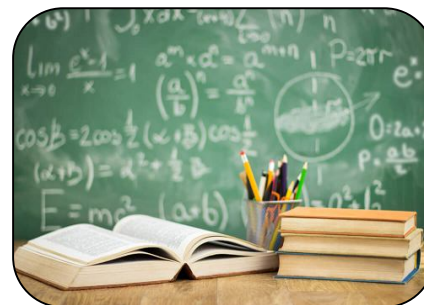




SCIENTIFIC APTITUDE AND EDUCATION

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CONCEPT AND NATURE OF SCIENTIFIC APTITUDE:

- **Meaning of Scientific Aptitude:**

“Aptitude may be described as a special ability or specific capacity, which helps an individual to acquire a high degree of proficiency or Achievement in a specific field”. – Josen George, (2014).

Aptitude is not totally inherited quality we can modify it if not completely but to a considerable extent. One who has Scientific Aptitude, not only perceive the knowledge correctly but also apply it in understanding new situations. The application of knowledge in problem solving is another ability of an individual having Scientific Aptitude.

The Scientific Aptitude may be considered as an inferred state of readiness to react in a characteristic way towards particular type of situations. One who is Scientific minded and has Aptitude for Science is curious to solve problems curious to know things and raise significant questions with reference to observed phenomenon. Developing Scientific Aptitude amongst our children should be the major aim of Science teaching and Education. It completely changes the outlook of child. By teaching Science effectively, keeping this Scientific Aptitude in view, it can bring about the desirable changes in the behavior of the child. School is the only institution where children can be trained to develop this Scientific Aptitude.

Determinants of Scientific Aptitude:

The following points are the determinants of Scientific Aptitude. They are: Presence of certain study skills, Socio-economic factors, Persistence factors in learning science, hereditary background, cultural background, motivation, satisfaction derived from learning a subject.

Factors Considered For The Development of Scientific Aptitude:

The factors which are helpful for the development of Scientific Aptitude among the pupils are physical development, Social and emotional maturity, Moral character, Interest, Abilities, Attitudes.

Criteria For Locating Individuals With Aptitude For Science:

Scientific aptitude plays a vital role in science education and in the lives of students pursuing science education. The first and foremost aspect of the present study is to examine the influence and importance of scientific aptitude of students on their achievement in science.

Aptitude is a component of a competency to do a certain kind of work at a certain level. Outstanding aptitude can be considered “talent”. Aptitudes may be physical or mental. Aptitude is inborn potential to do certain kinds of work whether developed or undeveloped. Ability is developed knowledge, understanding, learned or acquired abilities (skills) or attitude. The innate nature of aptitude is in contrast to skills and

achievement, which represent knowledge or ability that is gained through learning. Aptitude is a special skill or ability in a person to perform a particular task in a better way. It differs from general intelligence.

The aptitude was distinguished from general intelligence and was considered as the capacity to acquire proficiency with the given amount of training, formal or informal, likewise scientific aptitude is concerned with proficiency in science. Scientific aptitude includes curiosity, observation, identification, description, experimental investigation, and theoretical explanation of phenomena. Factors such as creative abilities, capacity for critical thinking, ability to see relationships, open-mindedness, suspended judgment, physical development, social and emotional maturity, moral character, interest, attitudes and skills were also facets of scientific aptitude. And these factors may be immensely responsible for achievement in science which will helps in tracing out the problems concerned in study. There are many studies conducted on scientific aptitude. One study conducted on achievement of science shows that the level of scientific aptitude is low of standard ix students. The study also found that girls and boys differ significantly in their scientific aptitude and achievement. On Academic achievement and scientific aptitude among the students of standard X revealed that the aided school students are having higher scientific aptitude as compared to the government school students. The urban school students are having higher scientific aptitude as compared to the rural school students. The female students are having higher scientific aptitude as compared to the rural school students. The urban school students are having higher academic achievement in science as compared to the rural school students. There was also conducted a research study entitle "A comparative study of scientific attitude, scientific aptitude and achievement in biology at secondary school level". The study found that scientific aptitude in secondary school pupils was average. The pupils of private schools, residential schools, English medium schools and urban schools held a bit more scientific aptitude. There was also a highly significant and positive association among scientific aptitude and achievement in biology. The achievement in biology was average. The rural schools, residential schools, English medium schools and government schools were better achievement. As such many studies were conducted on secondary school level thereby few reviewed were conducted on higher secondary level. Therefore, it is very much necessary to look into the various determinants which affect scientific aptitude in higher secondary level.

Scientific aptitude is the most important outcome of science teaching. The concept of aptitude as the sum total of man's inclinations and feelings, prejudice, or bias, pre-conceived notions, ideas, threats and convictions about any specific topic. Though Aptitude transferred through genes from parents to children, Aptitudes can developed and they are not completely inborn. They can be changed or modified over the time. Such an aptitude is also noticed in the field of science, which we consider as "scientific aptitude". Here, the scientific aptitude means ones inclination or readiness of mind towards the pursuit of scientific knowledge. This scientific aptitude sometimes interchanged with scientific temper. This temperament is a tendency of an individual who is very much inclined to learn scientific concepts. The aptitudes of a scientist involve critical observation, open-mindedness, suspended judgments, free from superstitions and false belief etc. Learning significantly depends on the unique traits and abilities of a learner determining their characteristics. Aptitude in Science and scientific attitude are few among these important factors, upon which Science learning depends to a great extent. Aptitude in Science helps a learner to apply skill and competency in learning science successfully and indicates the possibility of future accomplishment in the field of learning Science. Proper scientific attitude inclines a learner towards scientific knowledge, a scientific process, eminent scientists, and towards scientific inventions encouraging learners' spirit of scientific enquiry. Therefore, scientific aptitude, and scientific attitude are two important factors which may influence effective Science learning and may also the determinants of scientific achievement.

Scientific Aptitude is a potentiality of future accomplishment in science without regard to past training and experience. An individual with right Aptitude towards Science develops better Scientific Aptitude, which is useful in selecting a career. Without right Aptitude towards a subject one cannot master or show any interest in a subject. Like-wise without good Scientific Aptitude an individual does not perform

much in science. Keeping this in mind, the Investigator has chosen the Scientific Aptitude as one of the correlates of Achievement in the present study.

Scientific aptitude is the generalized disposition of any individual towards science, which can be measured in terms of its favorableness estimated from the scores obtained on a scientific aptitude scale. The testing of scientific aptitude involves the testing of components like curiosity, open-mindedness, faith in scientific methods, cause and effect relationship, critical mindedness, seeking evidence, objectivity, suspended judgment & aversion to superstition. In other words, we can say that scientific aptitude is a collective result of the above mentioned factors. Analyzing curiosity which is mentioned as a first factor to be judged while judging scientific aptitude we can say that curiosity of a student towards any subject helps him or her to develop an inclination towards that subject. Curiosity towards subject of science indicates the quality of a student which helps in developing a quest amongst the students to know more about the subject. When there is a quest to know more there will be desire to study sincerely. The sincere study will automatically help to remember and assimilate.

When a student develops interest and tilt towards science subject he/she starts knowing about the scientific activities and the scientists involved in it and develops a scientific thinking. This directly or indirectly adds to cultural heritage of man. In scientific pursuits it requires intellectual honesty at each step. Scientific aptitude is the most important outcome of science teaching. Scientific aptitude is a real significant concern of the process of science education. Scientific aptitude is a potentiality of future accomplishment in science without regard to past training and experience. Scientific aptitude is a compound of abilities which are developed through learning. It is a special intellectual ability to comprehend the scientific knowledge. The judgment of scientific aptitude involves a high degree of tilt towards reasoning and understanding of scientific concepts.

The students with higher scientific aptitude have to have special visualization towards the subject of science. There should be a high degree of interest amongst the students to read the scientific literature and grasp the concepts innately. When a student has higher scientific aptitude he/she will have higher scientific vocabulary which actually comes with getting more inclined to the „know – how“ of scientific literature. The development of scientific aptitude helps in raising the quality of numerical ability in students along with the information about scientific events. Without right aptitude towards the subject one cannot master or show much interest in subject likewise without good scientific aptitude an individual does not perform to a considerable level in science. Along with the presence of study skills which have been mentioned in paragraph above, every individual needs certain persistence factors in learning science. Heredity, background and the environment you live in are the eminent factors to count upon. To break it further we can say that the factors such as physical development, social and emotional maturity, moral character, individualistic interests/abilities and attitudes may also be considered necessary for development of scientific aptitude.

Scientific aptitude plays a vital role in understanding and comprehending the content in science subject. As a whole science needs in-depth reasoning power and special visualization of the content. Achievement in science strongly depends upon the fact that how much the students have learnt and how much they have retained during the time of examination. If the students have scientific aptitude, then the learning becomes easier and student will be able to retain it for a longer time. Thus it implies that there is a sincere need to explore as to how scientific aptitude links with enhancement of science education and thus achievement in Science. If a subject is understood well in a class, the students welcome it with interest and the learning phenomena become easier. If the aptitude of students is towards the study of science, then their attitude is welcoming to know more. This aspect of trying to know more is the quest to learn the subject more and go into its depth. If the students have the power to grasp faster and learn more, then that power can further be advanced from innate scientific aptitude to the enhanced scientific aptitude. This can further help the students to develop a positive attitude for the subject of science. Knowing about these two factors i.e. scientific attitude and scientific aptitude, develop a query as to how much these factors really influence the learning and grasping phenomena in the field of science. At this level there is a need to

understand as to what can help the students in better learning and assimilation in the subject of science? What are the factors which can help and affect the student's decision to choose science as a subject for their further studies? What are the factors which can affect the students' level of achievement in the subject of science? In nutshell this can be summed up as a sincere requirement of knowing the effect of scientific attitude and scientific aptitude upon the achievement level of students in the subject of science. These two play a decisive role in enhancing the grasping power in science and thus leading the students to understand the subject thoroughly. Both these factors are required to be judged and nurtured in the right direction amongst the students for the better perspective of science education.

Positive scientific attitude and higher scientific aptitude will help the students in early grasping and better adaptability to study science. This is the time when there is a requirement to open the field of science to those students who have an inborn scientific attitude and scientific aptitude. Along with this there is also a need to develop the measures as to how these qualities can be enhanced amongst the students for better achievement in the subject of science. How these variables can affect the results in the form of achievement in the subject of science amongst students? By studying the effect of these variables we can also find out the measures to develop and nurture the qualities to learn science in those students who are weak in science. These disciplinary qualities of mind, if judged and intensified may be carried over to manifest general achievement level of a learner. Scientific attitude and scientific aptitude are reflected amongst students' involvement in science related activities, their orientation towards science literature and their knowledge about scientists and their subsequent achievements.

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