male students was (46.93) and female students was (48.17) of secondary school. There exists significant difference in parental encouragement of male and female students;  $t$ -value of scientific attitude was found to be (3.73). The value of multiple correlations ( $R_{1,23}$ ) between creative ability, scientific attitude and parental encouragement is 0.085 which is not significant at 0.05 level of significance. There exists positive relation between creative ability, scientific attitude and parental encouragement among secondary school students. The value of correlation ( $r$ ) between creative ability and scientific attitude among secondary school students is 0.046 which indicates positive correlation. The value of correlation ( $r$ ) between creative ability and parental encouragement among secondary school students is 0.072 which indicates positive correlation. The correlation ( $r$ ) between scientific attitude and parental encouragement among secondary school students is -0.012 which indicates negative correlation

**Key Words: Creative Ability, Scientific Attitude, Parental Encouragement, Secondary School Students**

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# **CHAPTER-I**

# **INTRODUCTION**

# CHAPTER-I

## INTRODUCTION

### 1.1 THEORETICAL ORIENTATION OF THE PROBLEM

Creative ability is the trend to generate or identify new ideas, alternative or possibility that may be helpful to find out the solution of the various problems including family, society. Creativity ability is enhancing the ability of communicating with others, and entertaining ourselves and others. Creative person considers more general intelligent ways, such as directness, levels of ideation, independence, skill, tentative conduct. Mitchell Rigie stated that creative ability is refers to generate new ideas and thoughts or contact between thoughts where no one present. Robert W. Weisberg creative ability refers that it is a value of noble product, as in the telephone was a creative invention. Creative person that who create his work. Creative ability refers to the capacity which helps the person produce and create his or her work. Creativity requires hard work. Human being is gifted with unique power. Of all their power, creativity is the most unique. It is strength to human being, that's all things which make human being different from animals. Creativity has been recognized as a valuable source of appearance, progress and existence of man's culture through ages.

Mihaly, C stated that creativity is knowledge, action or creation that changes an existing area or that transfer an existing area into a new one. Joseph V. Anderson stated that creativity is the part of life. It is nothing more than interaction. Mitchell Rigie and Keith Harmeyer stated that creativity is producing new thinking and new thoughts, or making links between thoughts where nobody earlier presented. Dr. Betty Edwards Creativity ability refers to explore those efforts which help a man to diagnose problem and find out solution in a new way. Creativity is the internal power of man through using this power a man can create or discover something new. A man can invent something by using his ideas or experiences. Creativity includes two practices: thinking and producing. Innovation is the production or carrying out of an idea. If you have ideas, but don't act on them, you are imaginative but not creative. Rollo May Creativity has been defined it is a process by which a person can bring a life to something. It enhances our awareness and explores our hidden talent.

Creative ability have been recognized as essential in solving complex individual, social, and global problems through a significant amount of research. Every person has creative ability that varies person to person. Students differ from one another in a wide variety of ways. They have different background, different level of motivation, different attitude about teaching and learning, different responses to specific classroom environments and instructional practices. Related to this Nadeem and Anwar conducted a study on a comparison of creative thinking ability of high and low achievers secondary school students. Result of the study revealed that there was no difference between high and low achievers in terms of creative thinking abilities. However, girls and the students belonging to urban areas found better in their creative thinking.

One of the things which differ from rest of the other animal species is unique ability of creativity. A time back creativity was attributed toward divine source and was termed as “spark of genius”. However, today it is attributed to psychic functioning of human beings. Creativity is special ability, which effects human activity in practically all aspects of life. Creativity has been identified as a valuable source of advent, progress and survival of man’s culture through ages. Most of the changes and advancements in society as well as other fields tell us nothing but the story of man’s endeavor to create.

Super-fast computers are the computer which can process the information at lightning speed and perform the task at very high speed, are also having drawn-back that it can only repeat the mechanical orientations but cannot create unique, new concepts, but human mind is specially design to generate new and innovative ideas. So, it is necessary to be careful in elaborating creativity and distinctive it from other alike logical functions. Human mind is having sustainable role in the creative ability of a human being. The two part of the brain appears to have its own area of specialization and it processes the information in its different way, and of course, in the normal brain, majority of the human, it is the left hemisphere of the brain that keep check on rational thinking and linear thinking. It’s the feature that can calculate mathematics, remember the names, read and recall. By contrast, another hemisphere of the brain is having the function by which, metaphors are assumed, which are responsible for the feelings to felt and where dreams, imageries and fantasies are born. The left hemisphere of the brain is responsible for the following function: mathematical, analytical, verbal, linear and literal problems. The left hemisphere may then be particularly good at convergent thinking. By contrast, the right

brain appears to be dominant for the respective activities; metaphoric, imaginative, non-verbal, holistic (non-linear), spatial, musical, artistic, emotional, sexual, spiritual thoughts, and dreams. The right hemisphere may be particularly good at supporting divergent thinking and creativity more widely. In general, the hemispheres work together in synchronization, although often the right part is under-utilization. And really it is this hemisphere that is vital for learning and for development of creativity. The test for teachers is how to find methods of fostering creativity that nourishes the right brain as well as the left, for all children. Creativity is the process of rising innovative and original novel and yet suitable stimuli to a difficulty. An original response is one that is not generally given. An original answer is one that is different or has no precedent or instance.

Miller et al (2012) conducted a study on parenting style, perfectionism and creativity in high ability and achieving young adults. The finding revealed positive relationship between (a) permissive parenting style and creativity and (b) authoritarian parenting style and socially prescribed perfectionism. Furthermore, negative relationship was also found between authoritarian parenting style and creativity. These relationships were further investigated using a path model that includes control variables for gender and parents education level. Finding suggests statistically significant relationship between creativity and gender, authoritarian parenting and socially prescribed perfectionism and creativity and permissive parenting style and creativity.

Anwar et al (2012) conduct a research and studied the relationship of creative thinking with the academic achievement of secondary school students. Results revealed that a statistically important relationship between i) creative thinking and students' academic achievement on different aspects of test of creative thinking. ii) Creative thinking and academic achievement.

Liu et al (2012) studied the dynamics of motivation and learning strategy in a Creative Supportive Learning Environment in Higher Education. He found that the motivation among student should be increase by giving task and exercise and in addition to that this study works on the strategies of developing the creativity and metacognitive process.

Low and Cho (2013) conducted a study to investigate the relationship among creativity, intrinsic extrinsic motivation and creating home environment. The result of the study revealed that, first there were positive relationship between intrinsic motivation and the creative personality of young children but there were no statistically significant relationship between the intrinsic and extrinsic high motivation group was higher than any other types of motivation groups in creative personality. Third, there were significant relationship between the creative thinking ability and creative personality with the home environment.

Parsasirat et al (2013) attempted to investigate how socio economic status of a person influences the creative level of at the stage of adolescence. The result revealed that there is a positive co relation between family background and creativity among person.

## **SCIENTIFIC ATTITUDE**

In today's era, attitudes of the people should be scientific because it helps to make critical thinking of a person towards any situation. It involves broad mindedness, critical thinking, respect for proof, willingness to change opinion, search for truth, intellectual morality, curiosity, rational thinking, etc. Scientific attitude makes a man positive and it help him to face many problematic situations. These actions or tendencies include exactness, intelligent, honesty, broad-mindedness, critical thinking and a habit of observing for accurate cause and effect relationships. This concept is cognitive in nature; scientific attitudes and mental process of student are normally related to each other. These habits are having high significance in the day to day life and thinking, not simply of the scientist, but of everyone. Student attitudes possess attributes thought to be either true or false and do not express an evaluative quality. To lessen the semantic confusion, scientific attitudes may be better labeled as scientific attributes. The attributes of a scientific attitude is having faith that: A student believes that everything that happens for a cause or reason in this world. Curiosity: A students pays particular attentions and shows interest to objects or events. He asks questions and seeks solutions. Objectivity: If a student does not allow his feelings and biases to influence his recording of observations, interpretation of data, and formulation of conclusions etc. then student makes objective. Critical-mindedness: It helps to generate critical thinking among students and it also helpful to discover out some ideas and conclusions on evidences. They do question the



veracity of a statement in relation to the evidences presented whenever they are in doubt. Open-mindedness: A student listen the ideas of each other and respect them. They accept criticism and vagary their minds, if reliable evidence contradict theirbelieves. Inventiveness: A student can produce new and creative ideas. Risk-taking: A student will be able to give his opinions and tries new ideas even at the risk of failure or criticism with the help of scientific attitude. Intellectual honesty: A student provides a honest report of observations. He does not refuse vital information just to please himself or others. Humility: when he admits that he is not free from committing errors, then he behaves humble. He knows that there may be better ideas and realizes that there are individuals whom he may have to consult to attain at correct observations and conclusions. Responsibility: A student performs his task with full responsibility and actively participates in a tasks assigned to him.

The term scientific attitude contains a wide range of positive behavior. It is a psychological state of keenness exerting direct or indirect effect upon an individual's stimuli to all objects and situations with which it is related to. Scientific attitudes can be regarded as a complex of beliefs and rules which is held to be binding on the man of science. The norms are expressed in the forms of preparations, prohibitions, preferences and approvals .They are legitimized in terms of institutional values (Barnes and Dolby, 1970). A scientific attitude includes norms and values like objectivity, open-mindedness, biasedness, curiosity, suspended judgment, critical mindedness and rationality. According to Paul G. Hewitt, The success of science has more to do with scientific attitude and this attitude is one of inquiry, testing and humility before the facts. This attitude is one of the key objectives of science teaching and it also one of the major outcomes. It makes the people live as efficient citizens in the present scientific society.

Science is a system of knowledge, a process of acquiring and refining new knowledge through the processes of observation and experiment. The level of development of any country is largely based on the scientific knowledge. Progress in science depends upon continuous scientific inquiries. Many researchers have stated that, effective and well-resourced laboratories are in science teaching. It has shown that one of the most important factors in science is the attitude which determines behavior (Amjad& Muhammad, 2012). Also the importance of science is clear to most people; however the majority of the population is illiterate in science (Crocker, 1997). One of the goals of

science teaching is to encourage students to have positive attitude towards science for positive effects on learner's knowledge. Progress in science and skill has created a greater demand for people to study science and this is particularly pertinent in a developing country which is struggling for respectable status among international community and where the number of scientists and engineers are very small as compared to developed countries. To ensure the influx of new scientist is important to view how science is taught in schools and how this approach affects student's willingness to take an active role in their science learning. Research has regularly shows attitude as an important component of science education.

Now a day, science has become internal part of human life .The world without science cannot be imagined. Science has change the world from modern civilization to scientific civilization by its wonderful achievement; one of the objectives of education is to be developing scientific attitudes in students. The curriculum and educational system should be arrange In a way that the views of Indian citizen be scientific .On the other hand central and state government has not tried their best to developed the scientific attitude in student at secondary level. It resulted in decrease of number of student of science in colleges' .In the modern era science has been the backbone for the prosperity in each and every field of life, for this purpose student will have to pay attention to their study during their education career.

Science is an important area in the field education for the secondary level, after the secondary school classes, these student have to select such field which lead to their professional career, these student have to perform different activities at this level. These activities provide students different concepts related to science as well as scientific enquiry.

In science, we cannot separate the cognitive factors from effective domain (i.e. Human attitude), and cognitive domain from effective behavior. Attitude may include cognitive and behavioral component as well. However it is evident that attitude is an effective characteristic in which emotions are involved. According to

Reid (2003) states, "attitude expresses our evaluation of something or someone. Attitudes are important to us because they cannot to be neatly separated from study. It is relatively quick series of steps for a student with difficulty of a topic to move from that to

a belief that they cannot succeed in that topic. It is beyond them totally and they, therefore, will no longer attempt to learn in that area. A bad experience has led to perception which has led to an evaluation and further learning is effectively blocked.”

Thurstone (1928) was the first who was defined the dimension of an attitude as, “some psychological object is affected by some degree like positive or negative”. Attitude becomes psychologically in separate from an amount of other ideas which can be incorporated under the same concept these include curiosity, gratefulness, likes, dislikes, thoughts, principles, morals, social warmth, character traits and loyalty. Different person have different intensity of emotional content and generality as per the range in which object are there in the situation over which they applied. Mostly attitude learned are difficult to distinguish from such affective attributes of personality.

A scientific attitude can be defined as a way of viewing thinking , a curiosity to know how and why things happens , with an open minds and govern by facts ; scientific attitude is govern by factors like intellectual honest , open-minded and creativity .scientific attitude can be defined as the expression of thoughts based on factual or experimental evidence . Some common attitude includes include tolerance to uncertainty, willingness to change opinion and open-mindedness, scientific attitude is a disposition of thought with regards to proof and experimental fact. Some scientific attitude includes suspended judgment, objectivity, and critical mindedness. Willingness to change opinions and tolerance to uncertainty a person must poses certain attitude to be successful in making investigation. Personality has an important room for scientific attitude.

An individual with scientific attitude having the good qualities features, and it has shown through hi behavior and feeling towards the situation. These people have the qualities like broad mindedness, experiment oriented, discovering new ideas, stable emotions, sense of belongingness, knowledge about lots of skills, intelligently true, impartial, honest, and poses scientific temper and the expectations that the solution of the problem will come through the use of verified knowledge.

In education field science subject plays a very important role. It helps to inculcate the various skills and qualities among learner in schooling stage. However, for the development of a learner science knowledge is required to study and teacher should adopt scientific methods, so the learner became capable to doing things practically. Science is

very important part of life it provide basic and equal opportunities to the students so they can develop their intellectual and attitude, and they also able to get information about their surroundings and environment, the student should be able to gain the creative thinking and scientific attitude so they can easily find the solution of many problems An individual begin development with good qualities features, and it has shown through the behavior and feeling towards the situation. These people have the qualities like broad mindedness, experiment oriented, discovering new ideas, stable emotions, sense of belongingness, knowledge about lots of skills, intelligently true, impartial, honest, and poses scientific temper and the expectations that the solution of the problem will come through the use of verified knowledge begin to developed the scientific attitude characterized a as, open mindedness, curiosity, tolerance, honest doubt respect other point of view, critical observation and thought , freedom from superstitions judgment made on scientific facts , faith in cause and effect relationship and a planned procedure in solving problems , this is considered important to develop the scientific values fulfill the aims and objectives of science education for the students. .

Attitude does not refers only negative perspective of human being like stereotype thinking, discrimination and dislikes but also include positive perspective like feelings honesty attraction and divergence ideas(George, 200). An individual possess his or her life, he or she is not having only skills and knowledge, but also certain attitudes, point of views towards various issues and frame of mind about his or her experiences. These sure or certain attitudes, point of view and feeling are developed due to both as what kind of experiences the individual passes though, and how these experiences came across. Tendency to react positively or negatively toward selected class of response is attitude. If this reaction is according to the ethics of science, then it is scientific attitude. The scientific attitude investigates different scientific acts or thoughts of a person. It is the capability and ability of an individual that how he react objectively and rationally towards the situation by using his knowledge, skills and previous experiences of life. It is skill to do things in a way that bank on verified facts rather than unproven facts. An individual who has good scientific attitude is always free from orthodox thinking and from fallacy, unproven beliefs and many times from popular opinion that has no practical sources (Olatoye, 2002; Olatoye&Anderogba,2012; Klopfer,(1995). An individual with scientific attitude is not meant that he is only scientist but also careful about his action and thinking. Munby (1983) defined the person having the qualities like broad

mindedness, creative thinking, impartiality, always ready to explore new things, humbleness, honesty, curiosity to know thing became a scientist.

Scientific attitude involves certain techniques to solve a problem. These techniques are objectively, humility, ability to accept failure and perseverance. At the stage of adolescent, when an individual studying in higher secondary classes the passes through stress and storm, at that time he must needed proper guidance and counseling. Otherwise he will face the problem of disturbance. If he get proper guidance and counseling at this stage then he became a great personality.

Rao (1990) found that the scientific attitude in secondary school pupil was average. There was no difference in the scientific attitude of boys and girls.

Kumar, (1991) Patil, G.V (2009) found that the scientific attitude test scores of boys and girls of the average group differed significantly. There was also no significant difference between the Means of scientific attitude test scores of the urban and rural areas.

Nelliappan, (1992) revealed that biology students of higher secondary school have strong relation between low and high learning environment related to their scientific attitude and scientific interest.

Osborne et al., (2003) investigated that at the stage of adolescent, an individual attitude is influenced by family and his home environment. He also suggests that family and home environment plays an important role in attitude formation of learner. If parents take interest in academic affairs of learners it will help to increase the scientific attitude of an individual.

Cracker (2006) from the research it was found that many factors like gender previous science experience and expected achievement influence students' attitude towards science. If anyone wants to be successful in the domain of science then scientific attitude is an important aspect of personality of that person. It require rational questioning technique, Attitude is a sense you have, a state of mind, a disposition or a value. In addition, it is your view about your life, or how you perceive the things and problems of your life and things as well as how you act or behave towards with more practicality.

Leslie (2006) in a study revealed that males records a more positive attitude towards science than females, and that younger pupils records a more positive attitude towards science than older pupils

Stefansson (2006) conducted a study on the views of Icelandic student about science and technology and school science. He founded that school sciences are interesting to students, it is easy to learn and practically possible that everyone should learn science in school, to acquire scientific attitude. They are in a favor of belief that the science which they learn in school is very useful in their day to day life.

Anderson (2006) conducted a study on students of central region of Ghana. He concludes that science and technology plays a very important role in society and it help to overcome the poverty and scarcity in the world. He revealed that girls are not interested in becoming scientist as compare to the boy.

Chang et al., (2009) investigated the study on Taiwanese students. He explored the attitude of boys and girls about science and technology and learning interest about life experiences. He concludes that males have higher learning interest in sustainability matters and scientific topics than females.

Palaniappan (2009) compared creative levels of Malaysian and American students. He reported that American students are significantly superior to their Malaysian counterpart in general creativity as well as in its components, namely fluency, flexibility, originality and elaboration. However, there was no significant relationship between creativity and academic achievement. There was also no significant difference in academic achievement of Malaysian and American students. The important point is that a group of more creative students may not necessarily be academically below.

Patil, G. V (2009) conducted study on secondary school students to find out the scientific attitude. This paper found that there is significant difference in scientific attitude of boys and girls of secondary school. The result of this study shows that rates are influenced by attitude.

Asghar (2011) investigate the study on Persian students who studied in secondary school. The outcomes of the study revealed the fact that no noticeable difference was there in the scientific attitude of men and women.

Najafi (2012) conducted a study on students' Attitude towards science and technology. His Result revealed that the student have a positive attitude towards science and technology. However, there was a negative attitude towards few items of science and technology. The result also indicated that there is a noticeable difference in views toward science and technology between male and female, males have higher than females.

Mohammad et al (2012) conducted research which is having output that there is a significant difference in attitude towards science and technology between boys and girls point of views. According to this result, boys have higher average that the girls. The result of this research could be used by science teachers and educators to development of science curricula and science books, as the result provides important information about student's attitude towards science.

Pillai (2012) investigated the study on higher secondary students about scientific attitude. This study concludes that there exists no significance difference in attitude of boys and girls about scientific attitude. This study also counted that there is a significance difference in scientific attitude between the student of Government and private school students, and the student belongs to rural and urban area.

Farooq (2012) studied that the scientific attitude of secondary school students. Using statistical procedure the main empirical data was analyzed the mean score for each item, is calculated by importance of new knowledge.

Pitafi, A.I and Farooq, M (2012) conducted study on secondary school students to find out the scientific attitude. Sample consists of 100 subjects. Randomly data was drawn from 10 schools. Questionnaire tool was used in this study to collect the sample. This study shows that there is significant relation of scientific attitude among secondary school students

Barot (2013) conducted a research which found that scientific attitude helps an individual to develop vision for better life, to make life meaningful and teachers him to do all the fields of life so this must be attended.

Mukhopadhyay, R (2013) conducted the study on scientific society, attainment in science has become one of the parameters determining learning quality. Success in science is a complex variable has multidimensional concept. The present study has been

designed to investigate the various factors influencing learning physics. This study explored that intrinsic motivation is not a deep factor of achievement in physics.

Sekar and Mani (2013) in study indicate the moderate level of science attitude among higher secondary students. Further the female biology teachers have more influenced on developing science attitude among the students as compared male teachers and girls significantly differed with boys in science attitude. Its concept is cognitive in nature. Scientific attitude is really a composite of a number of mental habits or of tendencies to react consistently ways to novel or problematic situation these habits are tendencies include accuracy intellectual honesty, open mindedness, suspend judgment, criticalness, and a habit of looking for true cause and effect relationship. Scientific attitudes are normally associated with the mental processes of scientists these habits are important in everyday life and thinking not only of the scientists but of every one. Scientific possess attributes thought to be either true or false and do not expresses and evaluative quality. To lessen the semantic confusion, scientific attitude may be better labeled as scientific attributes. We cannot leave the development of scientific attitude and interest on the matter of chance. To succeed in their efforts relevant activities day to day teaching must be from significant areas of living which correct their erroneous ideas and misconception. It has been noticed that the science teachers are very much keen to teach and developed scientific attitude inside the students. Fragment changes in the science curriculum consistently aim at the development of scientific attitude among student though attitudes were studied and defined; they were not distinctly differentiated from scientific thinking and problem solving skills (Smith & Andrea 1960). Actually scientific attitude remained marginal and observe in teaching plan in very less content. Recently the development of attitude has received a considerable search of interest as it is evidence by the increasing number scientific research studies dealing with their description, measurement, learning and influence on cognitive learning and science. A scientific attitude is an important aspect of personality of someone who wants to be successful in the field of science. Scientific attitude is respecting fact a scientific attitude about life it simplifies thing science is not complicated. Some thins is scientific if it can be proven wrong. It is based on facts that there is no argument it is either right or wrong.



## **PARENTAL ENCOURAGEMENT**

Every successful individual after reaching his/her goal finds that his/her success is because of the help and support of his/her parents. The support given by parents exerts significant influence on children's interests, aspirations, attitudes and achievement. Encouragement means aiding the development of something or raising someone to be an accepted member of the community. The act of giving hope or holdup to someone (Boost) According to Sekar, P. and Mani, S. (2013) everyone is indebted to many people who played inspirational roles in shaping their lives. People who get encouragement at the right time, and motivation aim higher and achieve more. However, the greatest motivators and role models of children are the parents. When parents are educated and ambitious, children also imitate them and develop a high degree of achievement drive. Strong and supportive parents contribute to the growth of strong and success oriented achievement drive in their children. GargRashmiet al. (2002) stated that positive family climate and parental encouragement foster a positive academic self-schema.

Parents are plays very important role in children life. The first and foremost responsibility of parents is that to adjust their child in society and help them to learn social skills. (Sekar. P, 2013) Parents who are highly motivated and oriented lead to pivot the right learning environment at home. Parents should motivate their child to take part in all activities which help them to involve social events and social development. They should enhance their cognitive and perception ability and also encourage them.

Rossi (1965) and Joshi (2001) defined the parental encouragement as a support and appreciation of their wards activity when they were satisfied with him in relation to his attainment of education. Involvement of parents and encouragement has impacts on educational attainment and success. Parents should encourage their child when they are young also added to the probability of their eventually passing from high school. Consistency the encouragement of parents over the high school years is positively related to attending college but less predictive of attendance of a two year college than a four year college. Parents of drop out may express their opposition to dropping out but not take any specific action to help their students stay in school parents attention may be shown by the presence of study aids such as magazines and dictionaries in the home, also related to the likelihood of staying in school. Number of parents may not be as important

as the nature of parenting. Parenting control, monitoring, discipline, encouragement and consistency are all aspects of parent child relationship that have been link.

Michael (2001) studied that involvement of parents has good impact on student educational outcomes is so instinctively attractive that society in general and educators in specific have consideration involvement of parents is an important components for the solution from many problems in education. Meta-analysis result shows a small to medium and practically meaningful, relation between involvement of parents and education outcomes. While, the moderate judging revealed that parents' educational expectation anticipation for student educational attainment has the strong relation, where parent observing in home has the weakest relationship with students' educational attainment

Thomas (2002) studied that the parental support facilities, adolescent's feeling of psychological wellbeing had given them confidence and leads generally to social and academic competence. Watkins (1997) explored that involvement of parents make an influence on a child's knowledge or learning and inspiration or motivation. This study looks at different types of participation including home instruction, volunteering in the classroom and participation in school governance. Wallis (1998) studied that the guidance of parents is the importance of encourage, admire, praising and participation. Also the study of Baharudin (1998) analyses the role of the home or family and the definite interactions between a parent and child have been determined to be powerful indicators of development. Some important purposeful relations contain encouragement, daily routine, regular family discussions, praise, limit setting, warmth, and intellectual stimulation. Wang and Wildman (1995) analyze that in adding to the significance of parents attitudes and behavior, children's perception of their parents support are very significant. Children's perceptions that their parents are involved and interested in school, and encourage them to do well are positively related to academic achievement. Also Wang et al. (1996) found that the parental impact has been accepted as a significant issue effecting student success. Results indicate that education of parents and encouragement are strongly related to better student success.

Riaz(2003) explored that children distinguish that mother are apparent as more accepting than father and father to be significantly more neglecting. Both father and

mother appear to the moderate in controlling children behavior, which add to their perception of parental warmth and acceptance.

Hill et al (2004) explored in a longitudinal model proposed that those parents are educated their children face fewer problem in academic achievement and those parents who uneducated their children face many problem in academic achievement. Involvement of parents in academic achievement may be interpreted may be differently share different across social demographic backgrounds.

Sunitha (2005) examined the meaning of parental encouragement is that where parents help, guide and understand their child do not lose hope or stability in difficult situation and time.

Lakshmi and Arora (2006) analyzed that the acceptance of parents and encouragement were related with academic school success and academic competence positively. Though, control of parents whether psychological or behavioral shows negative association with academic success and competence. Joshi (2001) examined the effect of parental encouragement which was most significant on the elevation of class room morale with effect on locus of control and creativity

Sravanthi (2007) showed that majority if the parents followed authoritarian parenting style for both boy and girls in academic area in order to make children score better in their study. There is a significant difference between the perception of adolescents' and the parenting style adopted by parents in authoritative and premises parenting style.

Devi and Mathuri (2008) examined that no significant difference in social maturity of docents by parental employment but significant differences were found in the dimensions such as interpersonal adequacy and social adequacy also no significant grade and gender differences were observes.

Harris and Good et al (2008) conducted a study to find out the relationship between parents engagement and pupil achievement. In this study collected data from 20 schools and 314 respondents. Find out result is that parental engagement in child's learning in the home makes the greatest difference to child's outcomes. Mostly schools are involving parents in school based activities in several of ways. The study also shows that this has

little, if any, impact on subsequent learning and achievement of young children. Home learning environment also differs depending upon its type of location.

Bhati (2008) examined that the parents have significantly low aspiration, lesser need for attainment and lesser expectation in education for girl's education than boys. This study on the issues of negligence verses indulgence and utopian expectation verses realism in children of single parents indicated that the parents where both are surviving inculcate indulgence experience more in their wards than single parent, also, it is depicted that experience of indulgence in the children is associated with low economic status families where as neglect experience is associated with high economic status families. Though over indulgence can develop inconsistence in adjustment in the social environment. Results also consider that parents where both are surviving inculcate realism experience more in their wards than single parents and also realism experience in the children in associated with low economic status families where as utopian expectation experience is associated with high economic status families.

Kathleen v. Hoover and Dempsey et al. (2011) parents encourage their children in any ways like, they help them in their homework performance that increase the ability of self-learning among students and through this, their performance in academic task is increased.

Kazmi (2011) investigate that the involvement of father with their children at school and home .The sample consist 300 subjects. The data was drawn randomly from urban and rural areas. For the collection of data questionnaire tool was used by investigator in classroom related to student's academic achievement. This study shows that the involvement of father has positive significant relationship in relation to the academic achievement in their ward.

Mani et.al (2013) investigated on the status of parental encouragement of higher secondary students as many of them having problems related to their academic failure or to stereotype them as loud, lazy, athletic, deprived, or some time dangerous and deviant. This study was based on survey method. Parental encouragement inventory of Mohanasekar(1980) was adopted in addition to a basic data sheet developed by the investigators. This study that the moderate level of parental encouragement to higher

secondary biology students and also significant difference was observed among the boys and girls in parental encouragement

Mani. S, (2013) studied that the perspectives of parental role and their support to the higher secondary students. Students experience academic failure and become deviant. The present study was designed to make out the status of parental encouragement of +1 biology students. Sample consists of six hundred and twenty one 9th standard students. However, the rural and urban higher secondary biology students have significantly differed in parental encouragement. Similarly, the higher secondary biology students belonging to Tamil and English medium also significantly differed in their parental encouragement. Sharma (2012) had investigated various schools and school organizations for their endeavor to get parents' involvement. Various studies on Parental involvement assert that when parents become involved, there is definitely a boost in academic achievement and school satisfaction, thereby resulting in a successful school setting. Therefore the study explored ways by which schools succeed in getting parents involved, and examined the levels of home school communication.

Anuradakotnala, et.al (2014) investigates the effect of Parental encouragement on self-confidence of adolescents. The sample consists of hundred subjects. Aggarwal's parental scale developed by Kusumaggarwal (1999) and agnihotri's self-confidence inventory developed by Rekhaagnihotri (1985) have been used to obtain score on Parental encouragement and self-confidence. Findings of this study indicate that rural adolescents, whether male or female, perceive less parental encouragement which, in turn, leads to lesser self-confidence. On the contrary urban adolescents, whether male or female, perceive high parental encouragement which leads to higher self-confidence.

There are many ways a parent can show encouragement to a child. Acknowledge that he is a unique individual. Every child grows and learns at a different rate, and has different abilities and interests. Let your child see that you love him for who he is. This unconditional love allows a child the freedom to develop at his own pace. Show your child that you have faith in her. Help her as she learns new skills, but allow her to do as much as she can on her own. Encourage her along the way and step in when she starts to get too frustrated. Appreciate him by noticing accomplishments or positive behavior. Be specific. Encouragement focuses on the effort rather than the end result. Rather than

telling her she has painted a beautiful picture, comment on how much she enjoyed making it and asks her to tell you about it.

Correlational research it has been seen that the performance of the students is relatively high where parents involve themselves in studies of their children as compare to other children whose parents are not involving themselves in the studies of their kids . (Flouri and Buchanan, 2004; Lee and Bowen, 2006).According to Alike (2011), when children are high achievers in school the tendency to drop out of school and later negotiate re-entry into school may be minimal or non-existent. This could also be attributed to the assertion that those take good marks in their academic task are highly externally motivated (Bainbridge, 2012). Parents and members of the extended family have great influence over their children's success and continued stay in school. When there exists a positive relationship between children and their parents, the educational attainment of the children would be realized that Parental involvement is beneficial in learning activities of child.

Parents are the first and important social agent for a child. Every member of the family has impact of his/her behavior .For better social adjustment each member of the family must show and behave properly with the child. Better home environment is that where parents provide more opportunity to understand things and situations and act according to their desires. The kind of environment helps the students for better performance on various tasks.

Parents are very important part of children life. They play critical role and supported role in children education life. Parents' guide, instructs, concern, care, and motivates their child to achieve and better perform in their academic task. Parents must take care of two given point:-

**Encourage for achievement:**Parents help their child and encourage them to gain and achieve their goal in life. Parent's plays very important role in children life. Home learning environment also differs depending upon its type of location.

**Encourage peer conformity:** Parents encourage their child and they also enhance their ability to work with their friends.Encourage for taking initiatives. Parents should encourage their children to take initiative in various fields to be a good leader.Parents

should encourage their children at the time of failure by boosting their morale as early as possible.

## **1.2 SIGNIFICANCE OF THE STUDY**

Creative ability is the trend to generate or identify new ideas, alternative or possibility that may be helpful to find out the solution of the various problems like, adjustment in family, society. It creates new ideas like thinking, reasoning ability. In today's era, attitude of the people should be scientific because it helps to make critical thinking of a person towards any situation. Scientific attitude define as the ability to deal with the future challenges with the help of previous past gained knowledge and training. It is the potentiality for future accomplishment in science with regard to past training and achievement. Every successful individual after reaching his/her goal finds that his/ her success is because of the help and support of his/her parents. Parents are very important part of children life. They play critical role and supported role in children education life. Parents' guide, instructs, concern, care, and motivates their child to achieve and better perform in their academic task. Pitafi, A. I and Farooq, M(2012) and Patil, G.V(2004) and Singh and Praveen (2010) found that there exists a significant difference, Tahira, Kamzi(2010) and Umunadi (2009) found that there is significant positive relationship in parental encouragement and academic achievement of secondary school students .Many studies have been conducted on the parental encouragement and academic achievement. But the investigator wants to explore more knowledge about the creative ability in relation to scientific attitude and parental encouragement. So, investigator decides to conduct a study, find out the relationship among creative ability, scientific attitude and parental encouragement.

## **1.3 STATEMENT OF THE PROBLEM**

The present study was an attempted to study the creative ability among secondary school students in relation to their scientific attitude and parental encouragement. Thus, the present problem entitled as:-**“Creative Ability among Secondary School Students in relation to their Scientific Attitude and Parental Encouragement”**.

## **1.4 OPERATIONAL DEFINITION**

### **CREATIVE ABILITY**

Creative ability is the trend to generate or identify new ideas, alternative or possibility that may be helpful to find out the solution of the various problems

### **SCIENTIFIC ATTITUDE**

It is the potentiality for future accomplishment in science with regard to past training and achievement. Scientific attitude makes a man positive and it help him to face many problematic situations.

### **PARENTAL ENCOURAGEMENT**

Parental encouragement has been defined as the process in which parents guide, instruct, concern, care, motivate, encourage their child in order to gain achievement and enhance the performance in various field.

### **SECONDARY SCHOOL STUDENTS**

Secondary school students are those students studying in 9th or 10th class. In the present study secondary school students will be the students studying in class 9th.

## **1.5 OBJECTIVES OF THE STUDY**

1. To study the levels of creative ability, scientific attitude and parental encouragement of secondary school students.
2. To examine the difference in creative ability, scientific attitude and parental encouragement of secondary school students.
3. To find out the relationship between creative ability, scientific attitude and parental encouragement of secondary school students.

## **1.6 HYPOTHESES**

1. There exists no significant difference in creative ability between male and female secondary school students.



2. There exists no significant difference in scientific attitude between male and female secondary school students.
3. There exists no significant difference in parental encouragement between male and female secondary school students.
4. There exists no significant relationship between creative ability, scientific attitude and parental encouragement among secondary school students.

## **1.7 DELIMITATIONS**

1. The study was delimited to the secondary school students of Jalandhar district of Punjab.
2. Total sample was 200 students of secondary school students.

# **CHAPTER-II**

# **METHODOLOGY**

## **CHAPTER-II**

### **METHOD AND PROCEDURE**

Research methodology is one of the significant side/aspects of a study. It explains about the many steps to be followed by the investigator to solve a research problem in systematic and logical way. A clear course of action provides the investigator a plan of action for selecting, gathering and analyzing the data in an economic and efficient mode. It helps the investigator to continue thoroughly while conducting the research and eventually save the time, efforts and money of investigator. It is necessary to accept an organized process to gather the relevant data. The relevant data should be sufficient in its quality and quantity. It should be reliable and valid. The selection of techniques and plans for a researcher is determined by the nature of the problem. The selection of appropriate technique, instrument and technique is a hard job and must be handled with every concern, care and consideration with respect to time, cost and procedure. The present chapter tries to explain all the key points as stated above. Presentation of this chapter follows the below given sequences: -

- Method and procedure.
- Sampling technique and design.
- Population
- Sample
- Tools of Data collection
- Procedure of data collection
- Data Analysis technique

#### **2.1 RESEARCH METHOD**

Method refers to the way a logical plan of solving a problem. In research there are number of methods and procedures to be applied such as experimental method, historical method and descriptive survey method etc. It is the way of doing something especially a systematic way of solving a problem. It is an orderly arrangement of parts and steps to

accomplish an end. A set of prescribed action or events must be enacted or have taken place in order to achieve a certain result. Method and procedure of the study depends upon the type and scope of the problem. Keeping in view the same, present study has employed Descriptive Survey Method. The descriptive research method has undoubtedly been the most popular and the widely used research method in education.

Descriptive research studies are designed to obtain pertinent and precise information concerning from the facts and discovered. It helps to explain educational phenomena in terms of the conditions or relationships that exists, opinions that are held by the students, teachers, parents and experts and processes that are developing. At times, descriptive survey is the only means through which opinions, attitude, suggestions for improvement of educational practices and instructions, and other data can be obtained. Descriptive research, also known as statistical research, describes data and characteristics about the population or phenomenon being studied. The present study was conducted to find out the “Creative Ability among Secondary School Students In relation to their Scientific Attitude and Parental Encouragement”

## **2.2 SAMPLING**

All items in the field of inquiry constitute a universe or population. The selected respondents from the population are technically called a sample. Sampling is a process of obtaining information about entire population by examining only a part of it. Sample should be true representative of population characteristics without any biasness, so that it may result in valid and reliable conclusions. The investigator used stratified random sampling technique to select the sample for study.

### **2.2.1 SAMPLING AREA**

A sample is a miniature picture of the entire group from which data has been taken. Sampling area is the unit of area, which is taken from the population. In order to get a representative sample the researcher collected the data from Punjab only.

### **2.2.2 SAMPLE SIZE**

A sample must be as near representative of the entire population as possible and ideally it must provide the whole of the information about the population from which the sample has been drawn.

A sample of 200 secondary school students. The sample was equally divided into main two groups i.e. 100 government secondary school students and 100 private secondary school students of Jalandhar district. These groups are further subdivided into two groups on the basis of gender, i.e. 50 male and 50 female in each group.

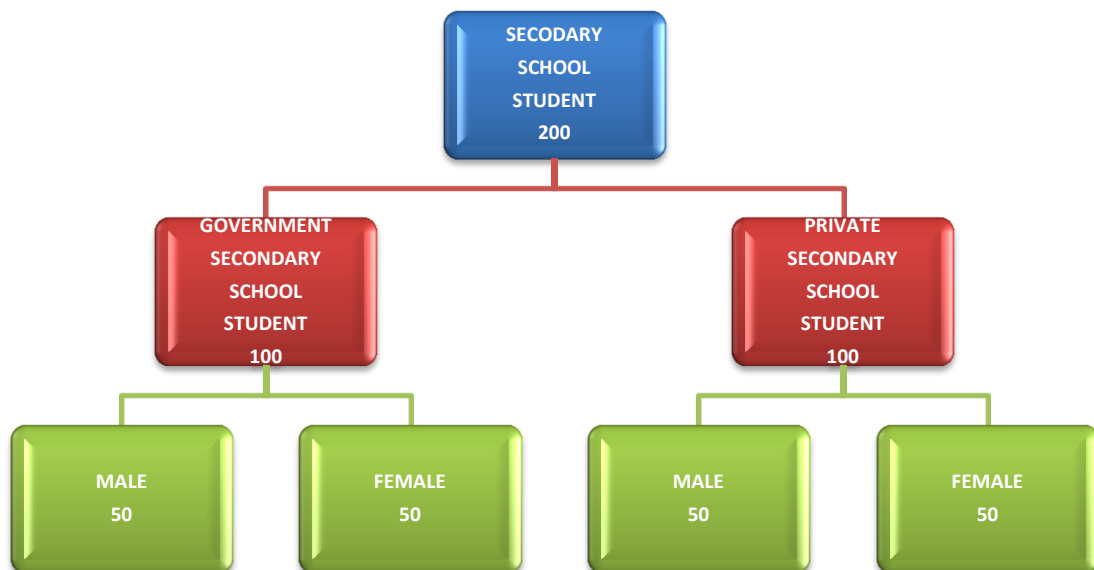
## 2.3 SAMPLING TECHNIQUE

Stratified random sampling technique was employed in order to select the representative sample.

### 2.3.1 SAMPLING DESIGN

For the present study sample design was as follows:-

#### *Sampling Design*



#### *Distribution of the sample*

## 2.4. TOOLS USED FOR THE STUDY

The following tools were used to collect the data:-

1. Creative ability scale by Dr. B.K Passi.
2. Scientific Attitude test by Dr. Avinash Grewal (1990).
3. Agarwal Parental Encouragement Scale by Dr. Kusum Agarwal (1999).

## **2.5 DESCRIPTION OF SCALE**

### **2.5.1 CREATIVE ABILITY TEST BY DR. B.K PASSI**

Creativity is a multidimensional (verbal and non-verbal) attribute ‘differentially’ distributed among people and includes chiefly the factor of seeing the problems, fluency, flexibility, originality, inquisitiveness and persistence.

#### **Measurement of creativity**

The measurement of creativity poses complex problems. According to Guilford (1950), the difficulties are mainly related to: a) establishing the practical criterion, (b) frequent fluctuation in creative performance, (c) types of items and their content, and (d) complexity and subjectivity involve in the scoring problems. Getzels and Jackson (1962) and Cropley (1966) also pointed out the difficulties, such as: (a) securing the creative subjects, (b) obtaining the co-operation of, especially, the younger children, and (c) evaluating young children’s responses.

In spite of various complications involve in the measurement of creativity, effort have been made to measure it by employing different type of media and methods of investigation depending upon specific situations. Taylor and Holland (1962) submitted the classification of prevalent measures: firstly, traditional measure, such as school grades, accumulation of knowledge and intelligence tests and secondly, multidimensional approach covering the cognitive factors recognized through the factor analytical studies of Thurston (1952). Guilford et.al. (1951, 1952) and Wilson et al (1954). The second category also involves non –intellectual measure, such as motivational, biographical, Sociometric and other personality characteristics, the third measure is a single test approach followed by many researchers in different part of the world.

A variety of tools such as checklist , the word association test , interest and temperament inventories , personality inventories , self-rating , supervisor’s rating , peer nominations or ranking , problem-solving test etc. Have largely been used to measure creativity. The creative behavior has also been predicted and assessed by taking into account the factors of home and school environment. The assessment of creativity through the PTC includes verbal and non-verbal test situation.

### **There are six types of tests**

- 1) The seeing problems test
- 2) The unusual uses test
- 3) The consequences test
- 4) The test of inquisitiveness
- 5) The square puzzle test
- 6) The block test of creativity

These tests are classified on the lines of Torrance (1962) as follows:-

- a) Tests consists of verbal tasks, namely, the seeing problems test, the unusual uses test and the consequences test :
- b) Test with verbal response tasks using mostly non-verbal stimuli, namely, the test of inquisitiveness,
- c) Test consisting of non-verbal tasks comprising the square puzzle test and the blocks test of creativity.

A brief and specific outline of all the six tests of creativity is given in the following captions:

1. **The seeing problem test:** it is a verbal, and an individual and group administered test. The seeing problem test was developed by adopting the pattern followed by Guilford, et al (1952). It is designed to measure a factor of sensitivity of problems, which is a component dimension of creativity as described by Guilford. The test is proposed to measure the ability to comprehend problems concerning the working of simple and handy articles of common use.
2. **The unusual uses tests:** it is a verbal, and an individual and group administered test. This is designed on the lines of the brick uses test by Guilford et al. (1952) and Torrance's (1962), the unusual uses tests .this test includes the names of things which could be used for numerous purposes. It includes only those items which have proximity with the psychological and physical environment of the subjects.
3. **The consequences test :** it is a verbal , and an individual and group administered test the pattern of the test is based on the test of Guilford (1952) and Torrance (1962), the consequences test includes four items , namely “ if human beings start

flying like bird” ; “if all human become mad” : and “if all females become males”. The maximum time limit for the test is kept eight minutes so that two minutes could be devoted to each of the items. Instructions to this effect are specially mentioned in the instruction booklet.

4. **The test of inquisitiveness:** it is a verbal, and an individual and group administered test .in order to provide an unfamiliar and novel situation, the test includes a relatively less familiar object providing sound and movement as the test content, a metronome .in order to provide a situation for greater inquisitiveness a play card bearing in capital letters “*A FEW CHILDREN CANNOT TOUCH IT*” “it displayed along with the metronome in a working condition. The students are expected to imagine and write as many question as possible within six minutes. They are told that the question should be mutually exclusive from each other in meaning and content.
5. **The sequence puzzle test (test of persistency):** it is non-verbal and individually administered test. the rationale, for including the dimension of persistency in creativity was, firstly based on the comment made by Eysenck (1947) about the significance of persistency for the effective use of a person’s ability and secondly, on the plea of Fernald (1912) that “the success or failure of an individual depends largely on the ability to endure and continue to strive for the sake of achievement in spite of fatigue and discouragement.”
6. **The block test of creativity (BTC):** it is a non-verbal and an individually administered test. The blocks test of creativity is a performance test and is administered individually. This test chiefly follows the pattern of the Lowenfeld mosaic test LMT (1952) which was described by Ames and Frances (1962) as useful tool for providing greater opportunity to observe individuals engaged in performing dynamic designs.

### **Reliability**

The test-retest reliability was found to be most workable with the PTC. The split-half technique was also employed with tests having more than one item. Parallel form method was not applicable since parallel form tests were not prepared The K-R formula could not be used for the simple reason that the nature of responses on the test items were not applicable in the form of proportion to correct responses .It was, however, thought worthwhile to test internal consistency in terms of inter test correlations.



Split half reliability method could be used with only three verbal tests, namely, the seeing problems test, the unusual uses test and the consequences test. The results were obtained by employing the spearman brown formula. The reliability results are given in the following table 3.

**Table 2.5.1**

S. No.	Name of the test	Test-Retest Reliability	Split-Half Reliability r11
1	Seeing Problem Test	0.68	0.88
2	Unusual Uses Test	0.97	0.51
3	Consequences Test	0.71	0.80
4	Test of Inquisitiveness	0.74	–
5	Square Puzzle Test	0.91	–
6	Blocks Test of Creativity	0.83	–
	Creativity (total)	0.92	–

The review of reliability literature helped to evaluate the present findings. Torrance(1963) found the test-retest reliability of the Minnesota Test of Creative Thinking as 0.80 with the stability of the part scores to be in the vicinity of 0.65 to 0.70.

### **Validity**

The concurrent i.e., Convergent and divergent and factorial validity methods were employed to validate the PTC. Validity studies were conducted on the sample of sixty subjects. The scores of subjects on the PTC were taken separately and collectively; and the scores on the things done on Your Own check list, non-verbal intelligence, and achievement, were also obtained. Thus, four external criteria were employed to see the validity of the PTC. These criteria were:

1. The things done on Your Own check list adopted from Torrance's (1962) check list.
2. Non-verbal intelligence (The Raven's 1960, Standard Progressive Matrices).
3. Verbal intelligence (The Jalota's 1964; Group Test of General Mental Ability),and
4. Achievement (common examination marks in school subjects).

### **Administration**

The PTC include six tests, namely:(i) The Seeing Problem Test,(II) The Unusual Uses Test,(iii) The Consequences Test,(iv) The Test of Inquisitiveness,(v) The Square Puzzle Test, and(vi) The Block Test of Creativity. The first three test verbal in nature. The last three tests can be classified as partially non-verbal for the simple reason that the test materials of these three tests present the non-verbal type of stimuli. The first four test can be administered individually as well as in convenient groups of nearly thirty subjects at a time. The fifth test of square puzzle can either be administered individually or in groups not exceeding six students per administration. The sixth test, namely, the Block Test of Creativity can be administered individually. The sequence of testing is observed as follows:

**Table 2.5.1**

S. no.	Test	Group/Individual	Time in Minutes
1.	Seeing Problem	Group (N=30) and individually	8
2.	Unusual Uses	Group (N=30) and individually	8
3.	Consequences	Group (N=30) and individually	8
4.	Inquisitiveness	Group (N=30) and individually	6
5.	Square Puzzle	Group (N=6) and individually	40
6.	Block Test of Creativity	Individually (N=1)	10

## Scoring

- 1. The Seeing Problems Test-** In the case of the seeing problem test each accepted response is given a credit of one score representing seeing problem (SP).
- 2. The Unusual Test-** With this test dimensions of fluency (UF), Flexibility (UX), and originality (UO), are measured. The fluency (UF) score is obtained by counting the total number of different categories of responses. Originality (UO) is assessed on the bases of commonness of responses for which a five-point scale from Zero to four was developed in order of assign weightage to responses according to level of commonness.
- 3. The Consequences Test-** The test is designed to measure the dimensions of fluency (CF) and originality (CO). Fluency (CF) is represented by the sum total of accepted responses on the test. The score of originality (CO) is represented by the total number of indirect or remote responses. The summated scores of fluency (CF) and originality, (CO) represent a score of creativity (CC) as measure by the consequences test.
- 4. Test of inquisitiveness –** In this test the relevant and mutually exclusive question asked about the metronome and about the play card displaying the sentence “A FEW CHILDREN CANNOT TOUCH IT” is counted in order to get the score of inquisitiveness (INQ).
- 5. The square puzzle test -** This test is intended to measure the dimension of persistency (PER) the score of a student on persistency is derived from the time taken by him on the task. The score of persistency is equal to the number of completed minutes on the task after deducting three minutes to the subject for initial practice and familiarities with the test material.
- 6. The Block Test of Creativity –** the dimension of fluency (BF), flexibility (BX) and originality (BO) are measure with the help of the block test of creativity. Creativity score (BC) on this test is the summation of the score on the dimension of the fluency (BF), flexibility (BX) and originality (BO).

### 2.5.2 SCIENTIFIC ATTITUDE TEST BY DR. AVINASH GREWAL (1990).

Scientific attitude as an opinion or position taken with respect to psychological object in the field of science (Richard W. Moore 1970) the science attitude has, therefore, been operationally defined as generalize attitude towards the universe of science content

and being measured in terms of its favorableness or unfavourableness estimated from the scores obtained by the subject on an attitude scale toward science comprising of the four categories from the universe of content 'science attitude'; (1) positive intellectual, (2) negative intellectual, (3) positive emotional, and (4) negative emotional attitudes.

### **Reliability**

The reliability of the science attitude scale (SAS) was estimated by the split-half (0.86) and test-retest (0.75) methods which was found to be quite satisfactory. This compares favorably with reliability (0.765) found by Sood (1975) for his scale attitudes towards science and scientists. Reliability of the scale further checked by two methods of scoring by administering the scale to a small sample of 50 subjects with instructions to check the statement in accordance with the usual Likert instructions, the coefficient of correlation found between the scores on two scales was 0.94. Ferguson (1941) reported a correlation of 0.82 between the Thrustone and Likert methods of scoring; the reliability coefficients are given in table no. 6.

**Table 2.5.2**

#### **Reliability coefficient and the SEs of their measurements**

<b>S. No.</b>	<b>Method</b>	<b>Reliability Obtained</b>	<b>Coefficient Correlated</b>	<b>Reliability</b>	<b>SE of Measurement</b>
1.	Split-half (odd-even)	0.76	0.86	0.87	-2.63
2.	Test-retest(3months)	0.60	0.75	0.77	-3.55
3.	Likert-Thurstone (Technique of scoring)	0.94	0.96	0.96	+4.48

## **Validity**

The SAS appears to have content validity and the method of selecting items supports this supposition. In addition, differences in mean scores were found among the selected groups of known preference for science i.e. Arts (Mean=46.41) and Science (Mean=50.58) students which is highly significant ( $t=6.62$ ) at 1 percent level.

## **Administration**

The SAS is a self-reporting inventory consisting of 20-items designed to assess the attitude of individual towards the science. There is no time limit but normally it takes about 5 minutes to explain the test and require about 15 items for giving responses to the items of the scale. The raw score can be converted into percentile norms which have been derived from the data collected from the norming population.

## **Scoring**

Each of the ten positive items (S. no. 2,4,6,8,10,12,14,16,18,20) of the scale are assigned a weight ranging from 4 ( Strongly Agree) to 0 ( Strongly Disagree). In the case of ten negative items (S. no.1,3,5,7,9,11,13,15,17,19) the scale scoring reversed ranging from 0(Strongly Agree) and 4 (Strongly disagree).The attitude score of a subject is the sum total of scores on all the twenty items of the scale . For each student a total score on the scale can be obtained by summing his score for the individual items. Thus a maximum of 80 scores can be obtained by a subject. However, the administrator of the test reveals that the scores ranged from 25 to 70.

### **2.5.3 AGARWAL PARENTAL ENCOURAGEMENT SCALE BY DR. KUSUM AGARWAL.**

The term 'parental encouragement' is slightly new in psychological research perspective. In parental encouragement, we assumed that parents show it by helping and guiding the child and coaxing him not to feel disheartened at a particular point of difficulty.

Rossi(1965) defined this term as when father and mother approve or disapprove of any activity related to education or remove any hurdle felt by the student in the process, or guide him the right or wrong –this entire spectrum activity comes within the purview of parental encouragement .So ,in short we can conceptualize parental encouragement in

this manner treatment originating from parents towards the child with a view to enhancing the possibilities of future occurrence of good behavior by care ,concern, approval and guidance.

This present scale is an attempt to measure quantitatively the parental encouragement as perceived by the child .it is also a useful tool to categorize the students in terms of the degree of their parental encouragement.

### **Reliability**

Two indices of reliability of the scale were found out. Firstly, its reliability was determined by K.R. Method (.79), secondly, two test -retest reliabilities were determined after an interval of three months (.82), and the other after an interval of six months (.80). These two sets of reliability coefficients of the scales are presented in the following Table 2.2.

**TABLE 2.5.3 : INDICES OF RELIABILITY OF APES**

	<b>K.R. Method</b>	<b>Test- retest Method</b>	
<b>N = 50</b>	<b>Time gap of three Months' Time gap of six months</b>		
<b>Value</b>	<b>0. 79</b>	<b>0. 82</b>	<b>0. 80</b>

### **Validity**

For determining validity of the APES, sit was given to 100 parents and 100 students belonging to those parents respectively .Their separates responses were correlated and when correlation was found high (0.73), it was assumed that the scale measures what it designs to measure. In order to establish interval validity the responses of each item were correlated with the total responses which have shown satisfactory correlation (0.64).

### **Administration**

The APES may be administered individually as well as in the group. There is no fixed time limit for the response. But usually respondents take 40 to 50 minutes for filling

in the whole scales. The instructions printed on the scales form should be made clear by the administrator to the respondent

### **Scoring**

The scale can be scored accurately by hand. The responses of the subjects were assigned numerical values, ranging from 1 to 5, depending upon the degree of perceived parental encouragement.

**TABLE 2.5.3 GIVES THE DETAILS OF THE WEIGHTAGE  
SCORING OF THE SCALE ITEMS**

Always	Most often	Frequently	Sometimes	Never
5	4	3	2	1

Thus the total weighted score of APES ranges from 80 to 100. The total weighted score, if high, reveals greater amount of parental encouragement, whereas lower scores indicate the lower degree of parental encouragement.

### **2.6 PROCEDURE OF DATA COLLECTION**

The researcher collected the data by personally visiting schools and after obtaining permission from the principals of those schools, seeks the cooperation of secondary school students to answer the questionnaires which were distributed to them. Before the administration of the test, the investigator made clear the purpose of data collection and gave directions regarding the attempt of questions in the tools, namely, Creative Ability Scale, Scientific Attitude and Parental Encouragement.

After proper explanation that they have to attempt each statement by placing a tick (✓) in one of the box provided and also not to leave any statement unanswered. They were assured that their data will be kept confidential and use only for research purpose.

The requirement of the study was to take students from secondary schools. It took 3-4 weeks for data collection. On one day, only one test was administered. On the first day, Creative Ability Scale was administered to a selected group of girl and boy students and data was collected. Then on the second day Scientific Attitude was administered on

the same set of selected male and female students. Further, the Parental Encouragement Scale was administered the same set of male and female students was also taken. In this way the total data was collected from all the schools (i.e. 5 Govt. secondary schools and 5 Private secondary school) from Jalandhar district of Punjab.

## **2.6 STATISTICAL TECHNIQUES**

Statistical technique is a collection of methods which is used to process large amount of report overall trends and data. It refers to a collection of methodologies used in measurement of data. It is normally used in ascertaining relative performance that involves assumptions about functional relationships. Statistical technique brings objectivity in interpretation and leads to the reliability in result.

In the other term statistical techniques work as an indispensable tool for analyzing and interpreting the data expressed in numerical terms and also facilitates the derivation of conclusions and formulation of generalization. It refers to an assortment of methodologies used in measurement of data. It is normally used in ascertaining relative performance that involves assumptions about functional relationships. Statistical techniques are employed to get a precise and exact picture of the data. In research process it is basically used for testing the hypothesis. With the help of statistical technique the result become more accurate, quantified and comparable.

In research studies, statistical technique was used by the investigator not only to understand, but compare data and also to test hypothesis. In research studies the following statistical techniques was used for the analysis of data:-

1. Descriptive statistic mean, median, mode and standard deviation was applied to find out the level of creative ability, scientific attitude and parental encouragement of the secondary school students.
2. Z-test was applied to determine the significance of difference between two mean of sample groups.
3. Multiple correlation (R) was used for determining the relationship among creative ability, scientific attitude and parental encouragement.



**CHAPTER-III**

**ANALYSIS AND**

**INTERPRETATION**

## **CHAPTER-III**

### **ANALYSIS AND INTERPRETATION**

The present chapter deals with the statistical analysis of data, description and interpretation of the result in accordance with objectives of the study. Data is meaningless heaps of material without analyses and interpretation. The analysis and interpretation represents the application of inductive and deductive logic to the research process. Analysis of data is most important and crucial step in research. It means studying the organize material in order to discover inherent facts. To quote F.N. Kerlinger “Analysis of data means categorizing, ordering, manipulating and summarizing of data to obtain answer to research questions”. Firstly by keeping in mind the objectives of the study the researcher studied the level of creative ability, scientific attitude and parental encouragement of secondary school students on the basis of gender and nature of school, After that the investigator used t-test to find significant difference on creative ability, scientific attitude and parental encouragement of secondary school students on the basis of gender and nature of school. Pearson’s coefficient of correlation was used to find the relationship of creative ability with scientific attitude and parental encouragement. At last regression analysis were used to study the prediction of creative ability on scientific attitude and parental encouragement of secondary school students. Presentation of analysis and interpretation of the data follows the sequences given below:-

**3.1 Results pertaining to levels of creative ability, scientific attitude and parental encouragement of secondary school students.**

**3.2 Results pertaining to difference in the creative ability, scientific attitude and parental encouragement of secondary school students.**

**3.3 Results pertaining to the relationship of the creative ability, scientific attitude and parental encouragement of secondary school students.**

#### **3.1 RESULTS PERTAINING TO LEVELS OF CREATIVE ABILITY, SCIENTIFIC ATTITUDE AND PARENTAL ENCOURAGEMENT OF SECONDARY SCHOOL STUDENTS**

The analyses and interpretation of the level of creative ability, scientific attitude and parental encouragement of secondary school students have been studied under this heading. Levels of creative ability, scientific attitude and parental

encouragement of secondary school students have been explored. Details' pertaining to the analysis has been given separately for creative ability, scientific attitude and parental encouragement.

### **3.1.1 LEVEL OF CREATIVE ABILITY AMONG SECONDARY SCHOOL STUDENTS**

In order to explore the level of creative ability among secondary school students of Jalandhar district of Punjab the investigator used creative ability scale for collecting information from the subjects. The scores of the creative ability scale were calculated and divided into three groups as per norms developed by the investigator i.e. Low Creative Ability Group (LCA), Average Creative Ability Group (ACA) and High Creative Ability Group (HCA). This means that the subjects having creative ability scores less than 48 belong to low creative ability group while subjects having scores between 48-80.25 belong to average creative ability group and the subjects having scores more than 80.25 belongs to high creative ability group. The results pertaining to different levels of creative ability of secondary school students have been presented in the table 3.1.1

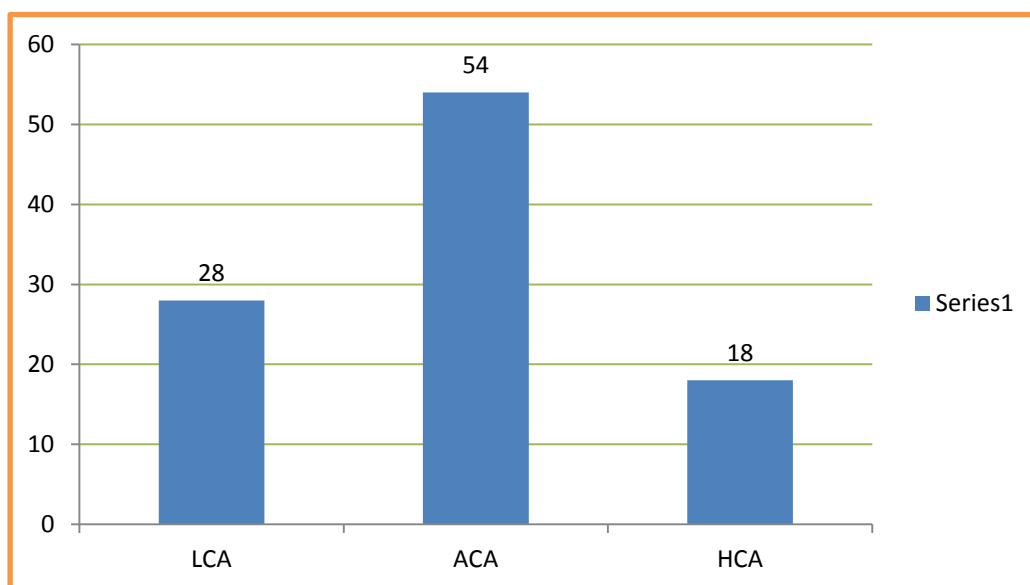
**Table 3.1.1 Level of Creative Ability among Secondary School Students**

<b>Levels of Creative Ability</b>	<b>N (200)</b>	<b>Percentage</b>
LCA	56	28%
ACA	108	54%
HCA	36	18%

The result of the table 3.1.1 revealed the percentage wise creative ability data of senior secondary students. From the table it was revealed that 28% of secondary school students have low spiritual intelligence, 54% have average creative ability and 18% have high creative ability. It means majority of senior secondary school students falls in average level of creative ability. The result of the above table has been presented graphically through the figure 3.1.1

**Figure 3.1.1**

**Bar graph showing Level of Creative Ability among Secondary School Students**



### **3.1.2 LEVEL OF SCIENTIFIC ATTITUDE AMONG SENIOR SECONDARY SCHOOL STUDENTS**

In order to explore the level of scientific attitude among secondary school students of Jalandhar district, Punjab the investigator used scientific attitude scale for collecting information from subjects. The scores of the scientific attitude scale were calculated and divided into three groups as per norms developed by the investigator i.e. Low Scientific Attitude Group (LSA), Average Scientific Attitude Group (ASA) and High scientific Attitude Group (HAS). The subjects having less than 41.75 scores belongs to low scientific attitude group while subjects were having scores between 41.75-53 belongs to average scientific attitude group and the subjects having scores more than 53 scores belongs to high scientific attitude group. The results pertaining to different levels of scientific attitude of secondary school students have been presented in the table 3.1.2

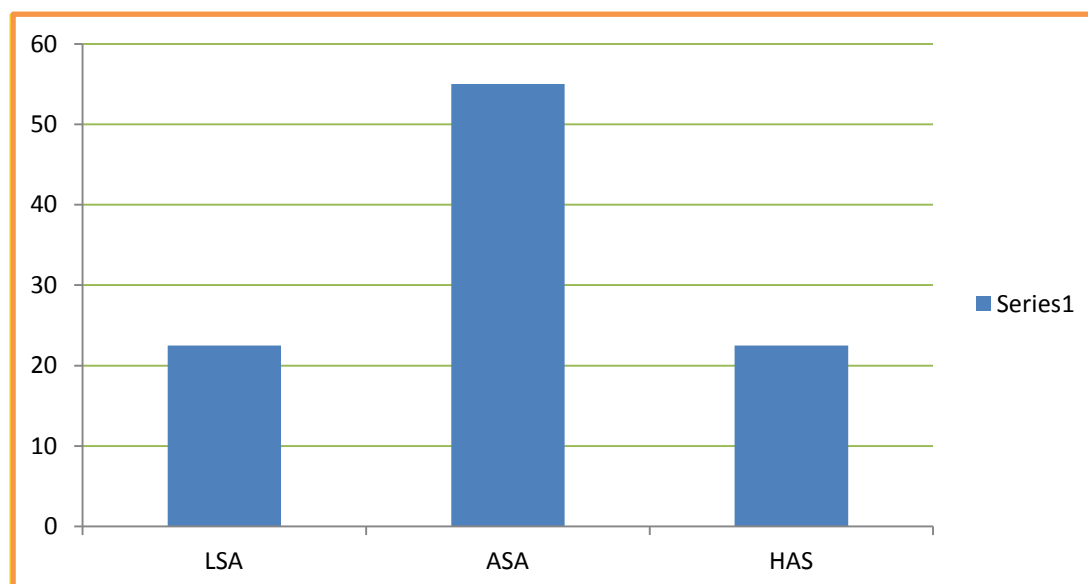
**Table 3.1.2 Level of Scientific Attitude among Secondary School Students**

Levels	N (200)	Percentage
LSA	45	22.5%
ASA	110	55%
HAS	45	22.5%

The result of the table 3.1.2 shows the percentage wise data of secondary students in scientific attitude. From the table it was revealed that 22.5% of secondary school students have low scientific attitude, 55% have average scientific attitude and 22.5% have high scientific attitude. It means majority of senior secondary school students falls in average level of scientific attitude. The result of the above table has been presented graphically through the figure 3.1.2

**Figure 3.1.2**

**Bar graph showing Level of Scientific Attitude among Secondary School Students**



### **3.1.3 LEVEL OF PARENTAL ENCOURAGEMENT AMONG SENIOR SECONDARY SCHOOL STUDENTS**

In order to explore the level of parental encouragement among secondary school students of Jalandhar district, Punjab the investigator used parental

encouragement scale for collecting information from subjects. The scores of the parental encouragement scale were calculated and divided into three groups as per norms developed by the instigator i.e. Low Parental Encouragement Group (LPE), Average Parental Encouragement Group (APE) and High Parental Encouragement Group (HPE). The subjects having less than 300 scores belong to low parental encouragement group while subjects having scores between 300-346.5 belongs average parental encouragement group and the subjects having scores more than 346.5 scores belongs to high parental encouragement group. The results pertaining to different levels of parental encouragement secondary school students have been presented in the table 3.1.3

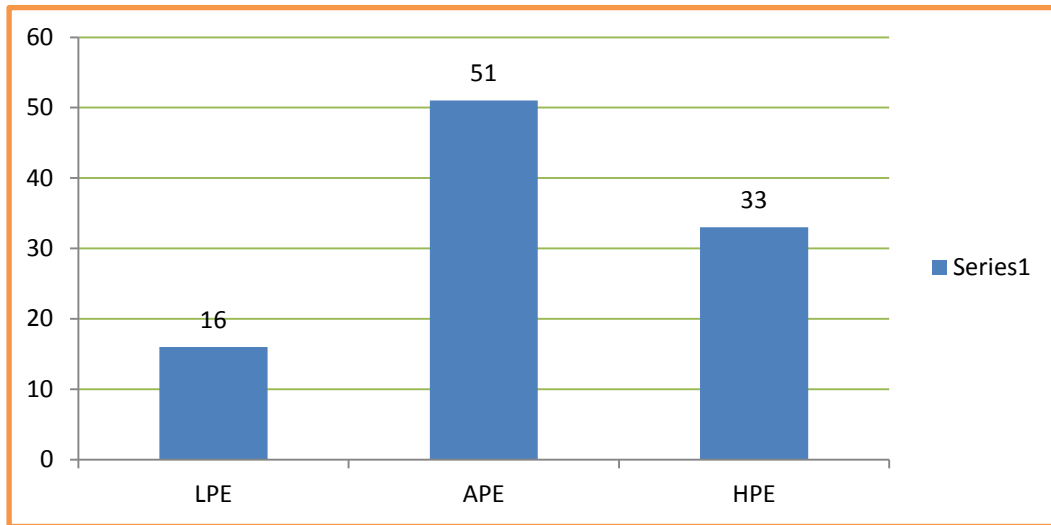
**Table 3.1.3 Level of Parental Encouragement among Secondary School Students**

<b>Levels</b>	<b>N (200)</b>	<b>Percentage</b>
LPE	32	16%
APE	102	51%
HPE	66	33%

The result of the table 3.1.3 revealed the percentage wise data of secondary students in parental encouragement. From the table it was revealed that 16% of secondary school students have low parental encouragement, 51% have average and parental encouragement 33% have high parental encouragement. It means majority of senior secondary school students falls in average level of Parental encouragement. The result of the above table has been presented graphically through the figure 3.1.3

**Figure 3.1.3**

**Bar graph showing Level of Scientific Attitude among Secondary School Students**



### **3.2 RESULTS PERTAINING DIFFERENCE BETWEEN CREATIVE ABILITY, SCIENTIFIC ATTITUDE AND PARENTAL ENCOURAGEMENT OF SECONDARY SCHOOL STUDENTS**

In order to find the difference in creative ability, scientific attitude and parental encouragement between male and female of secondary school students, the investigator used creative ability scale, scientific attitude scale and parental encouragement scale for collecting information from 200 male and female of secondary school students.

3.2.1. Difference in creative ability between male and female secondary school students.

3.2.2. Difference in scientific attitude between male and female secondary school students.

3.2.3. Difference in parental encouragement between male and female secondary school students.

### 3.2.1. DIFFERENCE IN CREATIVE ABILITY BETWEEN MALE AND FEMALE SECONDARY SCHOOL STUDENTS.

In order to find the difference in creative ability between male and female students of secondary school, for require information from the students the investigator used creativity ability scale. The collected information was tabulated and t-test was applied. The result so obtained has been present in the table 3.2.1

**TABLE 3.2.1**

#### **DIFFERENCE IN CREATIVE ABILITY BETWEEN MALE AND FEMALE SECONDARY SCHOOL STUDENTS**

Category	Mean	Sd	Sed	df	t-value	t –value
Male	57.93	25.63	3.227	198	3.56	Significant at 0.01 level
Female	69.43	19.60				

The above table 3.2.1 indicates that the mean value of male students of secondary school was turned out to be 57.93 whereas for female students of secondary it was 69.43. The standard deviation for male of secondary school students was turned out to be 25.63 whereas for female of secondary school students, it was 19.60. Then the t-value was calculated as 3.56 which were found to be significant at 0.01 level of significance. Therefore, the second hypothesis of the study which was stated that “There exists no significant difference between male and female of secondary school students in creative ability”, was rejected. The results revealed that there is significant difference in the creative ability of male and female students’ secondary schools. Nadeem&Anwar (2012) conducted a study on a comparison of Creative Thinking Ability of High and Low Achievers Secondary School Students. Result of the study revealed that there was no difference between high and low achievers in terms of creative thinking abilities. However, girls and the students belonging to urban areas found better in their creative thinking. The finding of this study revealed that female students seem more creative ability than male students and there is no significant difference between male and female students of secondary school.



### 3.2.2. DIFFERENCE IN SCIENTIFIC ATTITUDE BETWEEN MALE AND FEMALE SECONDARY SCHOOL STUDENTS.

In order to find the difference in scientific attitude between male and female students of secondary school, for require information from the students the investigator used scientific attitude scale. The collected information was tabulated and t-test was applied. The result so obtained has been present in the table 3.2.2

**TABLE 3.2.2**

#### **DIFFERENCE IN SCIENTIFIC ATTITUDE BETWEEN MALE AND FEMALE OF SECONDARY SCHOOL STUDENTS**

Category	Mean	Sd	Sed	df	t-value	t –value
Male	46.93	8.14	1.089	198	1.14	Insignificant at 0.05 level
Female	48.17	7.24				

The above table 3.2.2 revealed that the mean value of male students of secondary school was turned out to be 46.93 whereas for female students of secondary school it was 48.17. The standard deviation for male students of secondary school was turned out to be 8.14 whereas for female students of secondary school, it was 7.24. Then the t-value was calculated as 1.14 which was found to be insignificant at 0.05 level of significance. Therefore the second hypothesis of the study which was stated that “There exists no significant difference between male and female of secondary school students in their scientific attitude” was accepted. The results revealed that there is no any significant difference in the scientific attitude between male and female students of secondary school. Female students seem more scientific attitude than male students. Asghar (2011) conducted a study on Persian secondary school students. The result of the study showed that there was no significant difference between male and female secondary school students in relation to their attitude towards science. Kumar, (1991) Patil, G. V (2009) found that the scientific attitude test scores of boys and girls of the average group differed significantly. There was also no significant difference between the Means of scientific

attitude test scores of the urban and rural areas. Rao, (1990) found that the scientific attitude in secondary school pupil was average. There was no difference in the scientific attitude of boys and girls. It revealed that female students have more interest as compare to male students at secondary level. Female students of secondary school are take more interest in science subject.

### **3.2.3. DIFFERENCE IN PARENTAL ENCOURAGEMENT BETWEEN MALE AND FEMALE SECONDARY SCHOOL STUDENTS.**

In order to find the difference in parental encouragement between male and female students of secondary school, for require information from the students the investigator used scientific attitude scale. The collected information was tabulated and t-test was applied. The result so obtained has been present in the table 3.2.3.

**TABLE 3.2.3**

#### **DIFFERENCE IN PARENTAL ENCOURAGEMENT BETWEEN MALE AND FEMALE OF SECONDARY SCHOOL STUDENTS**

Category	Mean	Sd.	Sed	df	t-value	t-value
Male	322.39	26.79	4.103	198	3.73	Significant at 0.01 level
Female	337.71	31.08				

The above table 3.2.3 revealed that the mean value of male students of secondary school was turned out to be 322.39 whereas for female students of secondary school it was 337.71. The standard deviation for male students of secondary school was turned out to be 26.79 whereas for female students of secondary school, it was 31.08. Then the t-value was calculated as 3.73 which were found to be significant at 0.01 level of significance. Therefore the second hypothesis of the study which was stated that “There exists no significant difference between male and female of secondary school students in parental encouragement” Was rejected. The results revealed that there is significant difference in the parental encouragement between male and female students of secondary school. Female students seem more parental encouragement than male students.

Devi and Mathuri (2008) examined that no significant difference in social maturity of docents by parental employment but significant differences were found in the dimensions such as interpersonal adequacy and social adequacy also no significant grade and gender differences were observes. Sravanthi (2007) showed that majority if the parents followed authoritarian parenting style for both boy and girls in academic area in order to make children score better in their study. There is a significant difference between the perception of adolescents' and the parenting style adopted by parents in authoritative and premises parenting style. This study also revealed that there is no significant difference between male and female students of secondary school students. It revealed that female students seem more parental encouragement as compare to male students. Parents of female students are more caring and girls also encouraged by their parents.

### **3.3. RESULT PERTAINING RELATIONSHIP BETWEEN CREATIVE ABILITY, SCIENTIFIC ATTITUDE AND PARENTAL ENCOURAGEMENT**

The present study explored to find out the relationship between creative ability of secondary school students with their scientific attitude and parental encouragement. In order to achieve this objective standardized creative ability scale, scientific attitude scale and parental encouragement scale were administered for data collection. Multiple correlations were calculated and the results are presented in the table given below:

<b>Variables</b>	<b>N</b>	<b>“r”</b>	<b>Types of variables</b>		<b>Df</b>	<b>“R”</b>	<b>Result</b>
C.A and S.A	200	0.046	Dependent Variable	Creative ability	198	0.085	+v correlation
C.A and P. E		0.072	Independent Variable	Scientific Attitude and			
S.A and P.E		-0.012		Parental Encouragement			

The table 3.3 revealed that the value of multiple correlations ( $R_{1,23}$ ) between creative ability, scientific attitude and parental encouragement is 0.085 which is not significant at 0.05 level of significance. It indicates that there exists positive relation between creative ability, scientific attitude and parental encouragement. Hence, the present hypothesis "There exists no significant relationship between creative ability, scientific attitude and parental encouragement" was accepted. It can be concluded that creative ability is strongly related with scientific attitude and parental encouragement of secondary school students.

Data given in the table also revealed the value of correlation ( $r$ ) between creative ability and scientific attitude among secondary school students is 0.046 which indicates positive correlation. It means higher the extent creative ability then there will be higher scientific attitude among secondary school students. Table also indicates the value of correlation ( $r$ ) between creative ability and parental encouragement among secondary school students is 0.072 which indicates positive correlation. It revealed that parents encourage students of secondary school to enhance their creative ability. It also mean that creative ability among secondary school students is influenced by parental encouragement. Table also shows the correlation ( $r$ ) between scientific attitude and parental encouragement among secondary school students is -0.012 which indicates negative correlation. It means scientific attitude among secondary school students is not as much influenced by parental encouragement.

The finding of the study indicated Creative ability, scientific attitude and parental encouragement are significantly not correlated. Tahira, Kamzi, Ghazi (2010) and Umunadi (2009) found that there is significant positive relationship in parental encouragement and academic achievement of secondary school students. Parental involvement is beneficial in learning activities of child. Harris and Good all (2008) conducted a study to find out the relationship between parents engagement and pupil achievement. Find out result is that parental engagement in child's learning in the home makes the greatest difference to child's outcomes. Find out result is that parental engagement in child's learning in the home makes the greatest difference to child's outcomes.

**CHAPTER-IV**

**CONCLUSIONS**

**RECOMMENDATION**

**AND SUGGESTIONS**

## CHAPTER IV

### CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS

#### 4.1 CONCLUSION

In the light of interpretation of data, the researcher has to use all care and cautions in formulating conclusions and generalizations. This final step of research demands critical and logical thinking in summarizing the findings of the study and compares them with the objectives formulated in the beginning. The researcher should not draw conclusion, which are inconsistent among them or with external realities.

Conclusion is as essential as investigation. They provide a finishing touch and review to the whole of the critical work. In the present study the investigator has tried to find out the creative ability among secondary school students in relation to their scientific attitude and parental encouragement. On the basis of analyses and interpretation of data, following conclusion can be drawn:

1. Majority (54%) of the students are having average creative ability and (18%) of students are having high creative ability and (28%) are having low creative ability.
2. Mean score of creative ability between male students was (57.93) and female students was (69.43) of secondary school.
3. There exists significant difference in creative ability of male and female students, t-value of creative ability was found to be (3.56)
4. Majority (55%) of the students are having average scientific attitude. (22.5%) of students are having high scientific attitude and (22.5%) are having low scientific attitude.
5. Mean score of scientific attitude between male students was (322.39) and female students was (337.71) of secondary school.
6. There exists no significant difference in scientific attitude of male and female students, t-value of scientific attitude was found to be (1.14)
7. Majority (51%) of the students are having average parental encouragement. (33%) of students are having high parental encouragement and (16%) are having low parental encouragement.

8. Mean score of parental encouragement between male students was (46.93) and female students was (48.17) of secondary school.
9. There exists significant difference in parental encouragement of male and female students, t-value of scientific attitude was found to be (3.73)
10. The value of multiple correlations ( $R_{1,23}$ ) between creative ability, scientific attitude and parental encouragement is 0.085 which is not significant at 0.05 level of significance.
11. There exists positive relation between creative ability, scientific attitude and parental encouragement among secondary school students.
12. The value of correlation (r) between creative ability and scientific attitude among secondary school students is 0.046 which indicates positive correlation
13. The value of correlation (r) between creative ability and parental encouragement among secondary school students is 0.072 which indicates positive correlation.
14. The correlation (r) between scientific attitude and parental encouragement among secondary school students is -0.012 which indicates negative correlation.

#### **4.2 SUGGESTIONS**

1. It can be suggested that parents need to support their students physically as well as mentally so that they can develop their creative abilities and scientific attitude as well.
2. Students need to develop positive mind-set and should accept criticism in order to shape their creative abilities.
3. It can also be suggested that students need to build up strong innovativeness, risk taking and open-mindedness for shaping their creative abilities
4. Students ought to develop a sound body of scientific knowledge and information shaping their scientific attitude.
5. Similar study can be conducted at a large scale from other districts of a state.
6. It can also be suggested that future study need to focus on other variables including innovation orientation, emotional labour and perceived parental involvement.
7. The generalizability of the findings could be increased by future studies based on larger samples of participants from diverse educational institutions and regions.

### **4.3 RECOMMENDATIONS**

1. Schools need to organize planned meetings with parents so that they can know the level of intellect of their wards.
2. Policy makers especially CBSE and NCERT should conduct talent based workshops for students so that they can be encourage and motivate.
3. Students should be given opportunities to participate at national level competitions based on essay writing, group discussion etc so that they can develop their cognitive abilities.
4. Teachers should use different pedagogies including audio-visual and demonstrations so that students can develop and update themselves with knowledge and technology.
5. Government need to improve the level of education by providing students with free computer education and other facilities so that they can be benefited in the long run
6. Teachers should provide the students with necessary soft skills by training them in the language labs so that they feel competitive and encouraged
7. Parents ought to visit schools on weekly basis to know the status quo of their wards.



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