SOCIAL INTELLIGENCE AND SCIENTIFIC ATTITUDE OF SECONDARY SCHOOL TRIBAL STUDENTS OF ADILABAD DISTRICT IN RELATION TO THEIR ACHIEVEMENT IN MATHEMATICS

A thesis submitted to the University of Hyderabad in partial fulfillment of the award of

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In

EDUCATION

BY

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DECLARATION

I. **Srinivas Ghodam,** hereby declare that the thesis entitled, "**Social Intelligence and Scientific Attitude of Secondary School Tribal Students of Adilabad District in Relation to their Achievement in Mathematics**" submitted by me under the guidance and research supervision of **Prof. G. Bhuvaneswara Lakshmi** (Former Head of the Department), Department of Education and Education Technology (DOEET), School of Social sciences, University of Hyderabad, is a bonafide research work. I also declare that it has not been submitted previously in part or in full to this University or any other University or Institution for the award of any degree or diploma.

Signature of the student

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CERTIFICATE

This is to certify that the thesis entitled "**Social Intelligence and Scientific Attitude of Secondary School Tribal Students of Adilabad District in Relation to their Achievement in Mathematics"** submitted by **SRINIVAS GHODAM** bearing registration number **18SEMD08** in partial fulfilment of the requirements for award of Doctor of Philosophy in the Department of Education and Education Technology (DOEET), School of Social sciences, University of Hyderabad, is a bonafide work carried out by him under my supervision and guidance.

This thesis is free from Plagiarism as per university norms and has not been submitted previously in part or in full to this or any other University or Institution for the award of any degree or diploma.

Further, the student has the following publications before submission of the thesis for adjudication and has produced evidence for the same in the form of acceptance letter or the reprint in the relevant area of his research.

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Further, the student has passed the following courses towards fulfillment of the coursework requirement for Ph.D.

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Abstract

This study aimed to examine the relationship among social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students of Adilabad district of Telangana state. A quantitative correlational research design was used in this study. The simple random sampling method was used to select the sample. The population of the study is **4298** secondary school tribal students of the Adilabad district of Telangana state, India. The data was collected from a sample of 420 secondary school tribal students by using the survey tool that covers demographic variables, gender, locality, and Medium of instructions. The results analyzed by using mean, median, t-test, Pearson product movement correlation, and regression. Correlation analysis revealed that there is a positive significant relationship between social intelligence and achievement in mathematics, scientific attitude and achievement in mathematics and social intelligence and scientific attitude. The regression analysis revealed that scientific attitude is effecting more on achievement in mathematics. This study will help to school teachers and administrators to enhance social intelligence and scientific attitude of secondary school tribal students and, achievement in mathematics also.

Key words: Social Intelligence, Scientific Attitude, Achievement in Mathematics, Secondary Schools, and Tribal Students.

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LIST OF ABBREVIATIONS

S. I	:	Social intelligence
S. A	:	Scientific attitude
E.I	:	Emotional intelligence
A.A	:	Academic achievement
A.M	:	Achievement in mathematics
S.T	:	Scheduled tribes
A.H.S	:	Ashram high school
S.S	:	Secondary school
I.T.D.A	:	Integrated tribal development agency
P.O	:	Project officer
D.D	:	Deputy Director
Df	:	Degree of freedom
Ed.	:	Edition
e.g	:	For example
etc.,	:	And so forth
Dr.	:	Doctor
Dept.	:	Department
T.S	:	Telangana state
S.D	:	Standard deviation
Et al.	:	And others

F- Value	:	Fishers value
H.M	:	Head master
i.e.	:	That is
M	:	Mean
M.Ed.	:	Master of Education
Mr.	:	Mister
Mrs.	:	Misses
M.Sc.	:	Master of Science
N	:	Sample size
No.	:	Number
P./PP.	:	Pages
Ph.D.	:	Doctor of philosophy
Prof.	:	Professor
r	:	Coefficient correlation
Regd.	:	Registered
Rev.ed.	:	Revised edition
Smt.	:	Sreemathi
Viz.	:	Namely
Vol./vols.	:	Volume/volumes.
Vs.	:	Versus
N.C.F	:	National curriculum frame work
U-DISE	:	Unified-District Information System for Education

CHAPTER ONE

INTRODUCTION

1. INTRODUCTION

Education aims to change a person's behavior for a better society. It develops a person's ability to acquire and adapt to new knowledge, skills, values, attitudes, etc. One of the most important purposes of education is to prepare a child to contribute more positively to society as we are living in a society in which special skills, in particular, social abilities, are needed for individual life. The Secondary Education Commission (1953) and the Indian Education Commission (1964) point out that the aim of democratic education is the full and all-round development of the individual's personality and maximization of the individual's potentiality.

People are social by nature. We can't live alone by ourselves. As a result, it is important to improve our social intelligence so that we can get along better with other people. Not only does this make us better individual in general, but it also keeps us healthy. In large organizations, processes would stop working properly if people had trouble getting along with each other. The main aim of social intelligence is to resolve conflicts well, negotiate well, and improve personal and professional relationships. Social intelligence teaches people how to deal with differences between people in a positive way instead of trying to avoid them or run away from them. When we have social intelligence, we are better able to adapt to our social environment and change based on what other people need.

The most important outcome of science education is the upliptment of a S.A. which in turn helps us to think in a logical manner. It is the sum of a person's various positive traits and characteristics, which may be seen in their actions and how they conduct themselves. According to Grinnell, "a scientific attitude is not a strategy for

addressing the issues facing the world; rather, it is a perspective through which one perceives the world." Scientific attitude is essential for developing one's analytical and deductive reasoning skills. Almost all of the education related commissions and committees that have been set up since the country became independent have stressed the need for students to have a scientific attitude.

It has been observed that a person who has a scientific attitude is highly inquisitive and wants to learn more and more about the things, people, and events that are occurring around him. He will not cease his investigation until he has obtained an adequate explanation and an answer that satisfies his needs. A guy with a scientific attitude is resolute in his conviction that every occurrence can be traced back to one or more factors that contributed to it. He does not subscribe to the notion that bad luck and superstitions have a role in the world. He believes that there is a definite physical force behind every event, that events occur in a definite pattern that follows the laws and principles of science, and that events are in no way governed by the supernatural or other mysterious powers. He thinks that science is the best way to explain everything that happens. A person with scientific attitude is one who practices accepting only those things that can be shown to be true by the examination of accumulated data; moreover, this individual is willing to acknowledge the facts in their natural state and appearance. As a result of his refusal to accept assertions that are biased or prejudiced and that are not supported by enough facts, he describes what he genuinely experiences to precisely the same degree and quantity without trying to exaggerate or conceal anything.

In the 21st century, mathematics has become the key to success in every aspect of life. Maths is known as the "father" of all other sciences. You can't think of any kind of scientific study without maths. Every student has to achieve certain important goals

and objectives every day. Maths is a good place to start in order to achieve these aims. Every step of education is important in its own way. Secondary education is the foundation for all types of higher education. In the modern world, being good at math is an important part of doing well in school. In many jobs, it is the key to success.

As we know, social intelligence deals with society and its situations, and scientific attitude deals with the scientific thinking of individuals and others. And achievement in mathematics is an integral result of math learning. Social intelligence is the combination of skills such as authenticity, clarity, situational awareness, social information processing, and so on; scientific attitude is the combination of skills such as rationality, scientific thinking, evidence search, logic, and so on. With respect to mathematic achievement, students need rationality, clarity, scientific thinking, authenticity, and all that. So there are more or less common combination elements among the above three variables. So the researcher decided to see the relationship among social intelligence, scientific attitude, and achievement in mathematics.

1.2. SOCIAL INTELLIGENCE (S.I.)

The term intelligence is quite vast and ambiguous in its meaning. Psychologists have been explaining the term in various ways and are not agree on the meaning of the term intelligence. In the psychological literature, intelligence has been treated as an abstract concept. There are many theories of intelligence, some of which are still useful today and serve as a solid foundation for new researchers who are studying intelligence and its various forms.

Definitions of intelligence:

Binet's (1905) definition of "Intelligence is a judgment or common sense, initiative, the ability to adapt oneself" and again "to judge well, understand well, reason well — these are the essentials of intelligence".

The concept of S.I was very primarily used formally by John Dewey in 1909, giving it the longest history. He defined “the ability to notice and interpret social events" Later, researchers defined and repeatedly redefined the concept. However, Edward Thorndike (1920), a psychologist, originated the concept and described social intelligence as "the ability to understand and manage individuals to act wisely in human relations" back in 1920. It is the ability to understand oneself and others. After that, in 1927, it was described by Moss and Hunt as “ability to get along with others."

Vernon gave a very important definition of S.I. in 1933. He said that "S.I. is the ability to get along with people in general, to have social skills or be comfortable in society, to understand social issues, to be open to stimulation from other group members, and to be able to pick up on strangers' fleeting emotions or underlying personality traits”.

The idea of S.I. has been growing for more than a century. Social intelligence is the process of adjusting and understanding others in various situations. Social intelligence is nothing, but it is an ability to understand and manages interpersonal relations. It clearly differs from the intelligent quotient. Social intelligence deals with the understanding capacity of a person and acting according to that situation with respect to their feelings, thoughts, and behaviours. Social intelligence can take place in face-to-face conversations**,** and it reflects in deliberative thinking.

Social intelligence helps us day to day workouts, it helps to build good relationships, and it is a very important aspect of human beings' life. People who have high social intelligence easily understand others' feelings and intentions, and they will act according to the situation. As we are social beings, by understanding each other with the help of social intelligence, we can find ways to work collaboratively, and we will get benefit from each other in society. History says that strong and eminent

political leaders have high social intelligence, and due to high social intelligence, they easily inspire the people and get higher positions in politics.

Well-known social scientist Albrecht (2009) divided five parts of social intelligence for a better understanding of it. Such as SPACE is as follows:

S= Situational awareness: This is the capacity to recognize situations and to interpret the actions of members of the public in those specific circumstances.

P= Presence: This encompasses all the behaviors, verbal and nonverbal as well as vocal, that people associate with you and use to form their perceptions of who you are.

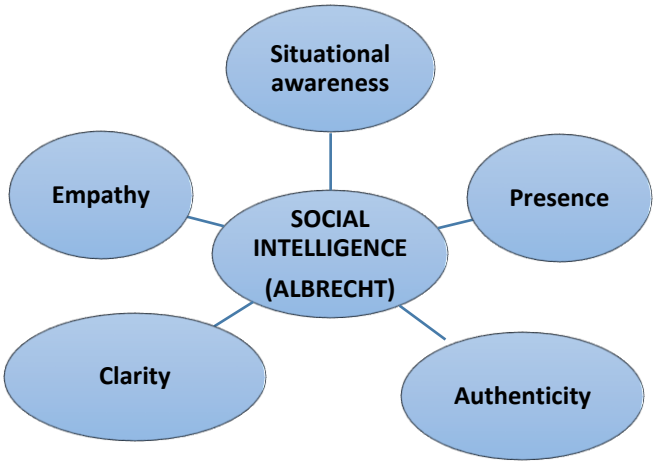
A= Authenticity: With this dimension, people will judge honestly, openly, and accurately.

C= Clarity: This is the ability to explain your ideas and opinion very particularly and clearly.

E = Empathy: This is the ability to connect with others and make a good atmosphere for relationships.

Figure 1.1.:

Dimensions of social intelligence as per Albrecht



Albrecht said that a high level of social intelligence can create a platform for either "toxic" or "nourishing". He explained that people feel devalued, inadequate, angry, frustrated, or guilty because of toxic actions. And behaviours that are nurturing establish a platform from which one can feel valued, loved, capable, respected, and appreciated. Apart from all the above things, he added that people who have high social intelligence are attracted by others, and those who have low social intelligence are repelled by others.

According to research conducted by **Silvera et al. (2001),** social intelligence is comprised of three distinct aspects, social skills, the capacity to process social information, and social awareness.

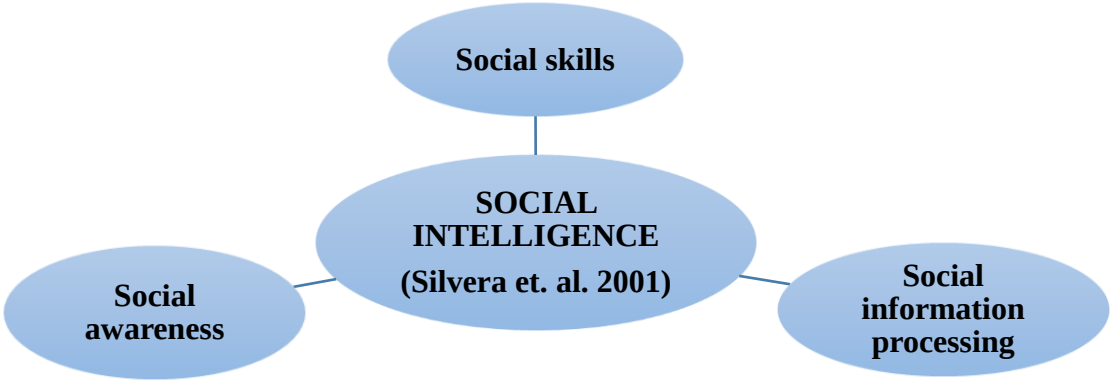
Social skills: Social skills are the capacity to deal with social conditions effectively. People who are good at social skills know when and where to show their emotions and feelings (Nwkah & Ahizu, 2009)**.**

Social information processing: this component shows an individual's capacity to manage conflict and emotional conditions such as anxiety and is capable of managing social situations responsible for it.

Social awareness: It demonstrates an individual's capacity to be aware of the sensations, emotions, and requirements of other people.

Figure 1.2.:

Dimensions of social intelligence as per Silvera et al. l.



According to Daniel Goleman (1995), social intelligence is the capacity to make friendly relationships, good communication skills, and empathy with others' personalities. Daniel Goleman expressed that people who have high social intelligence will manage their emotions as well as easily understand the emotions of others since social intelligence is nothing but the capability to manage emotions and feelings.

According to Goleman (1995), social intelligence can divide into two dimensions.

1. Social awareness: With the help of this component or dimension, we can understand another person's internal feelings. It explains how an individual thinks about another individual. It has the following sub-factors such as,

Primary empathy: Observation of nonverbal emotional signals.

Empathic accuracy: Receiving and comprehension of other individuals' feelings.

Attunement: Listen very carefully feelings of other individuals.

Social cognition: Knowing about the social world and how it works and its knowledge.

2. Social facility: social facility deals with how one can individually deal with others in a smooth way in their effective interactions. It is about how the individual will then do with that awareness and things. It has the below-mentioned factors, such as

Influence: Creating effects on the social exchange results.

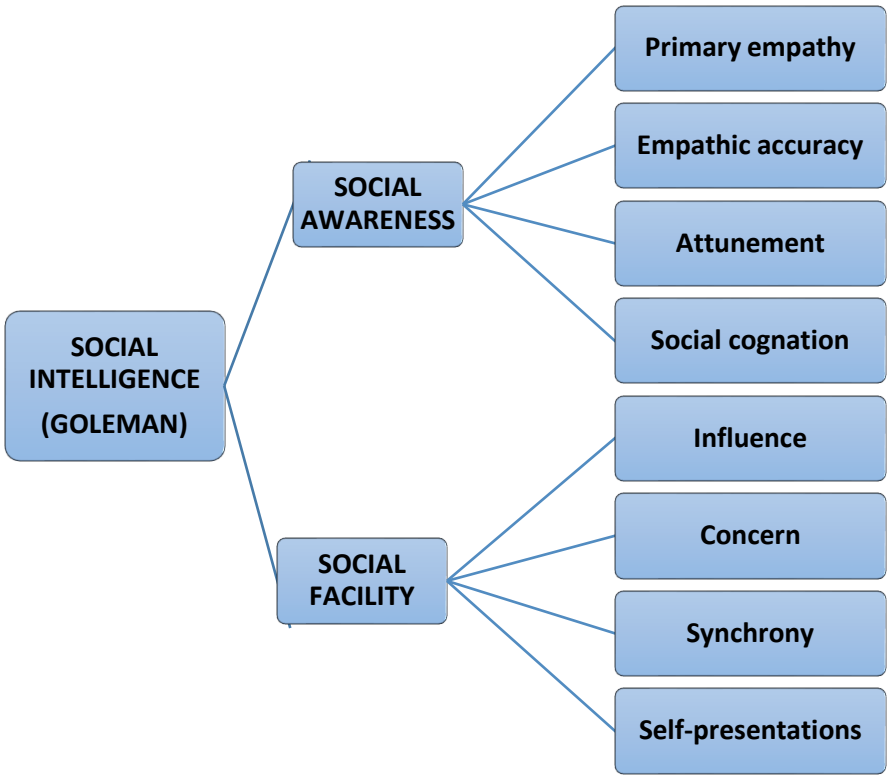
Concern: Put attention to the requirements of other people and act based on need.

Synchrony: Effortless interaction with others for nonverbal cues.

Self-presentations: Self-presentation with efficiency.

Figure 1.3.:

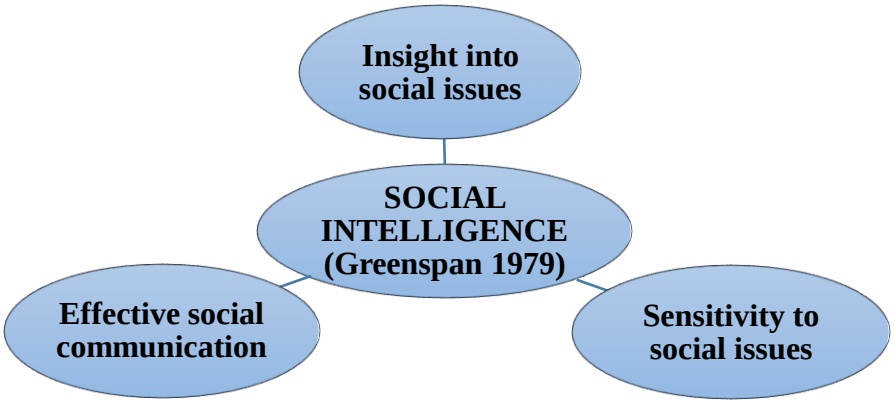
Goleman's Dimensions of social intelligence



The hierarchical model of social intelligence was developed by **Greenspan (1979)**. This particular model of social intelligence is comprised of three different components. A). Insight into social issues, B). Sensitivity to social issues C). Effective social communication.

Figure 1.4.:

Greenspan's Dimensions of social intelligence.



Social intelligence model of Williamson (1995): This model includes six abilities

1). The ability to reason tentatively,

2). Abstract ability,

3). Ability of imagination

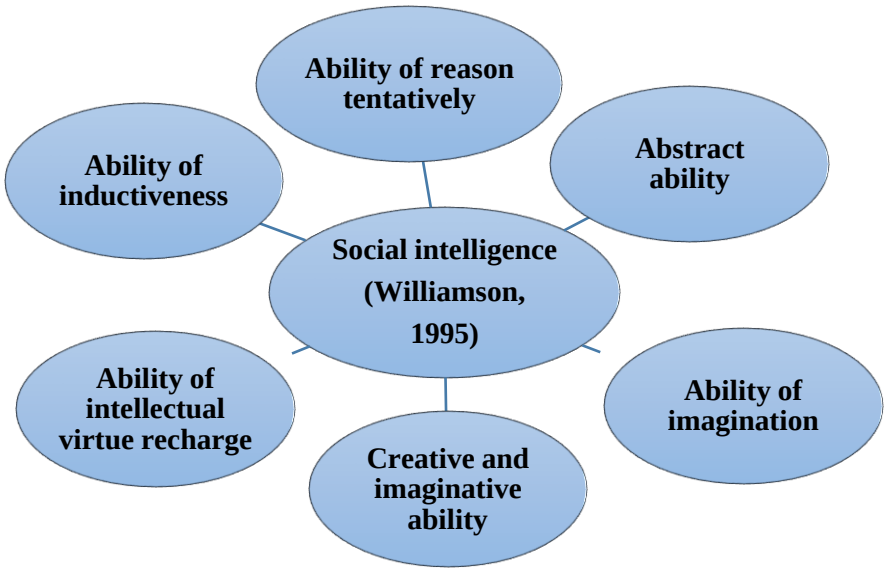
4). Creative and imaginative ability,

5). The ability of intellectual virtue recharge,

6). The ability of inductiveness.

Figure 1.5.:

Williamson's Dimensions of social intelligence



Definitions of Social intelligence based on Behavioral components

Thorndike- The ability to act wisely with other people

Vernon - The ability to get along with others and feel at ease in society.

According to Silvera et al. l. The ability to respond to different social situations

Definitions of social intelligence based on cognitive components

Silvera, Dahl - The capacity for empathy with other people as well as the skills of social comprehension, social memory, social creativity, social knowledge, and social perception.

Significance of possessing high social intelligence

Since humans are unable to survive independently, they must be a part of a group or civilization in order to stay alive. On all fronts economically, physically, socially, and culturally—there needs to be some sort of give-and-take exchange. Regarding interactions with other people, there is a predetermined level of decorum, standards, and rules that must always be adhered to; all of these aspects are dependent on a person's level of social intelligence. Because no human being chooses to live a life of solitude, a person's level of social intelligence can be inferred from the degree to which they are successful in their interactions with other people. Being able to coexist in a society, treating one another with decency in social interactions, adapting to the presence of other people, and getting along with them are all essential components of social intelligence.

According to Kriemeen and Hajaia (2017), a person's level of success is largely determined by their level of social intelligence rather than their intelligence quotient. This suggests that a person will be successful if he or she interacts well with other people. Because of its foundation in adaptability, comprehension, appropriate reactions, and engagement with one another, social intelligence is directly correlated to successful outcomes. As a result, it has evolved into an important factor in ensuring human well-being and the success of any organization (Asadi, 2016). It is not the behaviours of a single person that will determine whether an organization or society is successful; rather, it is the actions of all of its members. When a person possesses

social intelligence, all their actions are ultimately directed at ensuring their own happiness as well as the happiness of those around them. This is the key to achieving success. It was discovered that individuals who have higher levels of social intelligence, on average, perform better in their academic achievement (D'haene, 2015). This suggests that if students want to improve their academic life, they can begin by working to improve their social intelligence because it is closely related to their academic achievement. For this reason, parents who want their children to succeed academically should also place a focus on their children's level of social intelligence.

According to Goleman and Boyatzis, who were quoted in Fischman (2015), the value of social intelligence even extends to the business world, where it enables individuals to advance the success of their own companies. According to Goleman's research, which was cited by Fischman (2015), social intelligence helped people change their mental dispositions so that they viewed other people not as things but as other human beings who also have feelings and emotions. This shift in perspective was a result of social intelligence. In educational institutions, social intelligence is particularly significant since it assists the principals and other authorities in finding solutions to problems, and they can utilize it in meetings, seminars, conferences, evaluations, and communication. Additionally, it helps to solve problems more quickly (Kriemeen & Hajaia, 2017). Students' ability to adapt to one another is directly related to their level of social intelligence, which in turn serves to develop and shape their futures. In times of crisis, those who are socially intelligent are better able to make decisions; social intelligence also facilitates mental activity and improves communication with one another (Ebrahimpoor, Zahed, & Elyasi, 2013).

According to Thompson and Arset (2012), having social intelligence assists in the process of effectively interpreting and implementing solutions to social problems. In order to function well in everyday life, humans require a high level of social intelligence. D'haene (2015) shows that those who are required to converse and engage with others benefit from having high levels of social intelligence. It teaches students how to adjust, comprehend, and react appropriately to any life circumstance (Njoroge & Yazdanifard, 2014), which enables them to develop into excellent leaders. It also has a significant impact on communication across cultural boundaries (Wawra, 2009). People's individual thoughts, deeds, and behaviours, as well as the thoughts, deeds, and behaviours of groups of people, can be influenced by social intelligence. According to Marlowe, Tasleema, and Ganai (2015), those who are socially intelligent appear to live lives that are rich in both contentment and significance, in contrast to those whose emotive experiences are more condensed. This is a hypothesis that was proposed by Marlowe.

Lathesh and Vidya (2018) acknowledged that having high social intelligence makes it easier to overcome challenges and significantly improves one's chances of succeeding personally and professionally. According to a study conducted by Rezayee and Khalilzadeh (which were cited by Ebrahimpoor, Zahed, and Elyasi, 2013), social intelligence has a positive influence on job satisfaction. The researchers discovered that teachers reported higher levels of happiness and satisfaction on the job when their employers or managers had high levels of social intelligence. After looking at a large number of studies, Njoroge and Yazdanifard (2014) came to the conclusion that S.I. has a beneficial impact on the performance of employees. It is seen that people care about one another, talk about their emotions with one another, and worry about the well-being of other people. As a result, social intelligence enables individuals to

maintain cordial relationships despite the presence of disagreement and misunderstanding. Without social intelligence, people will have a difficult time interacting with one another, particularly in situations where there is disagreement; this will be detrimental to society as a whole. Therefore, people who have high social intelligence are better able to construct harmonious societies and make amends with one another.

METHODS OF IMPROVING SOCIAL INTELLIGENCE (S.I.)

It is impossible to downplay S.I.'s significance; hence, the societies and academics feel compelled to investigate and work toward enhancing the social intelligence of today's students and of the general population. Following an examination of the relevant literature, Fischman (2015) came to the conclusion that there is widespread agreement that social intelligence may be acquired through instruction. It is possible to teach it within the context of the home as well as at schools, colleges, and universities. Social intelligence is something that may be taught to a person at any point in their life, from when they are very young until they are very old. A society that wants to increase the quality of its social life should encourage its citizens to learn and improve their social intelligence.

Promoting social intelligence should always involve certain means and approaches, and such methods, in addition to any new methods, should be open to experimentation. Fischman encouraged participants in all different kinds of scenarios to identify more possibilities and innovative strategies to defuse potentially uncomfortable social circumstances. Consequently, innovative approaches to the education of social intelligence should be supported and researched. A great number of academics have proposed their own approaches to teaching social intelligence. Even while social intelligence is passed on intuitively from parents to children, it is still

something that needs to be taught deliberately. A person's level of social intelligence can be predicted by the manner in which they were instructed on the topic, as well as their level of observational skills. There are numerous approaches to education that focus on developing social intelligence. You can find them below.

Developing an Awareness on Social Intelligence: The first thing that must be done in order to acquire social intelligence is to increase an understand of the importance of social intelligence. Because of the constant changes that occur in society, having high social intelligence is essential for any situation in which one must interact with other people. People who are aware of the significance of social intelligence will have the desire to learn and enhance their skills in this area. When awareness is raised about a topic, it will be much simpler to educate people about social intelligence.

Observing and trying to imitate others: Sigma, Hynes, and Hill (2012) concurred with the findings of earlier studies that individuals can improve their social skills by observing and imitating the actions of others. Providing students with real-world experiences is the most effective method for teaching social intelligence. It doesn't matter how much people talk and lecture about it; if they don't show kids how it works, it won't have any impact on how they live their lives. A kid gained further knowledge by mimicking the actions of adults and learning from their examples. Therefore, social intelligence does not constitute an exception to that rule. Learning in the modern day is sometimes referred to as pedagogical learning, which simply means learning through watching and mimicking one's teachers and other pupils.

Developing and adhering to social norms: Some civilizations have very stringent laws and regulations, while other communities may accept certain behaviours to a certain degree. The observance of traditions, standards, and laws was essential to society's health and prosperity. If there are no pre-existing norms, then new ones will

have to be devised specifically for this objective. People's capacity for social intelligence can be improved through developing and adhering to social norms and conventions and making sure they are followed.

Training in Social Intelligence: As Dhaene (2015) points out, social training is beneficial for all different kinds of people. It's possible that some people have a greater need for training than others. Training is the process of systematically applying activity in order to accomplish a particular objective. Therefore, training in social intelligence refers to the process of applying the information and practices of social intelligence in a methodical manner so that a person might emerge from the training with increased socially intelligent capabilities.

Understanding Others' Point of View: In social relationships, it is critical that people comprehend others from their perspective. This will bring you closer to other people's sentiments and emotions. It is a technique taught to others, particularly children, to help them better comprehend others by putting themselves in their shoes. People can be taught social intelligence by teaching them how to better understand one another because understanding others improves social intelligence. Although social intelligence teaching methods are still emerging and thus limited, scientists believe that using experiences, participation in activities, and repetition are significant strategies for teaching social intelligence (Fischman, 2015).

Experience: Everyone's first teacher is experienced. Children learn best via hands-on experience, and this form of learning has a long-term impact on their lives. Similarly, social intelligence experiences enriched and promoted the child's feelings and emotions. So, the child can be taught social intelligence by leading, guiding, and allowing him/her to experience positive social interactions and adjustments. Once a

youngster has demonstrated social intelligence, he or she will continue to do so in the future.

Participation in Activities: One approach to teaching social intelligence is to get the trainees involved in a variety of different activities. They shouldn't just be studying the subjects; they should be actively participating in a variety of activities and interactions (Fischman, 2015). Because, as the adage goes, actions speak louder than words, it follows that when pupils participate in certain constructive social activities, their level of social intelligence will rise. This point was reiterated by Fischman when he expressed the opinion that people's social intelligence can be improved through the completion of performance tasks and stimulations.

Repetition is a different way to educate social intelligence. Repetition helps people learn and remember more. The ability to create new routes requires repeated learning (Fischman, 2015). As a result, people should be made aware of social intelligence on a regular basis, and trainees should be encouraged to repeat positive social activities and acts that will help them enhance their social intelligence.

Teamwork: Another technique to develop social intelligence is to teach people how to work together as a group. Teamwork is critical for a person's social intelligence to develop. People who learn how to work in a group have a high level of social intelligence. Teamwork strengthens and unites society. Individuals should therefore be taught the value of teamwork in order to become more socially intelligent.

Interaction with Others: Interactions with others can also be used to teach social intelligence. People's interactions with one another are the foundation of social existence. The more people can interact, the better their social lives will be, and their social intelligence will rise. People should be encouraged to interact favourably with others in order to increase their social intelligence.

1.3. SCIENTIFIC ATTITUDE

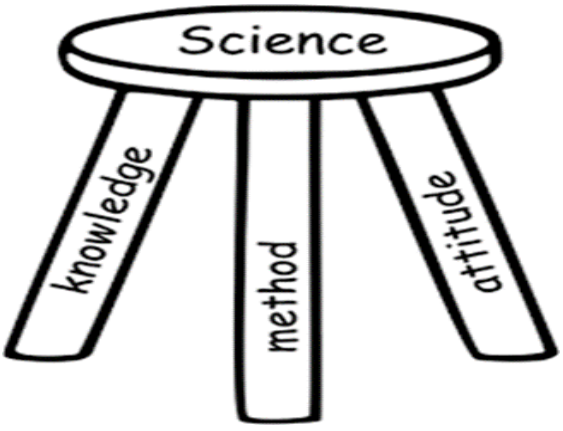
Science is occupied every corner of human life. Contemporary society directly or indirectly depends on science. We cannot expect a world or universe without science. Achievements of science lead to comfort life for human beings.

As we know, science education satisfies the intellectual curiosity of human beings as well as their inventions. It provides material comforts for human society. Western Europe, where modern science was born but in contemporary days home of science is not only the particular country, but the entire world is the home for it. In the olden days' the fruits of science were enjoyed only in limited countries only, but now it is used globally. Science is neither concerned with creed, caste, colour, and religion.

The study of science has several benefits; while studying science, there is more scope for practical aspects and continuous observation of a particular phenomenon, these things will create interest in education among the students, and it will enhance patience and concentration on a particular phenomenon. Science allows students to use their imaginations constructively and to think creatively. The learner cultivates the habit of seeking the truth. The importance of science is that whatever a student learns may be applied immediately to the world around him. This is an excellent teaching resource.

Figure 1.6.:

Science table:



Science Education and its aims:

0ne of the key aims of science education is to increase **scientific attitude** among pupils through teaching and, learning process. Some important aims of science education

- To develop and inculcate a scientific attitude among students.
- Reinforce the skill of performing experiments.
- To develop the habit and skill of accurate measurement.
- To enable students to cause and effect relationships in natural incidents.
- To develop skills in observation, classification and drawing.
- To create thrust about the environment.

Scientific attitude is the complex aspect of various components such as rationality, curiosity, open-mindedness, objectivity, and aversion to superstition. It has been discovered that people who have a scientific attitude are highly inquisitive to learn about new topics on a continual basis, and he is always ready to go with scientific arguments. He puts effort continuously until, and unless he gets satisfaction with the concerning phenomenon, he believes that the universe has a cause-and-effect relationship. A man of a scientific attitude never belies superstitions, and he always trusts collected data and evidence-based reports rather than traditional beliefs. A man who has a scientific attitude always rejects biased and prejudiced statements which do not have evidence-based support.

Having a scientific attitude means that you use a certain way to solve problems, evaluate ideas and information, and make decisions. Evidence is gathered and judged objectively so that the person making the decision doesn't let his or her own personal biases affect the decision.

Concept of Scientific Attitude (S.A)

One of the primary aim of science learning is to build a suitable scientific attitude (S.I), in pupil, such that no teacher or individual can properly impart science to pupils without first comprehending the appropriate meaning and genuine nature of scientific attitude. According to some experts, scientific attitudes are best defined as open-mindedness or a willingness to acquire precise knowledge. It also entails building trust in systems for acquiring knowledge, as well as the anticipation that by using confirmed knowledge, all issues will be solved. Some of the key characteristics of such attitudes are open-mindedness, intellectual honesty, and critical-mindedness. As a result of this knowledge, it employs the most recent and authoritative approach for acquiring information about the problem.

Burnet (1944) describes scientific attitude as scientific mindedness, whereas Noll (1933) defines it as the habit of scientific thought, and the Educational Policies Commission (1966) defines it as the spirit of science. All of these definitions refer to scientific attitude as the spirit of science. Usually, it is described by a list of attitudes that make it up, like being objective, having an open mind, and being willing to suspend Judgment if there isn't enough evidence. Researchers agree that someone with a scientific point of view 1) looks for natural causes of events and 2) is open to the work and ideas of others as well as information related to these issues. (3) Is able to form judgments and draw conclusions based on sufficient facts; (4) Is able to analyze the strategies and methods that were utilized, as well as the information that was collected; and (5) Is interested in what he observes. According to Heiss (1958), the primary objectives of science education are the inculcation of a scientific attitude and the acquisition of the skills necessary to carry out scientific procedures. The most important contribution that science makes is that it teaches students to think in a

scientific manner so that they can pursue scientific careers. The scientific method is responsible for the development of scientific attitudes since it is utilized by science in both the creation of science and its application of science.

Meaning of Scientific Attitude:

The development of a scientific way of thinking is intended to be one of the key outcomes of students' participation in science education. Scientific attitudes are established in learners by the scientific process used to absorb information of scientific facts and claims, not through science teaching. 1) Science education is so vital for the development of scientific attitudes among students that some experts argue that only those disciplines should be taught properly and successfully. It is always concerned with open-mindedness, the need for accurate information, faith in the procedures for acquiring knowledge, the use of verified knowledge to find a solution to a problem, reason, curiosity, objectivity, and resistance to superstitions, among other things. 2) Scientific attitude is a conceptual criterion that can be used to evaluate academic progress. 3) The formation of a scientific mentality among students is one of the major and crucial goals of science education.

Characteristics of a scientific attitude:

If a person possesses all of the above qualities, one could say that they have the mentality of a man and of a scientific approach.

- He possesses an inquisitive nature.
- Holds the belief that every event has a preceding cause.
- Has an open mind and a deep appreciation for the truth.
- He approaches his thinking and his job using the scientific method.
- Does not subscribe to any superstitions or have any prejudices.

An open mind, a desire for accurate information, faith in the ways to find knowledge, and faith in the use of verified knowledge to fetch a solution to problems are all characteristics of the scientific attitude. Other characteristics include rationality, curiosity, objectivity, and a form of superstition. Regarding the conceptual criterion that can be expanded upon in terms of academic development, the scientific attitude is the one to focus on.

Scientific attitude & its importance:

Scientific knowledge is supposed to grow in lockstep with the advancement of scientific attitudes. It may not occur in all cases, but the impact of tradition can occasionally stifle the development of scientific attitudes, and such a lopsided development may not be beneficial to the advancement of scientific knowledge. Given the importance of scientific thinking and attitude in growing scientific knowledge, it is necessary to examine the relative growth of scientific attitude on a regular basis, particularly among scientists. This type of exercise necessitates the use of credible and trustworthy techniques for assessing scientific attitudes at various levels, including universities.

Development of Scientific Attitude:

In layman's terms, the steps that may be taken to foster a scientific attitude in pupils are those through which the students' curiosity can be fulfilled and through which they can rid themselves of their superstitions. Curiosity is a fundamental characteristic that may be observed in all human beings, although it is most prevalent in youngsters. This tendency, however, should be fostered by the instructor by encouraging students to ask questions of them and by making an effort to respond to their concerns and questions in a way that satisfies them. Additionally, a spirit of inquisitiveness and independent research should be fostered in the students. The

scientific approach can be utilized to accomplish this goal. Students should be given some possibilities where they can experience complete independence in the direction of the scientific method. This is something that should be provided for them. The supply of science displays should be made in the schools at regular intervals, and the duty of organizing all the necessary arrangements for such events should be placed squarely on the shoulders of the student body. It is also essential that the science classroom, science laboratories, and other places where science activities take place should be equipped with a sense of scientific temper and spirit of the scientific environment. This is because developing a scientific attitude is essential for the advancement of scientific knowledge.

Definitions of Scientific Attitude:

Gardener - It is evidence-related reasoning and argumentation, search for clarity and internal consistency, open-mindedness and scepticism, and willingness to change when data contradict their own views.

John Dewey - It's associated with a thirst for knowledge, a vivid imagination, and a tone of exploratory inquiry.

Good - The scientific attitude is the collection of emotionally charged notions about science and scientific processes that are linked to a course of action directly or indirectly.

Emina (1986), scientific attitude is classified into five components. Those are

i). Rationality, ii). Curiosity, iii). Open-mindedness, iv). Objectivity

i). Rationality:

A human being is a rational animal. The demonstration of reason or logic in the pursuit of a solution to a problem is an example of rationality. In most cases, rationality is the goal, and it can be achieved through the use of logical and applicable

syllogism. Because there is no differentiation between arguments that are invalid and those that are valid, there is no longer any gradation. Additionally, this criterion is solely applied to the performance of acts. Human beings who are rational should have characteristics such as the ability to analyze traditional beliefs to determine whether or not they are supported by reason, a dedication to the importance of rationality, a tendency to analyze cause-and-effect relationships, and an acceptance of challenging and important issues.

- Rationality is the state or quality of being reasonable, established on truths, not on feelings and emotions.
- Rationality is the quality or condition of being rational
- Rationality will accept things that are valid
- Rationality will not accept if there is an absence of concrete reason
- Rationality will accept things after careful consideration
- Rationality is the condition which is logical

ii). Curiosity:

Curiosity encompasses a drive for brand-new facts and concepts, as well as a yearning for more background. It is the innate or internal aptitude of a great many living species, but it cannot be classified as an instinct because it does not possess the quality of a permanent pattern of behaviour. It is able to be articulated in a wide variety of adaptable ways. However, instinct never expresses itself in any way other than the one and only way that is predetermined, and this confers a survival advantage. Curiosity is the quality of being curious.

- Curiosity is the phenomenon which wants to learn more about something
- Curiosity is the thrust for complete knowledge
- This is the phenomenon of why, how, regarding a particular situation

- It is the concept of understanding very clearly the new phenomenon
- Curiosity is the thrust towards new phenomenon with respect to that is the reason, how it will and why it will.

iii). Open-mindedness:

Being open-minded involves being ready to acknowledge and take into account new evidence, which simply means being willing to expose one's data and opinions to criticism and examination from other people. Jonathan Adler, a prominent philosopher, asserts that the scientific community places an even higher premium on a different characteristic of open-mindedness. A person with an open mind is one who is willing to listen to the findings of objective research rather than his or her personal preferences. It is not the same as maintaining a neutral stance.

- Open-mindedness is the continuous process of investigating the proof before the mind is entertained.
- Open-mindedness is the open platform for hearing others' ideas
- Open-mindedness never rejects ideas which are conflict with own ideas
- It is the process of being free from prejudice and accepting others which will help for solving the problem
- It is the process of accepting possible options while investigating a problem
- It is the phenomenon of considering and evaluating the ideas presented by others
- Open-mindedness is the thrust for new ideas and things

iv). Objectivity (intellectual honesty):

Objectivity includes a preference for an evidence-based statement over to unsupported one; it means support for scientific generalization, which is gone through critical review. Objectivity is nothing more than intellectual honesty, which involves

letting nature speak for itself without imposing our own will and desires on certain phenomena. Even if objectivity is an essential part of the scientific method, this does not mean that every single scientist must adhere to it for the scientific enterprise as a whole to be successful. Objectivity is nothing but Judgment based on without interference from emotions and bias.

- It is a quality of a particular person who is going to record data, observable, interpret it and verify its consistency
- Objectivity considers all available pieces of evidence
- The objectivity of a particular statement evaluated by another person
- It is nothing but impartiality in thinking or doing work

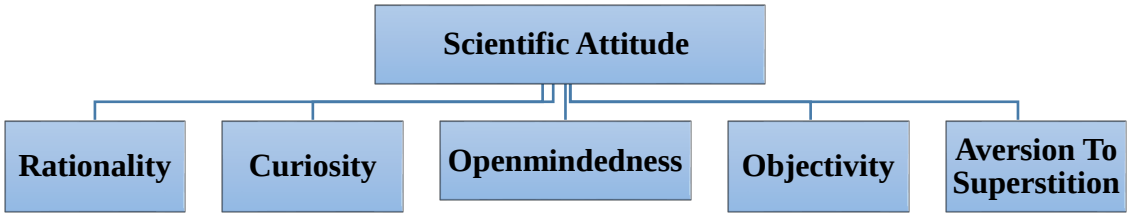
Aversion to superstition: Aversion to superstition is nothing but a rejection of superstitious beliefs and a preference for scientific evidence-based explanations. Magical beliefs and superstitions have been found in traditional communities for thousands of years, and these beliefs are still dominating in modern society. A false belief that is supported by ignorance, fear of the unknown, reliance on magic or chance, or some other erroneous notion of the relationship between events and their causes is known as a superstition. In most cases, culturally varying beliefs in the existence of the supernatural provide the foundation for superstitions. It's possible that superstitions are connected to things that society or people don't fully grasp or know.

These beliefs work on traditional stories or beliefs

- There is no more evidence for superstition
- Scientists don't believe the superstition
- Superstition creates fear
- Superstitions are followed by unscientific people
- Superstition is highly projectable.

Figure 1.7.:

Emina's Dimensions of scientific attitude:



In accordance with the recommendations of **the Educational Policies Commission** (1964), scientific attitude may be included, Objectivity, Open-mindedness, Skepticism, and Willingness to Suspend Judgment

1.4. ACHIEVEMENT IN MATHEMATICS

Mathematical achievement is critical in achieving a student's objective of harmonious growth. Mathematical achievement refers to a person's degree or amount of success or ability in various areas of mathematics, as well as math scores. Achievement is a wide-ranging and complex thing. Achievement is closely linked to how a student learns and grows in school, which is helped by the learning and teaching that happens in the classroom. It depends on how a child looks and what skills they've learned in school.

"Achievement" is "the extent to which a student benefits from the instructions in a given area of learning," according to Crow & Crow (1956).

"Achievement," according to Webster's New World Dictionary (1976), "means reaching the desired outcome, especially via skill, labour, or other methods."

Factors that affect achievement in mathematics:

Sharma (2016) According to the author, there are a number of things that contribute to the high or low achievement in mathematics in pupils, and these characteristics can be grouped into the following three categories: psychological factors, environmental factors, and personal factors.

Psychological factors: Intelligence, learning capacity, motivation, self-efficacy, learning styles, study skills, creativity, and the degree of aspiration, self-concept, and curiosity are all examples of psychological elements. Other psychological aspects include

Environmental factors: The socioeconomic status of the individual, the educational system, the family environment, the value system, the effectiveness of teachers, the evaluation system, and the school situation and environment are all examples of environmental factors. These factors are related to the individual's surroundings and the environment in which they are found.

Personal factors: Under the rubric of this area, personal factors, elements such as age, gender, heredity, and health, might be included as potential contributors to academic success.

These factors have the potential to influence academic success in both positive and negative ways. Warm and loving behaviour toward children has been linked to improved academic success in studies (Epstein, 2000). So, in a nutshell, academic achievement t refers to a student's scores or marks in all subjects over the course of an academic year, whereas mathematical achievement refers to a student's scores or marks in mathematics over the course of an academic year.

Mathematical achievement plays a significant function in the attainment of harmonious growth of a pupil. The degree or quality of achievement or skill in

mathematics is referred to as mathematical achievement. Mathematical success is a result of both broad and specialized learning experiences. It is essentially a student's proficiency in the disciplines that he has learned at educational institutions. Mathematics isn't just for the brightest students. Every student must strive for academic success in mathematics.

It is absolutely necessary to keep in mind that mathematics is comprised of more than just arithmetic. In addition to numbers and the operations associated with numbers, it is imperative to place emphasis on shapes, spatial knowledge, patterns, measurement, and data management. The progression that students make in their understanding of concepts, from the concrete to the more general, needs to be mirrored in the curriculum in a very clear way (National Curriculum Framework, 2005). As a consequence of this, the learning of mathematics and the success that a student has in mathematics are indisputably significant in academics.

The level of success that students have in mathematics during their time in high school has a significant bearing on how well they do in college (Ismail & Awang, 2008). Academic progress in mathematics is impacted by a variety of factors, including but not limited to cognitive aptitude, problem-solving ability (Bhat, 2014), teaching technique, parental participation, pupil's self-concept, motivation, sex difference, pupil's attitude toward mathematics (Kaur, 2011 & Rao, 2014), study habits, anxiety, and other factors. It is also affected by factors such as evaluation, the availability of sufficient textbooks, the appropriateness of the mathematics instructor, and the appropriateness of the available amount of time.

There are two types of factors that influence pupils' mathematical achievement (Kaur, 2011 & Rao, 2014):

1. Psychological factors.
2. Mathematical factors.

Psychological factors such as attitude toward mathematics, Interest in mathematics, and Memory.

Mathematical factors such as the ability to logically thinking and problem-solving, Computational skills, Mathematical language, and Mathematical concepts.

Many studies have identified substantial disparities in math achievement between males and females, while many other researchers have looked into numerous causes for variances in arithmetic ability and have looked into the variable of gender and found no significant differences (Hyde, Fennema & Lamon, 1990; Mason & Scrivani, 2004; Rangappa, 1993-94). As a result, the problem of gender inequalities in mathematics remains unresolved for the time being.

Mathematical achievement refers to a student's ability in the subject. However, there are intra and inter-individual variances in mathematical achievement. These discrepancies might be attributable to their attitudes about the subject and their capacity to solve problems. Students' attitudes toward mathematics, as well as their perceptions of their own mathematical competence, have been identified as predictors of mathematical achievement (Micheli).

Basically, mathematics contains logical reasons and critical thinking and mathematical aptitude in other dimensions. These dimensions play a very significant role in day to day life of human beings. A scientific attitude also includes rationale, logic, critical thinking, open-mindedness, scientific thinking and aversion to superstition. And social intelligence also includes confidence, memory, tactfulness and recognition of the environment as there are so many internal factors that are interrelated to social intelligence, scientific attitude and achievement in mathematics, so researchers want to know the relation effect and influence on relation of above three

variables with respect secondary school tribal students. This is a very basic cause to do this study.

1.5. TRIBALS & THEIR EDUCATION IN INDIA

Education is the basic tool of development in all aspects of society; without proper education, it may not be possible for any type of development. As we all know, education and the growth of society or strata have a very favourable link. Tribals are the most underprivileged society in the Indian community; they live in dense forests without using modern trends and technologies. They are aloof and unaware of modernized society and its facilities. Nowadays also, they are adopting old techniques for their daily livelihood.

A group of people who live in isolation from or with minimal interaction with the governing national society of the nation in which they are located is referred to as a tribe.

The word 'tribe' though well understood generally, is more complex to define precisely. There has been a difference of opinion between Anthropologists and Sociologists and also differ from one set of anthropologists to another set of anthropologists.

However, based on the most common definition of tribes, the following qualities have been sought in them:

a) Because of their long history of affinity with the land, the tribes are referred to as "old people." They dwell in the hills of the forest, isolated from the rest of the civilized world.

b) They are primitives in the sense that they have not reached a considerable level of technological and economic progress.

c) They have a unique cultural and linguistic identity that can be easily recognized.

The tribal population in different states of India is given in table 1.1. The rate of increase of the tribal population in India is given in the table

India, the world's second most populous country, is a massive, diversified, multiracial country that ranks seventh in terms of land area. In terms of tribal population, India is second only to South Africa. Given the country's size and population, the Indian Constitution has specific provisions for certain ethnic minority groups, referred to traditionally as Scheduled Tribes (STs), who make up about 8.14 per cent of the country's overall population of 84.51 million people (2001 Census). According to the Central Government's notification under Article 342 of the Indian Constitution, there are 697 STs residing in various regions of the nation. The majority of tribal tribes have their own languages that are distinct from the regional languages of the state in which they live. There are over 270 languages in this category. The tribal languages of India are divided into many distinct language groups, the most important of which are the Austric, Dravidian, Tibeto, Chinese, and Indo-European families.

Most STs live in scattered homes in the country's interior, in mountainous and forest areas that are hard to get to. This is one of the things that makes them stand out. Nearly a quarter of tribal settlements have less than 100 people living there.

More than 40% have between 100 and 300 individuals, while some have less than 500. Despite the fact that tribal people make up just 8.14 per cent of the Indian population, they are the majority in certain states and union territories and a sizable number in others. They do have a 94.75 per cent majority in Mizoram, 93.15 per cent in Lakshadweep, 87.70 per cent in Nagaland, and 87.70 per cent in Meghalaya (85.53 per cent).

Table 1.1.

S.T Population in India (State-wise)

S. No	India / State	Total Population (In Lakh)	ST Population (In Lakh)	% STs In India/ State To The Total Population Of India/ State	% STs In The State To Total ST Population In India
.	India	12108.55	1045.46	8.6	-
1	Andhra Pradesh	493.87	26.31	5.3	2.5
2	Arunachal Pradesh	13.84	9.52	68.8	0.9
3	Assam	312.06	38.84	12.4	3.7
4	Bihar	1040.99	13.37	1.3	1.3
5	Chattisgarh	255.45	78.23	30.6	7.5
6	Goa	14.59	1.49	10.2	0.1
7	Gujarat	604.40	89.17	14.8	8.5
8	Haryana	253.51	NST	NA	NA
9	Himachal Pradesh	68.65	3.92	5.7	0.4
10	J&K	125.41	14.93	11.9	1.4
11	Jharkhand	329.88	86.45	26.2	8.3
12	Karnataka	610.95	42.49	7.0	4.1
13	Kerala	334.06	4.85	1.5	0.5

S. No	India / State	Total Population (In Lakh)	ST Population	% STs In India/ State To The Total Population Of India/ State	% STs In The State To Total ST Population In India
14	Madhya Pradesh	726.27	153.17	21.1	14.7
15	Maharashtra	1123.74	105.1	9.4	10.1
16	Manipur	28.56	11.67	40.9	1.1
17	Meghalaya	29.67	25.56	86.1	2.4
18	Mizoram	10.97	10.36	94.4	1.0
19	Nagaland	19.79	17.11	86.5	1.6
20	Orissa	419.74	95.91	22.8	9.2
21	Punjab	277.43	NST	NA	NA
22	Rajasthan	685.48	92.39	13.5	8.8
23	Sikkim	6.11	2.06	33.8	0.2
24	Tamil Nadu	721.47	7.95	1.1	0.8
25	Telangana	351.94	32.87	9.3	3.1
26	Tripura	36.74	11.67	31.8	1.1
27	Uttara hand	100.86	2.92	2.9	0.3
28	Uttar Pradesh	1998.12	11.34	0.6	1.1
29	West Bengal	912.76	52.97	5.8	5.1
30	A & N Islands	3.81	0.29	7.5	0.0
31	Chandigarh	10.55	NST	NA	NA
32	D & N Haveli	3.44	1.79	52.0	0.2

S. No	India / State	Total Population (In Lakh)	ST Population	% STs In India/ State To The Total Population Of India/ State	% STs In The State To Total ST Population In India
33	Daman & Diu.	2.43	0.15	6.3	0.0
34	Delhi	167.88	NST	NA	NA
35	Lakshadweep	0.64	0.61	94.8	0.1
36	Puducherry	12.48	NST	NA	NA

NUEPA- Higher Education: MHRD's All India Survey on Higher Education (AISHE)

Table-1.2.

Literacy Rates of STs and ALL

Year	All			Scheduled Tribes		
	Persons	Males	Females	Persons	Males	Females
1961	28.30	40.40	15.35	8.53	13.83	3.16
1971	34.45	45.96	21.97	11.30	17.63	4.85
1981	43.57	56.38	29.76	16.35	24.52	8.04
1991	52.21	64.13	39.29	29.60	40.65	18.19
2001	64.84	75.26	53.67	47.10	59.17	34.76
2011	73.00	80.90	64.60	59.00	68.50	49.40

Source: The Registrar General's Office in India

Table 1.3.:

Gross Enrollment Ratio for Students in Scheduled Tribe

Year	Primary (I-V) 6-10 Years			Upper Primary (VI-VIII) 11-13 Years			Elementary (I-VIII) 6-13 Years		
	Boys	**Girls**	**Total**	**Boys**	**Girls**	**Total**	**Boys**	**Girls**	**Total**
2013-14	114.4	111.9	113.2	90.5	92.2	91.3	105.9	105.0	105.5
2014-15	110.6	108.2	109.4	93.0	95.2	94.1	104.4	103.7	104.0
2015-16	107.8	105.7	106.7	95.4	98.2	96.7	103.4	103.1	103.3

For School Education: Unified-District Information System for Education (U-DISE),

Table 1.4.:

Gross Enrollment Ratio for Students in Scheduled Tribe

Level/ Year	Secondary (IX-X) 14-15years			Senior Secondary (XI-XII) 16-17years			Higher Education 18-23 years		
	Boys	**Girls**	**Total**	**Boys**	**Girls**	**Total**	**Male**	**Female**	**Total**
2013-14	70.3	70.1	70.2	36.7	34.1	35.4	12.5	10.2	11.3
2014-15	71.8	72.6	72.2	39.8	37.8	38.8	15.2	12.3	13.7
2015-16	73.7	75.4	74.5	43.8	42.4	43.1	15.6	12.9	14.2
2016-17	NA	NA	NA	NA	NA	NA	16.7	14.2	15.4

Data Source: For School Education: Unified-District Information System for Education (U-DISE), Reports Note: Figures relating to school education are provisional.

Secondary-School Tribal Students:

The changes that occur in children during adolescence have an impact on the psychological and social components of adolescence. Due to a lack of awareness, the majority of tribal students deal with changes without having the necessary information and understanding. They require social abilities and emotional skills, particularly during this period, in order to function effectively in society. These social skills and self-concept will assist them in dealing with problems related to parental illiteracy, home environment (parental ignorance), socioeconomic status, and school and society problems. These elements are crucial in tribal adolescents' schooling. The lack of these skills causes uncertainty and misunderstanding concerning changes that affect students' academic achievements and extracurricular activities.

The Action Plan (Tenth Five Year Plan) said that most tribal parents, especially in rural areas, work as day labourers, farmers, or scavengers. They are not interested in their children's education. They don't have much time to spend on their charges. "More crucially, there exist discrepancies in educational access as in tribal areas," according to the Ninth Five Year Plan's action plan. The IX standard is the final stage of secondary school education, with a focus on general education. Higher secondary education, commonly known as Intermediate or XI and XII levels, focuses on liberal education with a vocational orientation. Secondary education is seen as a crucial step in the educational process.

The primary goal of teaching-learning has been to integrate the child and adolescent into the community's way of life. Low enrolment, low literacy, and high dropout rates among aboriginal youngsters have also been objectively discovered through research investigations. Poverty, a lack of social awareness, illness, child labour, a lack of encouragement at home, psychological variables, language

challenges, gender, parental education and occupation, and other social-cultural elements have all been found to have little impact on the low literacy rate.

Tribal Education and Problems:

The literacy rate in India is quite low, and the literacy rate of STs in India is substantially lower than the general population's literacy rate, implying that tribal literacy is lower than the national average. Internal restrictions include problems with the structure, content, and curriculum, medium of instruction, pedagogy, academic supervision, monitoring, and problems with teachers. The third group of problems has to do with the social, economic, and cultural backgrounds of tribes, as well as the mental problems that first-generation students face. (K. Sujatha, 2002)

According to the NCF (2005), children, particularly those belonging to STs, shall be educated about social concerns such as poverty, child labour, illiteracy, and class inequities in both urban and rural areas. The education system does not operate in a vacuum from the society in which it is embedded. This is evident in the stark discrepancies across social and economic classes, as evidenced by the SC and ST populations' school enrolment rates.

Some students have been historically viewed as being afraid of learning, and inferiority and inequality are inherent in caste and gender. This is a matter that raises serious concerns about the persistence of stereotypes regarding children from marginalized groups, such as SC and ST, who traditionally have not had access to schooling. This is a matter that causes serious concern. These children with special needs do not feel accepted by the teachers, and they are unable to relate to the material in the textbook. The development of new technology options and ways of life that took place over the course of the past century has resulted in the degradation of the

environment as well as massive inequalities between those who are privileged and those who are deprived.

The vast majority of the tribes have their homes dispersed around the country in small, isolated communities that are difficult to reach due to their location in mountainous and forested regions. In most of the places where tribes are concentrated, there is a dearth of essential amenities like roads, transportation, communications, electricity, and medical facilities, among other things. There is a relatively low percentage of literacy among tribal people, and a sizeable proportion of tribal students continue their education outside of the traditional classroom setting.

Usha Jayachandran (2002) revealed that higher levels of workforce participation by women in tribal communities related to higher rates of dropout owing to domestic responsibilities, such as caring for younger siblings. In particular, it had a detrimental impact on students' ability to stay in school (low dropout rate).

Sujatha, K. (2000) highlighted in her research that ST students' psychological difficulties contribute to low levels of education, tribal children's natural dread of teachers, and their inability to create a communication bond with teachers, all of which result in low attendance and high dropout rates. On the other hand, a broad sense of socioeconomic status, cultural influences, poverty, social conventions, cultural ethos, a lack of knowledge, and a lack of appreciation of the significance of formal education creates conflict and a divide between school and home. Low achievement levels are caused by a lack of skill development, competency growth, and motivational factors.

1.6. NEED AND IMPORTANCE OF THE STUDY

People are social beings. They constantly stay in a group or society. For the sake of their continued survival, they have always made adjustments to one another

(Sanderson, 1995). Students also live in a community at home, in the neighborhood, and at school. They must comprehend, accommodate, love, and support one another. Greater social intelligence and adaptability in students will improve the learning environment. Since social intelligence is the capacity to deal with others, it aids in better situational adjustment and interpersonal harmony (Hampshire, 1982). A lack of social intelligence will lead to problems for both oneself and other people. As a consequence of their pro-social behavior, individuals who possess high social intelligence may also have a positive perspective on others and lend a helping hand to those in need. A person who purposefully helps, consoles, shares, and cooperates with others engages in pro-social behavior. However, in today's society, many are reluctant to lend a hand to one another because they believe that they are not the other person's siblings, parents, or other close relatives, (Algoe et al. 2008). The willingness of people to assist one another and cooperate is decreasing on a frequent basis, and there are occasions when the lives of individuals are in jeopardy and need prompt action. If people do not have this mentality of supporting one another and working together, then they will not provide assistance.

There are some significant factors that influence students" achievement in mathematics subjects. In school, the students are exposed to the same subject matter, the same teacher, and the same environment; still, there are differences in the achievement levels of pupil in mathematics subject. What can be the cause of it? The achievement marks of students at the end of examinations are much less a comparison to the efforts they put in. On the other hand, there are a few students who comparatively do not spend that much time and effort in their studies but achieve better than others. This variation in the achievement level of pupil in math is the indicator of individual differences and abilities of student’s achievements (Pandey, 2017). All this draws the

attention of researchers to go into the depth of reasons as to how learning can yield better assimilation in math's subject.

As we know, education is the basic tool of development, and the very basic aim of getting education is holistic and; all-around development of the student. To reach the educational aims of students, a teacher plays a very critical role. As told by our honorable first prime minister of independent India, Jawaharlal Nehru, "the future of this country is going to be constructed in the classroom only". The above quotation shows the importance of the teaching and learning process. Socially intelligent teachers will prepare socially intelligent students, as well as teachers who are concerned about scientific attitudes, will think about the scientific attitudes of students.

Now a days, so many students and people are facing many challenges with respect to their lives and society, such as conflicts and struggles in student life as well as mature age, irrespective of education, profession, and richness. People who have high social intelligence use it to analyze conflicts and struggles in such a perfect way that they will overcome all those conflicts and struggles with the help of high social intelligence, (Torrego, 2003). Because S.I is nothing but the ability to understand men and women, boys and, girls as well as social situations.

Research evidence says that people who have a high scientific attitude will think creatively and scientifically with respect to their problems or the problems of society. Why? Because a scientific attitude is just an attitude that shows how scientifically you think about different things in life. With scientific thinking, people can deal with every problem in a scientific way, such as with evidence-based results and no place for doubt without evidence, (Candrasekaran, 2014). With the above technique, we will get a scientific solution for every problem of society or an individual. This will lead to a harmonic life for society as well as an individual.

By understanding the students' levels of social intelligence and scientific attitude in secondary school, we will be better able to determine how to raise those levels with the assistance of special attention on the students from specialists in the relevant fields or relevant teachers appointed by the appropriate authorities.

Knowing the relations between S.I scientific attitude, and achievement in mathematics is very helpful for the concerned students and teachers also because if social intelligence positively affects achievement in mathematics, so we can improve the social intelligence of concerned students with the help of expert teachers in the concerned area. In other concern, if the scientific attitude effecting positively on the achievement of mathematics of secondary school tribal students, so we can improve the S. A. among tribal students secondary school with the help of science teachers or experts in the concerned area. Due to the above many reasons, this study is very much needed and has a very important aspect with respect to secondary school tribal students of Adilabad district in Telangana state.

In the present study, "social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students of Adilabad in Telangana state: A study," the researcher is going to check the distribution of S.I and S.A in secondary school tribal students and relationship among social intelligence, scientific attitude and achievement in mathematics.

1.7. STATEMENT OF THE PROBLEM

The present study revealed the levels of S.I., S.A and A.M of secondary school tribal pupil, as well as it will investigate mean deference in social intelligence, scientific attitude and achievement based on Gender, locality and Medium of instruction of secondary school tribal students. Apart from this, current study reveals the

relationship, effect and influence among social intelligence, scientific attitude and achievement mathematics with respect to demographic variables like gender, locality and medium of instruction, of secondary school tribal students of Adilabad District.

"Social Intelligence and Scientific Attitude of Secondary School Tribal Students of Adilabad District in Relation to their Achievement in Mathematics"

1.8. OPERATIONAL DEFINITIONS OF THE KEY TERMS

Social Intelligence: Dewey was the first psychologist who used the term S.I., in 1909. Dewey defined S.I., as the ability to form relations with other people. He defined it as "the ability to observe and understand the social situations", according to his book Moral Principles in Education. In this study, S.I refers to the S.I. of secondary school tribal pupils of the Adilabad district of Telangana state.

Scientific Attitude: The scientific attitude is an attitude which reflects scientific thinking and is scientific. In this study, scientific attitude refers to the S. A of secondary school tribal pupils of Adilabad dist. Of Telangana state.

Achievement in Mathematics: The term Achievement refers to the knowledge that a learner has obtained or the skills that they have developed, typically in the academic topics that are being studied and assessed by test scores and teacher-given grades, or both. Achievement in mathematics refers to a student's ability in the subject. However, there are intra and inter-individual variances in mathematical achievement (Micheli). In this study, achievement in mathematics refers to the mathematical achievement of tribal secondary school students of the Adilabad district of Telangana state.

Tribal Students: Article 342 of the Constitution says that S.T are tribes or tribal communities or parts of or groups within these tribes and tribal communities that have been declared as such by the President through a public notification." This definition

includes the phrase "part or groups within these tribes and tribal communities." The Scheduled Tribes live all over the country, but most of them live in areas with mountains and forests. In this study, tribal students refer to tribal secondary school pupils of the Adilabad district of Telangana state.

1.9. RESEARCH QUESTIONS

1. How do the social intelligence, scientific attitude, and achievement in mathematics distribute among secondary school tribal students?
2. Is there any significant difference in social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction?
3. Is there any relationship between social intelligence and achievement in mathematics, scientific attitude and achievement in mathematics, and social intelligence and scientific attitude of secondary school tribal students?
4. Is there any influence on the relation of the following variables among social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students such as Gender, locality, and medium of instruction?
5. Is there any combined effect of social intelligence and scientific attitude on the achievement in mathematics of secondary school tribal students?

1.10. OBJECTIVES OF STUDY

1. To determine the different levels of social intelligence of secondary school tribal students.

2. To find out the significant difference in the social intelligence of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.
3. To determine the different levels of the scientific attitude of secondary school tribal students.
4. To find out the significant difference in the scientific attitude of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.
5. To determine the different levels of achievement in mathematics of secondary school tribal students.
6. To find out the significant difference in the achievement in mathematics of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.
7. To determine the relationship between social intelligence and achievement in mathematics of secondary school tribal students.
8. To determine the relationship between scientific attitude and achievement in mathematics of secondary school tribal students.
9. To determine the relationship between scientific attitude and social intelligence of secondary school tribal students.
10. To determine the influence on the relationship among social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students, with respect to background variables such as gender, locality, and medium of instruction.

11. To find out the combined effect of social intelligence and scientific attitude on achievement in mathematics of secondary school tribal students of Adilabad district.

1.11. HYPOTHESES OF STUDY

H_{o1}. There is no significant difference in the levels of social intelligence of secondary school tribal students.

H_{o2}. There is no significant difference in the social intelligence of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.

H_{o3}. There is no significant difference in the levels of the scientific attitude of secondary school tribal students.

H_{O4}. There is no significant difference in the scientific attitude of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.

H_{O5}. There is no significant difference in the levels of achievement in mathematics of secondary school tribal students.

H_{O6}. There is no significant difference in the achievement of mathematics of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.

H_{O7}. There is no significant relationship between social intelligence and achievement in mathematics of secondary school tribal students.

H_{O8}. There is no significant relationship between scientific attitude and achievement in mathematics of secondary school tribal students.

H_{O9}. There is no significant relationship between scientific attitude and social intelligence of secondary school tribal students.

H_{O10}. There is no significant influence on the relationship among social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students with respect to background variables such as Gender, locality, and Medium of instruction.

H_{O11}. There is no significant combined effect of social intelligence and scientific attitude on achievement in mathematics of secondary school tribal students.

1.12. VARIABLES OF THE STUDY

In the present study following variables are used:

- Independent variables such as social intelligence and scientific attitude
- Dependent variable such as achievement in mathematics
- Demographic variables are Gender, locality, and Medium of instruction.

1.13. DELIMITATIONS OF THE PRESENT STUDY.

The present study, “Social intelligence and scientific attitude of secondary school tribal students of Adilabad district in relation to their achievement in mathematics”, is delimited to,

- Adilabad district's secondary tribal students only
- Tribal welfare ashram schools of the Adilabad district of Telangana state.
- In the present study, social intelligence and scientific attitude scales are formed in the form of statements on the basis of components decided by the developers of the theory.

- Gender, Area/locality, and medium of instruction are selected as the independent variables.

1.14. OVERVIEW OF THE STUDY

The present chapter discussed the statement of the problem of present research work, which is the title of the present research. It also provides information about social intelligence, scientific attitude, and achievement in mathematics. And it clearly explains the objectives, research questions, hypotheses, needs, and importance of the study also. This chapter is the foundation chapter for all other chapters. As well as the second chapter deals with a review of related literature on social intelligence, scientific attitude and achievement in mathematics from India and abroad. Additionally, in the second chapter researcher discussed research gaps in the present research work. In chapter three researcher discussed the methodology part of the research work. The fourth chapter deals with data analysis of research work. The researcher used statistical techniques such as descriptive statistics, correlation, t-test and regression. In fifth chapter discussed findings, implications with respect to education and considerable suggestions for future research work.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1. INTRODUCTION

Present chapter aims to conduct a literature review to establish a solid foundation for answering the research questions and locate the research gap that needs to be addressed. Reviewing journal articles that pertain to the topical areas of social intelligence, scientific attitude, and achievement in mathematics will be the primary focus of this activity. The present section compiles and summarizes the research findings related to all the variables selected for the present study.

2.2. REVIEW OF RELATED LITERATURE

Taking into consideration in to the objectives of the current research, the reviews of the suitable literature are discussed in the following order:

- Research studies related to social intelligence from India and abroad
- Research Studies related to scientific attitudes from India and abroad
- Research Studies related to achievement in mathematics from India and abroad

In this chapter, a quick review of the studies that have been done on the issue that is the subject of the study has been presented. The researcher has read many different research papers, theses, dissertations, abstracts, journals, research surveys, etc., and some of the important studies are reviewed

2.3. SOCIAL INTELLIGENCE

Kanimozhi and Vasimalairaja (2022), examined the influence of social intelligence on the academic performance of the Secondary Students in Tiruvallur district. The sample was made up of 300 students chosen at random from secondary

government and private schools in the Tiruvallur District. Study results reveals that academic performance, social relationships, and social understanding all have above-average mean scores. Academic achievement and social intelligence were higher among private school pupils than among those attending a government school. Social interactions are not much altered by parent education. Social comprehension has been demonstrated to be significantly affected by parental education. Social relationships and social understanding are significantly correlated with each other.

Sharma (2019) in his study, examined the relationship between adolescents' well-being and social intelligence. Regarding "physical," "mental," "social," "enthusiastic," and "otherworldly" aspects, "well-being" denotes a sense of contentment with one's life experience and one's employment in the field of labour. Sixty adolescents from the Haryana State city of Bhiwani have been selected using the random sampling technique. Present study reveals that the association between S. I. and well-being is estimated to be.771. The association was significant at 0.01 level of significance.

Toyin (2019) assessed the S.I, academic achievement and emotional intelligence, of senior school pupils in the Delta and Rivers States. Additionally, it looked at the moderating impacts of gender, age, and location of the school and the mediating effects of school climate, resilience, and social-emotional learning. Simple correlation and simple regression analysis were used to analyze the data. At a significance level of.05. All hypotheses were examined. The study's findings showed that in Delta State and Rivers State, there were a strong relation between the S.I of school students and academic achievement students (r =.04, P.05).

Additionally, there was a strong correlation between the social intelligence of school students in both states. Based on the research, recommendations were made for

teachers, parents, school administrators, and students to become more cognizant of the importance of social and emotional intelligence for academic success.

K.S. and Amalraj (2019) employed the normative survey method for the present study. About 400 pupils from secondary schools contributed to the sample. The instrument was the Social Intelligence Scale. The study's key finding indicates that social intelligence and mathematical achievement among secondary school pupils are significantly correlated. There are no appreciable differences in mathematic achievement and social intelligence between female and male school pupils. Additionally, it revealed that there are notable differences between secondary school children from rural and urban areas in terms of social intelligence and mathematical achievement.

Shree and Sreenivas (2019) investigated the current way of life, which is characterized by rising tensions, strains, and complexity, placing a greater emphasis on social intelligence. It is a life skill that may be learned, developed, and used to manage one's own life and interpersonal connections and achieve success in all spheres of one's life. Using a random sampling technique, 120 adolescents (60 boys and 60 girls) were selected for the current study, which attempts to determine social intelligence among adolescent males and girls. The study was conducted using an exploratory design. Adolescent pupils' social intelligence is measured using a test designed by Dr S. Mathur (2007). And study reveals that teenage girls and boys have very different levels of social intelligence**.**

Arora and Kaur (2018) carried out a study to assess the secondary school pupils ' social intelligence in connection to their mental health and parenting practices. This study was an application of research, and the method used to obtain the data was a quantitative study. The population was made up of senior secondary school students

from six public and private schools in the Jalandhar District, so 300 individuals were chosen at random as samples. Standard questionnaires were used as measurement methods. According to the results of a two-way study, senior secondary school kids' social intelligence differs significantly depending on their mental health and parenting practices, although this interaction is not statistically significant. Additionally, there were considerable differences between people's mental health and social intelligence (patience, cooperation, confidence, and social environment perception). Additionally, there were notable differences in their parenting techniques in terms of social intelligence (patience, confidence). Patience, cooperation, and confidence were revealed to be significant in the case of the interaction effect.

Elias and Mirunalini (2018) discussed the social intelligence of students in higher secondary schools and the use of social networking sites (SNS). Teenage students often use SNS as a result of the rise in smartphone use and the resulting decrease in the cost and convenience of internet access. When discussing social values and norms in the Indian setting, social intelligence is crucial. In this research, higher secondary school pupils in the Palakkad district's SNS use was compared to their S.I. The results of the research work indicated that there is no association between SNS usage and social intelligence.

Aggarwal and Kaur (2018) examined the relation between S.I., and adjustment in class XI students using a sample of 100 pupils (50 females and 50 boys) from two Chandigarh government senior secondary schools. The Social Intelligence Scale (SIS), created and standardized by Chadha and Gan-esan (2009), and Adjustment Inventory for Secondary School pupils, created by Singh and Sinha, were used to collect the data (1987). The results showed that class XI pupils' social intelligence levels did not significantly differ between boys and girls, but those gender-

related adjustments did differ significantly. Class XI pupils' social intelligence and adjustment were shown to be significantly correlated at the 0.01 level.

Kumar and Pankajam (2017), looked at S.I., and proficiency in science of high school pupils. 300 high school students who were chosen at random for the study were employed in the survey. The Social Intelligence Scale and Achievement Test in Science developed (A.T.S.D) by Baskaran and Anandan in 2011 were used by the researchers (ATS). The data were analyzed using the correlation, t-test, mean, and standard deviation. It was found that social intelligence and scientific achievement were significantly correlated among a sample of secondary school pupils.

Aslam (2017) examined the academic achievement of higher secondary school pupils and social intelligence of higher secondary school pupils concerning their gender and the rural/urban dichotomy. N.K. Chadda and Ganesan Social Intelligence Scales were used for the study. The results indicate a considerable variation in social intelligence between female and male students in higher secondary schools. The findings also point to a sizable mean academic achievement gap between students in rural and urban areas.

Divya and Pankajam (2017) investigated the relationship between high school students' test anxiety and students of secondary school ' social intelligence. The relation between S.I and test anxiety among students in higher secondary school was investigated by the researcher using a survey approach. The researcher selected a sample of 300 higher secondary students from six public and private colleges in and around the Tirupur district of Tamil Nadu using a straightforward random selection procedure. The findings indicated a strong relationship between social intelligence and test anxiety among upper-secondary pupils.

Gunduz (2017) looked into the correlation between a person's level of social intelligence and how much they use social networks. Data from 1,145 social network users in online media were gathered using the Social Network Scale (S.N.S), and the Social Intelligence (S.I) Scale. Despite the participants' high levels of social intelligence, social network adoption was only moderate. It has no relationship between gender and individuals' levels of S.I. or use of social networks. The extent to which people use social networks and their level of social intelligence are significantly positively correlated.

Baggiyam and Pankajam (2017) studied about how the academic success of the chosen arts group pupils at the higher secondary level correlates with social intelligence. To find out the link between the S.I., of secondary school pupils and the academic success of higher secondary school pupils, the researcher used survey approach. Using stratified random sampling, the researcher only chose 300 pupils from the Coimbatore district's Higher Secondary arts group as a sample. The results showed that among the higher secondary students in the chosen arts group, social intelligence and academic achievement have a somewhat positive association.

Rathina and Thomas (2017) examined the relation between S.I. and E.I among high school pupils with different levels of academic achievement. For this study, researchers made tests for both social intelligence and emotional intelligence, which they then gave to 628 high school students between the ages of 13 and 16. The research showed that when students were in high school, their levels of S.I. and E.I. were linked in a good way. But there isn't a big difference between the high achievers, the medium achievers, and the low achievers with regard to their social intelligence and emotional intelligence.

Rathod (2017) examined the relationship between S.I. and personality in adolescents. The objective was to examine the S.I. and personality traits among adolescents. One hundred sample were chosen randomly from inside the city of Rajkot. No discernible gap found between the personalities of males and females in terms of S.I. and emotional maturity.

Dhingra and Tiakala (2016) conducted a study to see the level of social intelligence possessed by students studying in high school in Nagaland. For the data collection, a self-prepared tool was used, and the t-test and ANOVA, were used for the analysis of the data. The study's results indicated that there was no considerable variation between the genders of the students in the aspects of social intelligence, such as patience, tactfulness, and sense of humor, as well as total social intelligence.

IllahiBhat (2016) examined relation among S.I. Study habits, and academic Achievement among Pulwama college students (J and k). The survey randomly sampled 410 college students, 193 males and 217 females. The Chadha and Ganesan Social Intelligence Scale (1986) and PSSHI were used to gather data. According to the survey, female college students exhibit strong social intelligence and intellectual success, according to the survey. 75% of male and, seventy two percent of female students of college have good study habits.

Dhingra and Tiakala (2016) conducted a study to evaluate the S.I. of secondary school pupils in Nagaland. A self-created tool was used for the collection of data from 628 students. The statistics t-test and ANOVA technique used for analyze the data. Research work revealed that there were notable differences in levels of confidence with respect to male and female students. Boys averaged a score of 29.56 on the cooperativeness dimension, while girls averaged a score of 30.39. It indicates that women were more obedient than men. The mean scores for boys and girls on the

confidence level dimension were 22, 19 and 20, 80, respectively. Consequently, girls were less self-assured than boys. Last but not least, for the sensitivity dimension, the mean scores for boys were 30.32, and for girls, they were 31.79. Boys were less sensitive than girls, as evidenced by this. Concerning their family income, the study found no significant differences in social intelligence. As a result, family income has no bearing on students' social intelligence.

Kanti Lal and Patel (2015) conducted a research on the S.I of high school pupil in Banaskantha, Gujarat, by gender, location, and educational stream in 2014–2015. The research employed cluster sampling to pick its sample. Survey research was employed for this study. In this research work, the researcher wants to examine the influence of gender, educational stream, and geography on Social Intelligence Scale scores. Hypotheses were t-tested. The result showed that girls are more socially intelligent than guys.

Singh and Raj (2014) conducted a study on academic stress among adolescents who attend school and its relationship to those students' social intelligence. This body of work studied the association between social intelligence and academic stress. For the present study, a random sample of 200 teenagers who were enrolled in school was recruited as participants. According to the findings of recent studies, male and female students in urban and rural settings, as well as students from different socioeconomic backgrounds, didn’t differ significantly in terms of their academic achievement or their social intelligence. Above all, pupils encountered the same number of stressful situations. Regarding pupils from both rural and urban environments, a considerable correlation may be seen between social intelligence and academic success.

Nagra (2014) studied the relationship between S.I. and adjustment among secondary school pupils. Current study investigates the S.I. and adjustment levels of students attending secondary schools, categorizing them according to the type of school they attend and their gender. Researchers collected data from secondary school students at random using the social intelligence scale and adjustment inventory. The total number of students in the sample was 200. While doing the analysis, statistical methods such as the mean, standard deviation, and t-test were utilized. The findings demonstrated that secondary school pupils, on average, have average levels of social intelligence and adaptability. There were no discernible variations found in terms of social intelligence and adjustment based on the kind of school or the gender of the participants.

Jogsan and Doshi (2014) conducted studies on students' study habits, academic achievement motivation, and social intelligence. Main objective of the study is findout whether or not there is a relation between a student's level of academic achievement, their study habits, and their level of social intelligence. Chi-square statistical analysis was employed for this investigation, which involved the collection of 104 student samples by the researcher. The findings of this research indicate that there is a considerable variation in the relationship between S.I and study practices, and academic achievement motivation.

Vikash (2014) examined the inequality in S.I between girls and boys among adolescent students. The purpose of this research was to investigate whether or not there are gender differences in the social intelligence of teenagers. To accomplish so, the researchers randomly gathered data from 35 boys and girls. The t-test method was utilized for the analysis of the data. The results of the study indicated that boys, in comparison to girls, have a higher level of social intelligence.

Abbas *et al.* (2013) identified the association between social intelligence and violence in Iranian high school boys. This study used descriptive-correlational research. Social intelligence and aggression were described descriptively. Social intelligence and aggression were studied using correlation. From 2010-2011, 3850 Kashan city high school boys were studied. Multistage cluster sampling was used for selecting 423 participants from this population. The aggression questionnaire from Buss Perry (1992) and the social intelligence questionnaire from Thout (1995) were used to assess the students. Regression and Correlation were utilized to analyze the data. The results demonstrated a substantial association between aggression and social intelligence, specifically physical, verbal, violent, and hostile behaviour among Kashan, high school boys. The more socially intelligent students are, the less violent they are. To reduce student aggression, social intelligence should be strengthened through curriculum preparation, in-service education programs, and principal seminars.

Abdul *et al.* (2012) conducted a study on the relationship between social intelligence and the behavioural characteristics of gifted middle school kids from the teachers' perspectives. The study sample included 200 male and female students from three Jordanian regions: Amman, Al-Salt, and Al-Zarqa. In this study, the social intelligence scale and the behavioural characteristics scale for talented kids by Renzulli were utilized. The validity and reliability indicators were judged to be adequate for achieving the study's goals. The results revealed that the sample's level of response on the social intelligence scale was high in both areas of the scale. In addition, the results revealed that the averages for originality, leadership and drive were all moderate, but the average for learning was low. The results revealed that there were no statistically significant variations in the average degree of response of the research sample as a

result of the sex variable on the social I.Q. and characteristic behavioral scales for the total score or sub dimensions.

Vandana *et al.* (2012) done research work on compare the S.I and, different personality traits of urban and rural adolescents. The sample size for the present study was 80, with 40 adolescent students coming from urban areas and 40 adolescent students coming from rural areas. In the course of this research, statistical methods, including the t-test and correlation, were utilized. The results of the study showed that there is a considerable variation between individuals from rural and urban backgrounds on several dimensions of personality and social intelligence. It was concluded that rural adolescent students scored very low compared to urban adolescent students.

Mortise *et al.* (2008) looked at how social and cognitive intelligence, which was measured by how well students did in school, affected how popular teenagers were in two different school settings. It was found that stoichiometric popularity, which is a measure of how well something is liked, is different from perceived popularity, which is a measure of social dominance. 56% of the students were girls and 44% were boys. Perceived popularity was always highly correlated with S.I. but not academic achievement. Stoichiometry's popularity was anticipated by the relationship between academic achievement and S.I., which was further clarified by the educational environment. Students in vocational programs outperformed peers socially or intellectually, but not both, whereas students headed for college outperformed peers socially or intellectually, but not both.

Sameer (2007) conducted a research about S.I. and aggression of high school pupils. Senior secondary school pupils have a high level of hostility and average level of S.I. Senior secondary school students' scores on social intelligence and aggression were found to have a negative and insignificant correlation across the whole sample.

The comparison of social intelligence between genders is shown to be important. Comparison of aggressiveness based on aggression is important. Aggressive behavior in schools has to be addressed with specific measures.

2.4. SCIENTIFIC ATTITUDE

Sapnasuman (2022) conducted a study to examine secondary school students' scientific attitudes and to compare students' scientific attitudes according to gender, school type, and geographic location of the school. 130 students in secondary schools were surveyed in this study. Results of the study revealed that there is no noticeable difference between male and female secondary school pupil's attitudes towards science. The pupils' scientific attitudes changed significantly depending on the school's type and location. Students attending private and urban schools showed a greater scientific attitude than students attending government and rural schools, respectively.

Nisha and Prema (2022) conducted the study to examine the levels of scientific attitude among secondary school children and assess whether there was any significant variation between them depending on age and gender. The results of the research provide a good indication of whether secondary school students have the necessary scientific attitude for a successful career in science. Survey method was used to conduct research. 227 pupils from certain schools were selected through random sampling. It concluded that there is no noticeable variation in the level of scientific attitude (S.A) between boys and girls or between various age groups.

Asriyadin *et al.* (2021) did a study to find out how learners feel about scientific attitudes. This research is a quasi-experiment that uses a neuroscience-based inquiry model. The research was done in one of Indonesia's Class 10 senior high schools. Indicators of the scientific attitude instrument being studied were curiosity,

cooperation, persistence, and creativity. The information was gathered using a scientific attitude questionnaire and written records. Quantitative methods were used to analyze the data. The results showed that the neuroscience-based inquiry model for learning physics was a good way to help students develop scientific attitudes like curiosity, teamwork, and creativity. However, compared to the other three indicators, the formation of the diligent indicator is not the best. Based on the results of the research, this research should be used and studied more to help students develop scientific attitudes.

Mishra (2020) conducted a research by using Dr. N.N. Srivastava's Scientific Attitude Scale (SAS) to compare scientific attitude and academic achievement (A.A). As a measure of academic achievement, the total number of marks scored in the Prayagraj-based Uttar Pradesh Board's High School Examination was used. According to the findings, pupils who were determined to have a greater scientific attitude scored higher than those who had a lower scientific attitude. This suggests that steps should be taken to enhance students' scientific attitudes beginning in early education through formal and informal instruction.

Shrivastava (2020) investigated the relationship between secondary school pupils' scientific attitudes and their academic achievement in science. The study involved five hundred students of science from Class XI and 10 different schools in Lucknow City, India. The goal of the study was to determine how students' learning preferences and scientific attitudes relate to one another. It also aimed to investigate any variations in learning styles between males and females. The kids' preferred method of learning is adaptive learning study. Students that use a convergent learning approach perform better in science. It has been determined that other learning methods are ineffective for teaching disciplines like physics, chemistry, and biology.

Nugraha *et al.* (2020) examined the association between junior high school pupils in Bandung, Indonesia's scientific attitude level and preferred learning approach. In this study, participants were asked to complete a questionnaire about their scientific attitudes and a VAK learning style inventory. The findings indicated a moderate link between students' scientific attitudes and their preferred learning methods. It was found that learning styles must be addressed while executing a science lesson, particularly in the Indonesian environment.

Ahuja (2018) studied how academic anxiety is situational anxiety that develops in a classroom setting and has a negative impact on academic results. The students need to be taught a scientific attitude right away. A total of 227 pupils from Delhi's government secondary schools participated in a descriptive survey. This study investigated gender differences in academic anxiety and scientific attitude. Similarly, there is a dependency between the scientific attitude (S.A), and academic anxiety, as well as a direct and indirect relationship between gender and the scientific attitude. The data analysis revealed a gender difference, favouring boy pupils in terms of academic anxiety and scientific attitude.

Mohit (2018) conducted a study to know how senior secondary students' physics achievement (P.A.) was impacted by teaching effectiveness (T.E.) and scientific attitude (S.A.). Teaching seeks to foster qualities such as objectivity, curiosity, open-mindedness, and scientific temperament. The findings indicate strong, substantial relationships between teaching effectiveness, scientific attitude, and physics achievement but weak correlations between scientific attitude and physics achievement.

Elumalai and Sumathi (2017) investigated the relationship between high school student’s scientific attitudes and creativity. Survey method was used to collect

data from 300 high school students who were chosen at random from a variety of Thiruvallur district schools. The results showed that students' scientific attitudes and creativity have a positive relationship. With regard to gender, teaching medium, kind of management, and location, there was a considerable difference between scientific attitude (S.A) and creativity among secondary school pupils. Additionally, there was no noticeable inequality between scientific attitude (S.A) and creativity in terms of the high school kids' family type, parental occupation, or parental education.

Revati and Meera (2017) looked into the attitudes of secondary school pupils in Kerala's Kottayam area toward science. The goal of the current analysis is to examine the scientific attitudes of secondary school pupils in Kerala's Kottayam region. The study also looks for any appreciable differences in the scientific attitudes of the various subsamples, including gender, location, and management style of the institution. One hundred eighty secondary school pupils from the Kottayam District make up the sample. For the data analysis, researchers employed descriptive statistical methods.

Kumar and Ranjith (2017) conducted a study to examine the levels of scientific attitude (S.A) among secondary school pupils and the differences between secondary school students from rural and urban schools in terms of their scientific attitudes. The sample consists of 300 secondary school students chosen at random from ten higher secondary schools in Tamil Nadu's Tirunelveli district's Sankarankovil taluk. The Scientific Attitude Scale was employed as a technique for data collection. The study demonstrates a modest level of scientific attitude (S.A) among secondary school pupils and a significant inequality between secondary school pupils from rural and urban schools.

Meenakshi and Vasimalairaja (2016) conducted a study to determine secondary school pupils' scientific attitudes. In the present study, the researcher has chosen the survey method. In the Virudhunagar district, a sample of 300 students from the eighth, ninth, and tenth grades was chosen at random. The study's findings showed that there is no noticeable gender or school-type variation in the mean scores of scientific attitudes.

Singh and Giri (2016), examined the "Relationship between Scientific Attitude and Academic Achievement of Rural Area Intermediate College Girls (Science Stream Only) in Varanasi District of Uttar Pradesh." (2016). scientific attitude is made up of two parts: scientific attitude "in the form of intent" and scientific attitude "in the form of action." Four colleges in the Varanasi district provided the sample. The analysis discovered that academic success is inextricably linked to a scientific mindset. It means that when female students' academic achievement improves, so does their scientific attitude.

Kristiani *et al.* (2015) examined the relationship between students' metacognitive abilities and scientific attitudes and their academic success in biology. The purpose of this correlational study is to evaluate the relationship between scientific attitudes (S.A) and metacognitive skills and the academic success of Indonesian high school pupils in Malang. This correlational research included twenty-three participants. The pupil's metacognitive skills were evaluated with the help of essay test that was also used to assess academic accomplishment. Using a questionnaire, the scientific attitudes of the pupils were assessed. According to the findings of the study, scientific attitudes and metacognitive skills contributed 71.4% to pupil's academic success. The impact of metacognitive abilities on the academic success of pupils was

much bigger (61,93%) than that of scientific attitude (9,49%). Teachers should consider employing an approach that might enhance students' metacognitive abilities.

Farooq (2015) evaluated the secondary school pupils' attitudes to scientific attitude provided the data. One hundred students were selected randomly from ten schools of Pakistan's Rajanpur District. The questionnaire used for the included eight characteristics of a scientific attitude: open-mindedness, objectivity, honesty, humility, and a willingness to suspend judgment. This study sought to understand how pupils in grade 10 were approaching science. The empirical data was examined using statistical methods. For each item, the average score for all eight components was determined. The data demonstrates that the pupils' mindset is only marginally scientific.

Ali (2014) investigated the impact of gender, location, medium of instruction, and management style on teenage pupils' scientific attitudes in the Vishakhapatnam area. D.N.Dani's Scientific Attitude Questionnaire was employed as a data-gathering technique to collect data from 300 teenage pupils who were selected with the help of random sampling procedure. Data was broken down using the mean, standard deviation, and t-test. The research showed significant differences in scientific attitudes regarding sex, territory, medium of direction, and kinds of administration. In terms of a scientific mindset, the results also demonstrate that self-funded school pupils score higher than government and aided school pupils.

Olasehinde *et al.* (2014) examined high school student's scientific attitudes, attitudes toward science, and science achievement in Nigeria's Katsina State. Present research work done with the help of, descriptive survey research method. From the three geopolitical zones of the state, 204 senior secondary school pupils were chosen using a random sample technique. The results demonstrated that scientific attitudes do not significantly differ between male and female students and that they explain 0.01

per cent of the total difference in science achievement (R2 =.001, p>0.05). It was suggested, among other things, that researchers turn their attention inward to identify the barriers to science learning in schools.

Srivastava (2013) looked at how high school students think about the environment and how they feel about scientific attitudes. Two hundred fifty science students from 10 government-funded schools that were checked were chosen at random. Emina set up the Inventory of Scientific Attitudes (ISA), which was used to gather information. Statistical techniques i.e., Mean, standard deviation, and the t-test were used to analyze the data. This research showed the high school science pupils had a normal view of science and that sex didn't change it.

Utibe *et al.* (2013) looked into how students in Edo South, Edo State, felt about scientific attitude. The goal of present research work is, how high school boys and girls feel about scientific attitudes. Data were gathered with the help of the Inventory of Scientific Attitudes (ISA) from 250 science students from 10 government-funded schools were chosen after being inspected. The study found that the attitudes of senior high school science students toward science were normal and not affected by gender.

Pyari and Sharma (2013) aimed to investigate Scientific Attitude and Science Achievement. A sample of 1500 kids from class X in Agra were taken for the study. S. C. Gakhar Amandeep Kaur's Scientific Attitude Scale was used to assess scientific attitude, while high school board examination grades in science subjects were utilized to assess science achievement. It was discovered that students with a high degree of science attitude had a more positive scientific attitude than students with a low level of scientific achievement.

Amjad and Muhammad (2012) attempted to assess secondary school pupil's scientific attitudes in their work Measurement of Scientific Attitude of Secondary

School pupils in Pakistan. The study's goals were to assess students' scientific attitudes in grade 10 and determine how far their scientific attitudes are developing. The investigation was conducted using a survey approach. The Scientific Attitude Questionnaire was used to collect the data from 100 pupils who were selected randomly. Curiosity, reason, readiness to suspend judgment, open-mindedness, critical-mindedness, objectivity, honesty, and humility are the eight key aspects of the scientific attitude listed in the questionnaire. The findings revealed that the pupils' attitude is slightly scientific. Learning experiences should be chosen based on the information, skills, and attitudes that will be acquired. The teaching of science, as well as the use of handmade, low-cost materials for various experiments, should be prioritized.

Jancirani *et al.* (2012) anlyzed the scientific attitudes of Namakkal District secondary school pupils. This study looked at how gender, location, teaching method, and school administration impacted teenage students' attitudes toward scientific attitudes. The study employed a survey approach. Three hundred teens were randomly sampled. Scientific Attitude Questionnaire developed by D.N. Dani was used to collect data. The mean, S.D., and t-test were used to examine the data. This research work found significant differences in scientific attitudes by sex, region, guiding medium, and administration type. Girls are more scientific than boys. Locality affects pupils' scientific attitude. Urban kids have a strong scientific attitude. The medium of education affects students' scientific attitudes. Tamil pupils are less scientific than English ones. Management type affects students' scientific attitude. Self-finance students are more scientific than government students.

Pillai (2012) conducted an analysis of high school student’s scientific attitudes in Virudhunagar. The study aimed to compare male and female students' scientific

attitudes, private and government school students' scientific attitudes, and urban and rural students' scientific attitudes. The study employed a survey approach. Asokan's Scientific Attitude Scale was used to collect data from 300 randomly selected high school students. Study revealed that Male and female students' scientific attitudes were similar. Government, private, rural, and urban students' scientific attitudes vary.

Yadav (2012) aimed to a research study on High School pupils Scientific Attitude in Relation to Academic Achievement. Avinash Grewal's Science Attitude Scale (SAS) and the students' Academic Achievement Report to collect data from 120 high school students. The findings of the study revealed a significant inequality in attitudes toward science between female and male secondary school pupils from rural and urban areas. A significant favourable link was also discovered between scientific attitude and academic success.

Patil (2011) conducted research named Comparative research Study of Scientific Attitudes towards Secondary and Senior Secondary pupils. The major objective of the present research was to compare the attitudes of secondary and upper-secondary pupils toward science. For this investigation, the survey approach was employed. The current study included a sample of 120 pupils. The mean, standard deviation, and t-test were used to analyze the data. The study showed that male and female pupils in middle school and high school have different ideas about scientific attitudes. Male secondary school students are have low level of scientific attitude compare to female students.

Ali (2009) studied class VII Urdu and Telugu pupils' scientific attitudes. The objectives of the studies were to Measure, compare and comprehend class VII Urdu and Telugu students' scientific attitudes. The scientific attitude scale (based on Likert's approach) designed by the late professor VenkatRam Reddy (SVO) was used to

measure scientific attitudes of One hundred fifty seventh-graders (75 each from Urdu and Telugu mediums). The findings revealed that Class VII pupils exhibit more positive scientific views regardless of the media. Gender and Medium of education didn't affect Telugu or Urdu students' scientific views.

Patil (2005) carried out a study entitled Correlational Study of Scientific Attitude between IX Standard Students and their parents. The main purpose of research was to find out the relation between scientific attitude and the family atmosphere IX-standard students. The measurable procedure relationship was utilized for the examination of data. The information was gathered with the assistance of the Scientific Attitude Scale and Family Environment Scale from 40 IX-standard students. The primary conclusion of this examination was that there is a certain connection between scientific attitude and family climate.

2.5. ACHIEVEMENT IN MATHEMATICS

Ali *et al*. (2022) compared two groups of children in the Territorial Region of Bodoland (BTR) of Assam, India, on their mathematics achievement. Boys and girls from various secondary and higher secondary schools in BTR are divided into three different types of categories, including tribal and nontribal, rural and urban, and boys and girls. Mathematical achievement differences between two groups of pupils are measured using the Mahalanobis Distance (M.D.). The outcome showed that there is no discernible variation between girls and boys in terms of the dynamic character of their mathematical achievement.

Bekoe *et al.* (2022) investigated the effects of student self-efficacy, student perception, and teacher-student relationships on mathematical achievement. The study, which was a survey, employed a structured questionnaire as its data-gathering

tool. A total of 400 pupils were chosen at random from two public high schools in the Ashanti region: 112 males and 298 girls. The collected data were statistically evaluated using a structural equation model. The results led to the conclusion that while student self-efficacy and perception had a beneficial effect on mathematics achievement, the teacher-student connection had little bearing on mathematics achievement. The findings suggested that teachers support efforts to improve pupils' attitudes toward mathematics achievement.

Sughayyir et al. (2022), determined about how utilizing the Math way program affected secondary school pupils in Najran City student mathematical achievement. In 2nd semester of the academic year, 83 students who were studying mathematics made up the study population. A pre-achievement test was used before the experiment to make sure the two groups were equal, and a post-achievement test was developed to determine any differences between the two groups after the experiment had been completed. According to the findings of the post-academic achievement test, there was a considerable variation between the means of the experimental group and the control groups of the study at 0.05 level.

Ryan *et al.* (2021) focused on math student performance in Ireland following the change from primary to secondary education. At the conclusion of the last year of primary school and the end of the first year of secondary education, academic achievement in mathematics was assessed using a standardized test. These two test results for 249 children were compared to see how much math learning had progressed during the transfer. Between the sixth grade (the last year of primary school) and the conclusion of the first year of secondary education, students' raw scores dropped by 7%. According to the results, each strand location and each process skill revealed statistically significant reductions. The results of this research project would be

interesting to the global mathematics education community because this academic change is not unique to Ireland.

Main *et al.* (2021) analyzed that learning performance is predicted by the multidimensional notion of student involvement. However, there isn't much focus on student participation, particularly in math. A survey was conducted for this study to ascertain the impact of student engagement on mathematical achievement. Secondary school pupils (n = 1000) were chosen using stratified random sampling. The results of end-of-year exams and surveys were gathered to provide information on student involvement and individual math proficiency. The results showed a substantial correlation between mathematical achievement and cognitive, affective, behavioral, and engagement. Research findings reveals that multiple linear regression study, affective involvement (p = 0.743, p 0.001), behavioral engagement (p = 0.585, p 0.001), and cognitive engagement (p = 0.375, p 0.01) are the three factors that predict mathematical achievement the most. In light of this, policymakers may want to create a curriculum that enhances affective and behavioral involvement.

Abín *et al.* (2020) investigated favorable correlation of academic achievement in mathematics is with emotional intelligence and motivational intelligence as well as cognitive talents. This study's purpose was to see how well cognitive, motivational, and emotional factors may predict students' high school mathematics achievement while taking their gender and age into account. The study included 2,365 Spanish high school students, a large sample drawn from four years of high school. Data indicated disparities based on gender and academic grade level. As predicted by the investigation, the motivational and emotional variables did not appear to be significant in these association.

Ogborn et al. (2020) examined the association between mathematics achievement and students' mathematics self-efficacy and self-concept in the TwifoHemang Lower Denkyira District of Ghana's Central Region. The two schools under consideration were represented using a probability-stratified random sampling technique. The Likert scale kind of questionnaire and the accomplishment test were prepared and used to acquire pertinent data for the study. A correlational research design was chosen as the research method for this research work. The achievement scores of pupils with low and high self-efficacy and self-concept scores in mathematics were compared using an independent sample t-test. Results found that students' mathematical achievement and mathematics self-efficacy were connected. The outcome demonstrated that students' perceptions of their own abilities in math did not correspond to those abilities. In light of this, it was advised that academic performance-related constructs should receive a lot of attention.

Abdul and Adown (2019) studied pupils' self-concept as a predictor of math success in Ankpa, Kogi State, Nigeria. A correlational research design was used. The study's subjects were SS II math students in Ankpa, Kogi State, Nigeria. The study sampled 332 (166 male, 166 female) mathematics students using stratified and simple random selection. The study used five hypotheses. The required data was collected using: The researchers used a 20-item questionnaire called Mathematics and a 20-item questionnaire called the Academic Self-concept Questionnaire (ASQC) to measure students' academic achievement. The ASQC reliability is 0.83. The data were analyzed using Pearson's PMC and multiple regression. At 0.05 significance, hypotheses were tested. The results showed a link between self-concept and math proficiency in high school. Female students' self-concept and math achievement in secondary school was

similarly different from males. According to the report, all genders should be encouraged to flourish in academics, given they have equal opportunities.

Recber *et al.* (2018) investigated the association between seventh-grade students' self-efficacy in math, math anxiety, attitudes toward math achievement, gender, and school type in this study. Two-way ANOVAs were used to find out how gender and type of school affected self-efficacy, anxiety, attitude, and achievement. Multiple regression analysis was also used to look at how math self-efficacy, anxiety, attitude, gender, and school type affect how well seventh-grade students do in math achievement. The results showed that gender was the most important factor when it came to mean math scores, attitude scores, anxiety scores, and math achievement. As well as, school type had a large impact on attitude ratings while having little to no impact on mean self-efficacy scores. Further research confirmed that self-efficacy, anxiety, attitude, and gender greatly influenced students' achievement scores.

Sheoran (2018) conducted a study on the academic achievement of 7th-grade students at BSEH (Board of secondary education Haryana) students. The standardized Mathematics Achievement (tool) test was used to obtain the data from 200 seventh-grade pupils of Sirsa district. The mean, S.D., and t-test were used for data analysis. The results showed that private schools had higher academic achievement in mathematics than public schools. Because they were provided greater resources, the male pupils in metropolitan areas performed better in math. More financial and academic resources should be provided to government schools, schools located in rural areas, and schools with female students so that progress can be made in government schools, schools in rural areas, and schools with female students.

Li M *et al.* (2017) analyzed the differences in mathematical achievement that exist between female and male pupils. The study's sample consisted of students

enrolled in the fifth and eighth grades. A meta-analysis was performed as part of the process of carrying out this investigation. The outcomes of the research indicated that there was no discernible gender gap in terms of the levels of mathematical achievement that the children had while they were in fifth grade.

Surya and Mahendran (2017) investigated the adjustment problem and how it affects secondary school students' mathematical achievement. The researcher used a survey method to investigate how adjustment problems affect secondary school pupils' math achievement. The researcher used a survey method to collect data. Researcher utilized used a simple random sampling procedure to choose the sample of 300 school pupils from four public and private schools in the Dindigul region of Tamil Nadu. The results showed that adjustment problems have a substantial mean score difference and have an effect on secondary school students' academic achievement in mathematics.

Kalia (2017) examined the relationship between mathematics performance and academic anxiety in high school seniors. The researcher recruited 200 non-medical 11th-grade students from government and government-aided institutions in Ludhiana, Punjab. Data were collected using Singh and Gupta's academic anxiety measure for children (2009). The mathematical achievement was based on 10th-grade board test scores. Mean, median, S.D., skewness, and kurtosis were computed to validate normality. Product-moment correlation was used for analyzing data. The study's findings showed a negative correlation between senior secondary school pupils' academic anxiety and mathematics achievement. More particularly, math achievement declines and vice versa as academic anxiety levels rise.

Paul and Govindharaj (2017) studied in Madurai, Tamil Nadu, India, to compare the math skills of high school students who were learning Tamil or English. Simple random sampling was used to choose 80 students: 40 from a government-

funded school that taught Tamil and 40 from a private school that taught English. A screening test was used to find out how well students did in math class. The person doing the investigation made up 25 math questions. Each question was worth four points, and the whole score was 100 points. The results showed that students who studied in English did better in math than those who studied in Tamil. Students in private schools did better in math than students in government-funded schools. Students whose parents could read and write did better in math than those whose parents couldn't read or write.

Anjum (2015) examined the gender disparities in math achievement and reading comprehension among Western UP pupils. The research included students in the upper elementary school stage from the cities of Bulandshahr, Aligarh, Khujra, and Jahangirabad in Western Uttar Pradesh. A total of 307 people were participated in the research study. There were 147 males and 160 females in the group. A descriptive survey was utilized as the method of investigation. The test was based on the NCERT New Delhi Achievement Test in Mathematics for Class 8, which was created in 2007. This research used the reading comprehension test developed by Promila Ahuja and G.C. Ahuja (2012). According to the data, there is a statistically significant variation in mathematical achievement and reading capacity between males and girls. It was revealed that the ability to read and interpret literature has a strong and positive relationship with mathematical success.

Isackmichael (2015) examined the basic causes of poor mathematics achievement in Kibaha secondary schools. The study included 60 students, 8 math professors, and four secondary schools which were selected through random sampling procedure. From four different schools, four academic masters and four heads of schools were specifically chosen. The process of gathering data involved the use of

surveys, open and closed-ended interviews, focus groups, observations (FGD), and document analysis. The results showed that poor teaching environments, not enough self-practice, and students who didn't know much about math made it hard to teach and learn math. The researcher suggested teachers to find out about their students' backgrounds so they can choose teaching methods that will help their students do better in school.

Chaman (2014) conducted a study titled "Factors influencing mathematics achievement among secondary school students: A review." Math self-concept, math anxiety, attitude toward math, math self-efficacy, parental involvement, teachers, peers, and gender are few of the factors that have been found to impact math achievement. Present research work reported that the elements mentioned above and others had an impact on math achievement.

Mahanta (2014) investigated how students' home environments effects on development of positive attitude toward mathematics. The researcher carried out a survey to determine the numerous aspects of the home environment that can influence students' mathematical achievement and to look into the nature of their influence. We tabulated some data from our survey and used Levene's test for equality of variances and the t-test for equality of means to analyze it appropriately. According to our research, there is a link between the family environment and students' views toward mathematics. The paper comes to the conclusion that a comfortable home environment is crucial in shaping students' desire for mathematics, which affects their long-term mathematical achievement.

Rajan (2013) investigated the link between high school students' self-esteem and math achievement to fill a knowledge gap. 300 management and government high school students were purposefully sampled. The Self Esteem Inventory (1996) and

kids' school accomplishment scores are used. High school students have middling self-esteem and math achievement. Boys and females, students in management and government schools, and rural and urban pupils had similar self-esteem and math proficiency.

Zakaria et al. (2012) examined the relation between secondary school students in Selangor, Malaysia, mathematics achievement, and math anxiety. The study looked at the gender disparities in math anxiety as well as the correlation between math achievement levels and math anxiety levels among pupils. One hundred ninety-five students participated in the study (86 male and 109 female). The Fennema-Sherman Mathematics Attitudes Scale was modified to create the instrument used to measure differences. SPSS was used to analyze the data in order to calculate the mean, frequency, t-test, and one-way ANOVA. Results of research showed that secondary school students struggle with arithmetic anxiety. The t-test concluded that there is no statistical significance between the mean variation in math anxiety and gender. Based on the degree of mathematics anxiety, the ANOVA test revealed that there were significant differences in achievement in mathematics.

Brown and Kanyongo (2010) conducted a study to discover whether or not there is a substantial difference in mathematical achievement based on gender. For this research work data was collected from a representative sample of 561 students who were enrolled in public schools located within an educational district. Component analysis was used for the questionnaire, and the results of this procedure allowed for the generation of five variables. These variables were as follows: perseverance, academic self-concept values and aims, school environment, and mathematical self-concept. The decision was made to utilize the multivariate analysis of variance

(MANOVA) method. According to the data, there is a performance discrepancy between the sexes in terms of mathematics, with females coming out ahead.

Govindarajan (2010) conducted a research on the "correlation between students' sense of self-worth and their level of mathematical achievement in secondary school". The experiences that a youngster has at school are directly related to many of the factors that influence his or her level of self-esteem. The degree to which a kid feels about his or her own personal worth and about the achievements that they have made is a major factor in determining the degree to which a child's self-esteem will be affected by the success or failure that the child experiences in the context of the school setting. When it comes to a student's level of self-esteem and academic achievement, there is no discernible inequality between girls and boys students attending management schools and students attending government schools, as well as students attending schools in rural and metropolitan areas.

Tuncay and Akdemir (2009) argued that the quality of teaching and learning math had been one of the biggest challenges and worries for educators. Instructional design is an effective way to solve problems with how math is taught and learned. This study was done to find out what affects how well students do in math by asking students in the math department what they think. The findings revealed that instructional strategies and methodologies, teacher competence in math education, and motivation or concentration were the three most significant factors to consider when making design decisions.

Hafner (2008) investigated the relationship between self-efficacy and mathematical achievement as well as anxiety about mathematics in school students. A lower level of mathematics achievement was associated with higher levels of mathematics anxiety. It was also shown that self-efficacy in mathematics was

positively connected with success in mathematics. The findings of the study had a considerable impact on the statistics. They showed that students' anxiety would decrease as their levels of mathematics self-efficiency increased.

Lamb and Fullarton (2002) investigated student, classroom, and school characteristics that influence mathematics success in Australia and the United States using data from the Third International Mathematics and Science Study (TIMSS). It was discovered that disparities in classrooms account for around one-third of the variation in student success in the United States and more than one-quarter of the variation in student accomplishment in Australia. The composition of the class and the way it was run were the primary contributors to the classroom's dynamic, with the teachers' individual styles contributing very little.

Mehra (2004), Baskaran (1991), Prakash (2000), Singh, Malik, and. Singh (2003) reported that urban students are better at math than rural students. This conclusion is not supported by the findings of Patel (2012), Balasubramanian (1966), and Feroze (1966), who said that there is no considerable variation in how well boys and girls did in urban neighborhoods. But Balasubramanian and Feroze found in 1966 that the math skills of rural boys and girls were very different from those of urban boys and girls. Even though Sood (1999) found that girls did a little better in math than boys, Mehra (2004) found that there was no big difference in how well students did in math based on their gender. Even so, Mehra (2004) found that there wasn't a big difference in how good they were at math.

2.6 RESEARCH GAP

Reviewing the current literature shows that more research needs to be done to improve educational structures that help develop talent and find students who could be

the new generation of this country. This study will fill the research gap by measuring social intelligence (S.I), scientific attitude (S.A), and mathematics achievement of secondary school tribal pupils and finding the impact of S.I and scientific attitude on achievement in mathematics of secondary school tribal pupils of Adilabad District. Although previous research investigated that there is a very positive relationship between S.I and achievement in mathematics (A.M), (Meera *et al.* 2019) scientific attitude and achievement in mathematics, (Mishra 2020) and social intelligence and scientific attitude (Ajay Prakash Tiwari, & Dileep Kumar Maurya, 2020) in general at various levels in the education system but here, the researcher is working with secondary school tribal students only. This is the very vital research gap for the present research work.

Most of the research was done with the help of readymade tools prepared by experts based on their needs, but the researcher here prepared self-constructed and standardized two tools, such as social intelligence and scientific attitude, based on the daily life situations of secondary school tribal pupils. This is a very significant feature of the present research.

2.7 CONCLUSION

As per previous studies of S.I., social intelligence impacts positively on the educational achievement of students with respect to secondary education and higher education, and high scientific attitude also boosts the success rate of students with respect to all levels of education. S. I. and S. A. are also having a significant impact on mathematics achievement. There is a positive relation among social intelligence, scientific attitude (S.I) and achievement in mathematics (A.M) of secondary school tribal pupils.

In conclusion, it is possible to state that although the majority of the research on variables in the field of education, such as social intelligence, scientific attitude, and achievement in mathematics, is available, this research has not been conducted in relation to secondary school students who are members of tribal communities. The majority of research has been done on elementary education, higher education, teacher education, and vocational education, but there has been no research done on tribal education with respect to variables such as social intelligence, scientific attitude and achievement in mathematics.

CHAPTER THREE

METHODOLOGY

3.1. INTRODUCTION

Present chapter includes the methodology and procedure adopted by the researcher for gathering information and data regarding the study's objectives. This chapter covered data analysis methods, population, samples, information-gathering tools, and statistical techniques for data analysis.

3.2. METHOD ADOPTED FOR STUDY

In order to carry out research, the researcher has to adopt a specific research method; it depends on the problem's nature, objectives of the study, and type of data. Because the problem of research study is the relationship between S.I., S.A., and achievement in mathematics of secondary school tribal pupils, the researcher has chosen the survey method to study the variables concerning demographic variables such as gender, locality, and medium of instruction.

A survey method is a systematic approach utilized when there is a need to collect data from a sizable amount of individuals at one particular point in time. It does not consider the peculiarities of persons in and of themselves. It is concerned with the statistics that emerge as a result of data extracted from various individual cases. According to Kerlinger (1973), survey research is a type of social science research that focuses on individuals and the essential facts about people: their views, opinions, attitudes, and motivations, in addition to their behaviors.

- **AREA OF THE RESEARCH STUDY**

  Present research study was conducted in the Adilabad district of the state of Telangana. Adilabad district is in Telangana's northernmost region.

Nirmal, Asifabad, and Mancherial are neighboring districts. The district of Adilabad is divided into two revenue divisions: Utnoor and Adilabad. It contains 508 villages and 18 revenue manuals. The researcher collected data from 14 tribal welfare ashram schools.

Figure 3.1.

Map of Adilabad district.

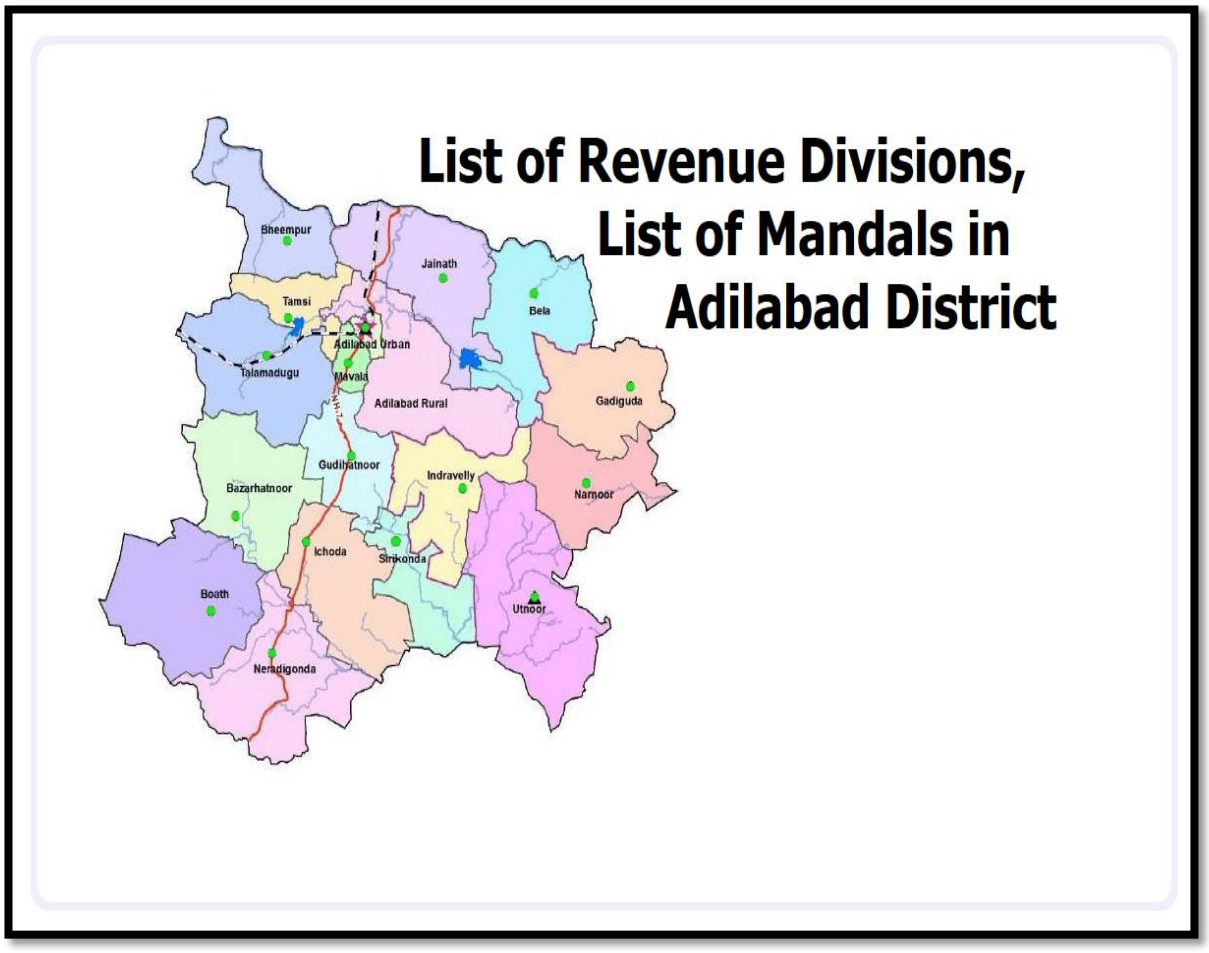


Table 3.1.

Adilabad District Demographic Characteristics.

Description	Data
Total population	7,08972
Male population	356407
Female population	352565
square kilometres	4,1535
Percentage of urban population	1,67746
Percentage of the rural population	541226
S.T Population	2,24622
Average literacy rate	63.46
Sex ratio	1:0.989

Source: Census of India (2011)

3.3. POPULATION OF THE STUDY

A population is any group of individuals that possesses one or more characteristics that are of interest to the researcher. Population is nothing more than all the numbers of a group about which the investigator wishes to draw conclusions. The current study's population comprises secondary school tribal students, such as, ninth, and tenth classes, from the Adilabad district of Telangana state. Population of the present study is tribal welfare secondary school tribal students, population size is 4298.

Sample for the Study:

The sample is the part of the population selected for analysis. The present study sample size is 420 secondary school (9 &10 class) tribal pupils of the Adilabad district. The sample was selected based on simple random sampling method from tribal welfare secondary schools. Adilabad District have two revenue divisions, these two revenue divisions have 18 revenue mandals. Among 18 revenue mandals four revenue mandals don't have tribal welfare secondary schools, so researcher selected 14 mandals for sample. From each revenue mandals researcher selected one school randomly with the help of lottery method. From each school class ninth and tenth 30 students selected randomly. Researcher collected data from 14 schools, so researcher did two stage randomization during data collection.

3.4 VARIABLES OF THE STUDY:

- Independent variables of the research study are social intelligence and scientific attitude.
- Dependent variable of the study is achievement in mathematics.
- Demographic variables are such as gender, locality and medium of Instruction.

Here, social intelligence and scientific attitude are taken as independent variables, and achievement in mathematics is taken as a dependent variable because previous studies say that achievement depends on social intelligence and scientific attitude. The investigator took demographic variables such as gender, locality, and medium of instruction into account. In various studies, female and male students' social intelligence, scientific attitude, and achievement in mathematics differed, and usually, tribal female students have very limited exposure to society (Aiken &

Aiken, 1969). That's why researchers decided to include gender as a demographic variable. The locality also plays a very significant role with respect to social intelligence, scientific attitude, and achievement in mathematics because rural school students may differ from urban school students with respect to social intelligence, scientific attitude, and achievement in mathematics (Dhir jingran 2009). Finally, the medium of instruction also contributes differently with respect to social intelligence, scientific attitude, and achievement in mathematics. This is because English is one of the hardest subjects among tribal students, so regional medium secondary school tribal students may be a little better than English medium tribal students (Panda, H. 2020). That's why the researcher decided to choose the above-mentioned variables.

3.5 TOOLS:

The researcher has used the following tools for the present research work:

1. Personal data sheet.
2. Social intelligence scale standardized by an investigator.
3. Scientific attitude scale standardized by an investigator.

There are several tools available in the market related to social intelligence and scientific attitude with respect to school education and higher education, but those tools are standardized long back based on respective situations, and they are not constructed based on the needs of secondary school tribal students. That's why the researcher constructed two tools based on the day-to-day situations of their livelihood and needs of secondary school tribal students of Adilabad District.

1. Personal data sheet

Researcher used a personal information sheet to collect information of the sample, which was comprised of pupils in secondary school (i.e., classes of ninth and

tenth). This data was gathered to better understanding of the demographic characteristics of the present research study.

2. Construction of the social intelligence scale

The researcher followed the steps given below for the construction and standardization of the scale. They are

i). Analysis of literature to find components of social intelligence:

The researcher reviewed the contemporary literature on social intelligence and went deeply into the concerned area of research. Based on this work, the researcher decided to take four components for the construction of the S.I. Scale, such as social leadership, social skills, social competency, and social adjustment.

ii). Construction of a S.I. Scale and Making a list of the statements or items:

The development of the scale is a very significant step. Based on the operational definitions of the major components, the researcher prepared the items or statements for scale. As this scale is for secondary school students, their day-to-day life situations are considered while preparing items or statements.

iii). Checking the statements:

It is the most important task to check the statements again and again by the researcher after the researcher sends them to experts in the concerned area to evaluate their appropriateness and usefulness. Therefore, ten expert members were selected from various areas. These expert members come from various fields, such as sociology, social sciences, psychology, philosophy, and education.

Fifty-eight (positive and negative) statements, along with major and minor components, were sent to expert members. Two options were given in front of each statement, such as 1. Suitable to measure social intelligence. 2. Not suitable to measure social intelligence.

Among those 58 statements, 52 statements were retained. These statements were selected by more than 60 per cent of the experts; the remaining six statements were removed as per the recommendations of the experts. After that, the researcher checked the grammatical and topological mistakes in the statements.

iv). Instructions for respondents

Before the actual implementation of the scale, it was essential to give some basic instructions to respondents about the scale and how to solve it. Some instructions given on the first page of the scale, such as the following statements, are concerned with social intelligence. Read each item thoroughly before marking your response on a sheet, such as A means agree, D means disagree, N means neutral, SD means strongly disagree, and SA means strongly agree. As per the responses of respondents researcher given 1 mark to strongly disagree, 2 mark to disagree, 3 mark to neutral, 4 mark to agree, and 5 mark to strongly agree for positive statements or items. 5 mark to strongly disagree, 4 mark to disagree, 3 mark to neutral, 2 mark to agree, and 1 mark to strongly agree for negative statements or items.

v). Standardization of social intelligence scale:

Pilot study: For the pilot study the researcher selected tribal welfare ashram schools in the Adilabad district of Telangana state; the sample size is 60. The researcher collected data from 6 secondary (9 and 10 classes) tribal welfare ashram schools. Among them, three schools are girls' schools.

While collecting the data, the researcher gave necessary instructions to respondents and supervised every respondent personally. The researcher split the sample into two sections after gathering data from the respondents, such as the top 27% scorers among 60 samples and the low 27% scorers among 60 samples. (That is,

the top and bottom 27 per cent of the sixty respondents). After that, the researcher tabulated the scores of both groups on an excel sheet.

Type of Items: There are positive and negative types of statements on the scale.

- **Item analysis:** Item analysis includes item selection, difficulty, and discrimination.

Difficulty level: The difficulty level of an item is defined as the proportion of respondents that properly marked the item or statement. This is the percentage of the respondents that rightly marked the statement or item. For calculating the difficulty index, the researcher followed the below-given formula (Garrett H.E, 2008, pp.362).

$$DL = \frac{Ru + Rl}{Nu + Nl}$$

Here, Ru-Students in the upper group who gave the right answer

Rl-Students in the lower group who answered correctly

Nu-Upper group students in total,

Nl-lower group students in total

With the help of the above formula researcher calculated the difficulty level of each item or statement. A value below 0.25 indicates a problematic item, and a value above 0.90 indicates a straightforward item. Here the researcher deleted items or statements that were scored below 0.25 and above 0.90.

Discrimination index: For calculating the discrimination index researcher adopted the given formula.

$$DI = \frac{Ru - Rl}{Nu}$$

Here, Ru- Students in the upper group who gave the right answer

Rl- Students in the lower group who answered correctly

Nu- Total number of students in the upper group

This value can range between -1.00 and +1.00. All of the items have positive discrimination because their values are higher than 0.20. It means that discrimination is all right (Agarwal, 1986).

Table 3.2.

Difficulty Level and Discrimination Index Values.

Social Intelligence

(Difficulty level & Discrimination Index)

S.NO	DL	DI	S.NO	DL	DI
1	0.294117647	0.352941176	29	0.264705882	0.411764706
2	0.294117647	0.235294118	30	0.264705882	0.411764706
3	0.147058824	0.058823529	31	0.588235294	0.352941176
4	0.294117647	0.352941176	32	0.294117647	0.235294118
5	0.264705882	0.294117647	33	0.323529412	0.294117647
6	0.294117647	0.470588235	34	0.264705882	0.529411765
7	0.264705882	0.411764706	35	0.264705882	0.294117647
8	0.264705882	0.294117647	36	0.382352941	0.411764706
9	0.264705882	0.411764706	37	0.264705882	-0.058823529
10	0.323529412	0.294117647	38	0.411764706	0.117647059
11	0.264705882	0.294117647	39	0.382352941	0.294117647
12	0.294117647	0.352941176	40	0.352941176	0.352941176
13	0.088235294	0.058823529	41	0.382352941	0.411764706
14	0.264705882	0.294117647	42	0.294117647	0.352941176
15	0.352941176	0.235294118	43	0.294117647	0.235294118

S.NO	DL	DI	S.NO	DL	DI
16	0.176470588	0	44	0.147058824	-0.058823529
17	0.235294118	0.352941176	45	0.264705882	0.294117647
18	0.411764706	0.352941176	46	0.264705882	0.529411765
19	0.235294118	0.352941176	47	0.382352941	0.529411765
20	0.176470588	0	48	0.264705882	0.294117647
21	0.176470588	0.117647059	49	0.147058824	0.294117647
22	0.088235294	0.176470588	50	0.264705882	0.294117647
23	0.264705882	0.294117647	51	0.382352941	0.647058824
24	0.323529412	0.294117647	52	0.264705882	0.294117647
25	0.264705882	0.294117647	53	0.323529412	0.529411765
26	0.382352941	0.411764706	54	0.323529412	0.529411765
27	0.176470588	0.117647059	55	0.294117647	0.235294118
28	0.470588235	0.235294118	56	0.382352941	0.294117647

DL= Difficulty level (According to GARRETT H.E-2008, pp362)

DI= Discrimination Index (According to Agarwal 1986)

	Range			
DI	0.4 & Above	Very Good	**DL**	0.25 to 0.90
	0.30 to 0.39	Good		
	0.20 to 0.29	Fair		
	0.09 to 0.19	Poor		

Reliability: For the reliability test, the researcher adopted the Cronbach alpha test. Cronbach alpha value of total items is 0.803676843. This is an acceptable value.

Validity: For the content validity of the tool, researchers sent 25 experts throughout India to central universities such as the Central University of Kerala, Central University of Tamilnadu, Pondicherry central university, Central University of Rajasthan, Delhi University, English Foreign Language University, Jawaharlal Nehru University, and state universities such as Osmania University, Acharya Nagarjuna University, Andhra University, Tamilnadu Teacher Education University, and Alagappa University. The tool was sent to education department professors and Associate professors of the above universities. After the suggestion and recommendation of experts from the above universities, among 52 statements, 41 statements or items are retained for the main study.

3. Construction of the scientific attitude scale.

For construction and standardization of the scientific attitude scale, researcher followed following steps:

i). Analysis of literature to find components of a scientific attitude.

The researcher reviewed the contemporary literature on scientific attitude and went deeply into the concerned area of research. Based on this work researcher decided to take five components for the construction of a scientific attitude scale, such as Rationality, curiosity, open-mindedness, objectivity, and aversion to superstition are all desirable traits.

ii). Writing of statements or items

The development of the scale is a very significant step. The researcher prepared the statements for scale based on the operational definitions of the major components of scientific attitude. As said by the researcher in the previous tool preparation process,

while preparing the tool, secondary school students' day-to-day life situations are considered.

iii). Checking the statements

It is the foremost important task to check the statements again and again by the researcher, after which the researcher sends them to experts in the concerned area to evaluate their appropriateness and usefulness. Therefore, ten expert members were selected from various areas. These expert members come from various fields such as life sciences, , psychology, philosophy, education, etc. 62 (positive and negative) statements, along with major and minor components, were sent to expert members. In front of each statement, two options were given, such as 1. Suitable to measure scientific attitude. 2. Not suitable to measure scientific attitude. Among those 62 statements, 50 statements were retained. These statements were selected by more than 60 per cent of the experts; the remaining 12 statements were removed as per the recommendations of the experts. The researcher checked the grammatical mistakes as well as topological mistakes in the statements.

iv). Instructions for respondents

Before the actual implementation of the scale, it was essential to give some basic instructions to respondents about the scale and how to solve it. Some instructions on the front page of the scale, such as the following statements are concerned with social intelligence. Read each item thoroughly before marking your response on a sheet such as, A means agree, D means disagree, N means neutral, SA means strongly agree and SD means strongly disagree. As for the responses of respondents researcher given marks 1 for strongly disagree, 2 for disagree, 3 for neutral, 4 for agree, and 5 for strongly agree for positive statements or items. 5 for strongly disagree, 4 for disagree, 3 for neutral, 2 for agree, and 1 for strongly agree for negative statements or items.

v). Standardization of the scientific attitude scale:

Pilot study: For the pilot study researcher selected tribal welfare ashram schools in the Adilabad district of Telangana state; the sample size is 60. The researcher collected data from 6 secondary (8, 9, and 10 th classes) tribal welfare ashram schools. Among them, three schools are girls' schools.

While collecting the data, the researcher gave proper instructions to respondents and supervised every respondent personally. The researcher split the sample into two sections after gathering data from the respondents, such as the top 27% scorers among 60 samples and the low 27% scorers among 60 samples. (That is, the top and bottom 27 per cent of the sixty respondents). After that, the researcher tabulated the scores of both groups on an excel sheet.

Type of Items: There are positive and negative types of statements on the scale.

- **Item analysis:** Item analysis includes item selection, difficulty, and discrimination.

Difficulty level: The difficulty level of an item is defined as the proportion of respondents that properly marked the item or statement. This is the percentage of the respondents that rightly marked the statement or item. For calculating the difficulty index, the researcher followed the below-given formula (Garrett H.E, 2008, pp.362).

$$DL = \frac{Ru + Rl}{Nu + Nl}$$

Here, Ru-Students in the upper group who gave the right answer

Rl-Students in the lower group who answered correctly

Nu-Upper group students in total,

Nl-lower group students in total

With the help of the above formula researcher calculated the difficulty level of each item or statement. A value below 0.25 indicates a problematic item, and a value

above 0.90 indicates a straightforward item. Here the researcher deleted items or statements that were scored below 0.25 and above 0.90.

Discrimination index: For calculating the discrimination index researcher adopted the given formula.

$$DI = \frac{Ru - Rl}{Nu}$$

Here, Ru- Students in the upper group who gave the right answer

Rl- Students in the lower group who answered correctly

Nu- Total number of students in the upper group

This value can range between -1.00 and +1.00. All of the items have positive discrimination because their values are higher than 0.20. It means that discrimination is all right (Agarwal, 1986).

Table 3.3.

Values of difficulty level and discrimination index of a scientific attitude scale.

(Difficulty level & Discrimination Index)					
S.N	**DL**	**DI**	**S.N**	**DL**	**DI**
1	0.264705882	0.294117647	27	0.264705882	0.529411765
2	0.294117647	0.352941176	28	0.264705882	0.411764706
3	0.264705882	0.020761246	29	0	0
4	0.147058824	-0.058823529	30	0.264705882	0.411764706
5	0.529411765	0.588235294	31	0.029411765	0.058823529
6	0.352941176	0.034602076	32	0.176470588	0
7	0.294117647	0.235294118	33	0.470588235	0.352941176
8	0.411764706	0.352941176	34	0.264705882	0.020761246

S.N	DL	DI	S.N	DL	DI
9	0.264705882	0.176470588	35	0.352941176	0.352941176
10	0.352941176	0.352941176	36	0.235294118	0.117647059
11	0.294117647	0.352941176	37	0.470588235	0.006920415
12	0.323529412	0.411764706	38	0.441176471	0.294117647
13	0.264705882	0.294117647	39	0.235294118	-0.235294118
14	0.5	0.411764706	40	0.411764706	0.470588235
15	0.352941176	0.470588235	41	0.352941176	0.588235294
16	0.147058824	-0.058823529	42	0.382352941	0.529411765
17	0.382352941	0.294117647	43	0.294117647	0.352941176
18	0.411764706	0.352941176	44	0.323529412	0.294117647
19	0.411764706	0.117647059	45	0.382352941	0.411764706
20	0.352941176	0.235294118	46	0.294117647	0.352941176
21	0.323529412	0.411764706	47	0.411764706	0.470588235
22	0.382352941	0.294117647	48	0.147058824	0.176470588
23	0.294117647	0.235294118	49	0.294117647	0.470588235
24	0.470588235	0.352941176	50	0.323529412	0.294117647
25	0.264705882	0.411764706	51	0.294117647	0.235294118
26	0.352941176	0.352941176	52	0.264705882	0.294117647

DL= Difficulty level, (According to GARRETT H.E-2008,(pp362)

DI= Discrimination Index (According to Agarwal 1986)

	Range			
DI	0.40 &Above	Very good	**DL**	0.25 to 0.90
	0.30 to o.39	Good		
	0.20 to 0.29	Fair		
	0.09 to 0.19	Poor		

Reliability: For the reliability test, the researcher adopted the Cronbach alpha test. The Cronbach alpha value of the total items is 0.803676843. This is an acceptable value.

Validity: For the content validity of the tool researcher, as told in the previous tools standardization process, sent 25 experts throughout India to central universities, state university professors, and associate professors in the concerned area; after the suggestion and recommendation of experts from various universities, among 58 statements, 42 statements or items were retained for the main study.

3.6. ADMINISTRATION OF THE TOOLS

After preparing the final draft of the tool or questionnaire, the researcher visited the secondary schools of the Adilabad district with permission from the heads of the institutions regarding the administration of the scales. Tools were administered to randomly selected students after giving appropriate instructions to respondents regarding rating and personal information. Respondents filled the personal information such as name, father's name, gender, locality, medium, age, class, and others. For the convenience of the students, enough time is given to them to respond to the scale appropriately. The tool is available in English and Telugu languages. The researcher used 450 questioners for social intelligence and 450 for scientific attitude, among which 22 questioners of social intelligence and 26 questioners of scientific attitude have not attended all statements. The remaining 12 questionires are marked with more than one statement; these quetionires are removed by the researcher. And the exact number of respondents is 420.

3.7. TABULATION AND INTERPRETATION

After the administration of the tools, scores are given to every respondent according to their rating choices. The scores obtained by the respondents were tabulated in an excel sheet with their personal information. For data analysis, various statistical techniques are used with the help of SPSS. For data analysis, the investigator used descriptive statistics, t-tests, correlation, ANOVA and regression.

3.8 STATISTICAL TECHNIQUES USED

For the present study, the specific statistical tests used for the testing of each hypothesis is described in table No 3.7.

Table No. 3.4.

Statistical techniques to be used.

S.No	Hypotheses	Statistical technique used
01.	There is no significant difference in the levels of S.I., scientific attitude and achievement in mathematics of secondary school tribal students.	The traditional method of categorizing the sample using sigma distances was utilized, assuming a normal distribution of social intelligence, scientific attitude and achievement in mathematics of scores. When we consider the baseline of the normal curve that represents the distribution extending from -3σ to +3σ, i.e. in the range of 6σ; secondary school Tribal Student's S.I, scientific attitude and achievement in mathematics scores which fallen between

		M+σ and M-σ were classified as 'Average level Group, the Students whose scores were below M-σ were classified as 'Low level Group' and those Students whose scores were above M+σ were classified as 'High, level Group with respect to social intelligence scientific attitude and achievement in mathematics.
02.	There is no significant difference in the S.I., of secondary school tribal students with respect to background variables such as Gender, locality, and Medium instruction.	To test the existence of exists any considerable variation in the achievement in mathematics of Secondary School Tribal Students on the basis of their gender, locality and medium of instruction, the test of significance of difference (t-test) was employed.
03.	There is no significant difference in the scientific attitude of secondary school tribal students with respect to background variables such as Gender, locality, and Medium of instruction.	To test the existence of any considerable variation in the scientific attitude of Secondary School Tribal Students on the basis of their gender, locality and medium of instruction, a test of significance of difference (t-test) was carried out.
04.	There is no significant difference in the achievement in mathematics of secondary	To test the existence of any considerable variation in the achievement in mathematics of Secondary School Tribal Students on the

	school tribal students with respect to background variables such as Gender, locality, and Medium of instruction.	basis of their gender, area/locality and medium of instruction, the test of significance of difference (t-test) was employed.
05.	There is no significant relationship between S.I., and achievement in mathematics of secondary school tribal students.	To find out the extent of the relationship between Social Intelligence and achievement in mathematics of Secondary School Tribal Students, the scores of Social Intelligence and the scores of achievement in mathematics of the total sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis.
06.	There is no significant relationship between scientific attitude and achievement in mathematics of secondary school tribal students.	To find out the extent of the relationship between Scientific Attitude and achievement in mathematics of Secondary School Tribal Students, the scores of Scientific Attitude and the scores of achievement in mathematics of the total sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis.

07.	There is no significant relationship between scientific attitude and S.I., of secondary school tribal students.	To find out the extent of the relationship between Scientific Attitude and S.I., of Secondary School Tribal pupils, the scores of Scientific Attitude and the scores of and social intelligence of the total sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis.
08.	There exists no significant influence on the relationship between S.I., and achievement in mathematics of Secondary School male and female Tribal Students.	To find out the extent of the relationship between S.I., and achievement in mathematics of Secondary School Tribal Students, the scores of Social Intelligence and the scores of achievement in mathematics of the Male and Female sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis.
09.	There exists no significant influence on the relationship between S.I., and achievement in mathematics of Secondary School Rural and Urban Tribal Students.	To find out the extent of the relationship between S.I., and achievement in mathematics of Secondary School Tribal Students, the scores of S.I., and the scores of achievement in mathematics of the Rural and an Urban sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis.

10.	There exists no significant influence on the relationship between S.I., and achievement in mathematics of Secondary School English and Telugu medium Tribal Students.	To find out the extent of the relationship between S.I., and achievement in mathematics of Secondary School Tribal Students, the scores of S.I., and the scores of achievement in mathematics of the English and Telugu sample of Secondary School Tribal Students were analyzed by Pearson's Product – Moment Correlation analysis.
11.	There exists no significant influence on the relationship between Scientific Attitude and achievement in mathematics of Secondary School male and female Tribal Students.	To find out the extent of the relationship between Scientific Attitude and achievement in mathematics of Secondary School Tribal Students, the scores of Scientific Attitude and the scores of achievement in mathematics of the female and male sample of Secondary School Tribal Students were analyzed by Pearson's Product – Moment Correlation analysis.
12.	There exists no significant influence on the relationship between Scientific Attitude and achievement in mathematics of Secondary School Rural and Urban Tribal Students.	To find out the extent of influence in the relationship between Scientific Attitude and achievement in mathematics of Secondary School Tribal Students, the scores of Scientific Attitude and the scores of achievement in mathematics of the urban and an rural sample of Secondary School Tribal

		Students were analyzed by Pearson's Product - Moment Correlation analysis.
13.	There exists no significant influence on the relationship between Scientific Attitude and achievement in mathematics of Secondary School English and Telugu medium Tribal Students.	To find out the extent of influence in the relationship between Scientific Attitude and achievement in mathematics of Secondary School Tribal Students, the scores of Scientific Attitude and the scores of achievement in mathematics of the English and Telugu sample of Secondary School Tribal Students were analyzed by Pearson's Product - Moment Correlation analysis.
14.	There exists no significant influence on the relationship between Scientific Attitude and S.I., of Secondary School male and female Tribal Students.	To find out the extent of influence in the relationship between Scientific Attitude and S.I., of Secondary School Tribal Students, the scores of Scientific Attitude and the scores of and S.I., of the Male and Female sample of Secondary School Tribal pupils were analyzed by Pearson's Product – Moment Correlation analysis.

15.	There exists no significant influence on the relationship between Scientific Attitude and S.I., of Secondary School Rural and Urban Tribal Students.	To find out the extent of the relationship between Scientific Attitude and S.I., of Secondary School Tribal pupils, the scores of Scientific Attitude and the scores of and S.I., of the Rural and Urban sample of Secondary School Tribal pupils were analyzed by Pearson's Product - Moment Correlation analysis.
16.	There exists no significant influence on the relationship between Scientific Attitude and S.I., of Secondary School English and Telugu medium Tribal Students.	To find out the extent of influence in the relationship between Scientific Attitude and S.I., of Secondary School Tribal pupils, the scores of Scientific Attitude and the scores of and Social Intelligence of the English and Telugu sample of Secondary School Tribal Students were analyzed by Pearson's Product – Moment Correlation analysis.
17.	There is no significant joint or combination effect of S.I., and scientific attitude on achievement in mathematics of secondary school tribal students.	To find out the combined effect of S.I. and scientific attitude on achievement in mathematics, Secondary School Tribal Students were subjected to Regression Analysis. A second step analysis was carried out to determine increment in the percentage variation accounted by the predictor variable. The second input variable Social

	Intelligence (X1) has the second highest value in the partial correlation with the criterion variable. Therefore this variable included in the second step of analysis.

3.9 CONCLUSION

In this chapter, methods, research design, tools for data collection and data analysis adopted for the study were discussed. Self-standardized tools of social intelligence and scientific attitude were used for data collection from tribal welfare secondary school students of Adilabad district of Telangana state. The next chapter deals with data analysis and interpretation of the data.

CHAPTER FOUR

ANALYSIS AND INTERPRETATION OF THE DATA

4.1. INTRODUCTION

This study investigates the relationship and influence among Social Intelligence, Scientific Attitude, and achievement in mathematics among Tribal Students of secondary school in Adilabad District of Telangana state. Social Intelligence, Scientific Attitude, achievement in mathematics and demographic factors of Secondary School Tribal Students were evaluated using statistical methods.

In order to reach the goal of the study, the collected data were analyzed statistically with the statistical package for the social sciences (SPSS 26.0). The descriptive statistics of the variables, the significance of the difference in means, the analysis of variance, the multiple regression analysis and the Pearson's product moment correlation analysis were used in the analysis.

4.2 DESCRIPTIVE STATISTICS OF S.I., S.A. & ACHIEVEMENT IN MATHEMATICS OF SECONDARY SCHOOL TRIBAL PUPILS.

Table 4.1 shows the measures of central tendencies and variation, which includes mean, mode, median, standard deviations, skewness, and kurtosis for social intelligence, scientific attitude, and achievement in mathematics.

Table 4.1

Measurement of Central Tendencies and Dispersion of S.I., S.A., and Achievement in Mathematics of Secondary School Tribal pupils.

Statistical Parameters	Social Intelligence	Scientific Attitude	Achievement in Mathematics
Mean	144.97	143.07	49.91
Median	145.00	143.00	49.00
Mode	145	143	49
Standard Deviation	14.607	15.654	11.159
Skewness	.119	.323	-.004
Kurtosis	.192	-.384	-.226

The mean score values for social intelligence, scientific attitude, and achievement in mathematics were respectively found to be 144.97, 143.07, and 49.91. The median score for social intelligence is found to be 145, which means that 50% of students scored above 145 and 50% of students scored below 145. The median score for scientific attitude is 143, which means that 50% of students scored above 143 and 50% of pupils scored below 143. In terms of achievement in mathematics, the median score is found to be 49.0. It also concludes that fifty percent of the pupils scored above 49.0 and the remaining fifty percent of students scored below 49.0. And the mode score for S.I., is 145, for scientific attitude is 143, and for achievement in mathematics, the mode value is 49. Which is the score that occurs very frequently in the distribution. Skewness values for S.I., and Achievement in Mathematics are.119, .323, and-0.004, which shows that both distributions are slightly positively skewed. In the cases of

social intelligence, scientific attitude, and achievement in mathematics, it is interpreted that relatively less scores lie on the left side of the distribution.

All the mean, median, and mode are the same for each variable. So it can be concluded that the distribution is very close to normality.

Figure 4.1

Comparison among Mean, Median and Mode of S.I., of Secondary School Tribal Students.

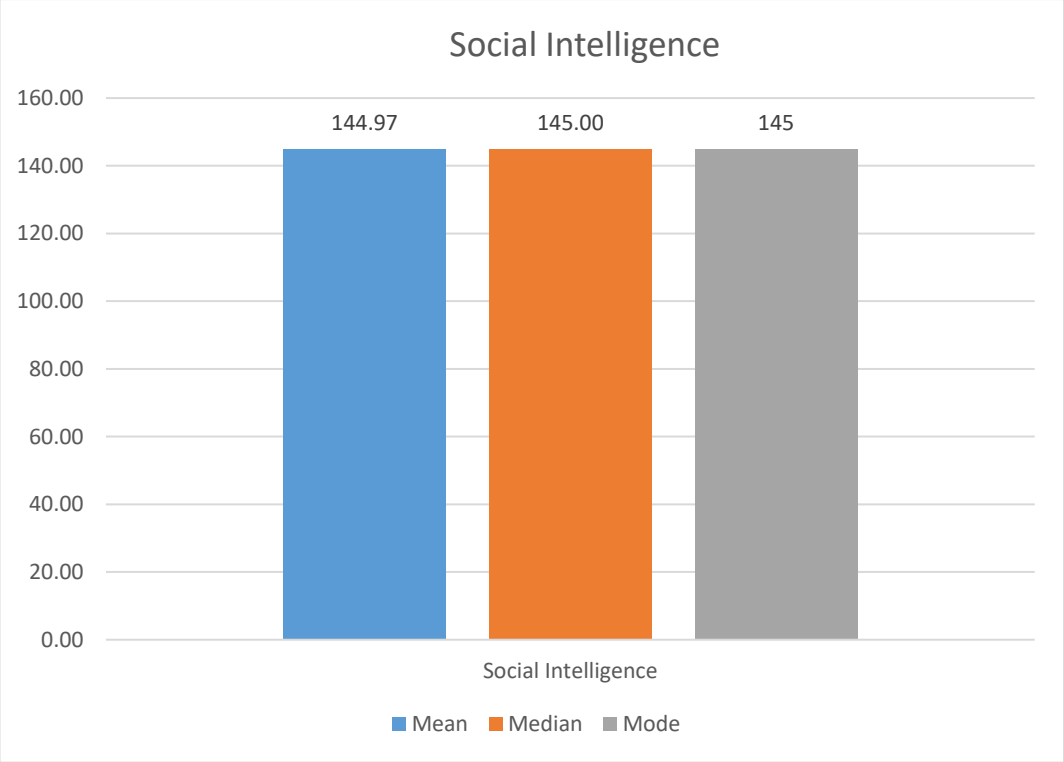


Figure 4.2

Comparison among Mean, Median and Mode of S.A., of Secondary School Tribal pupils.

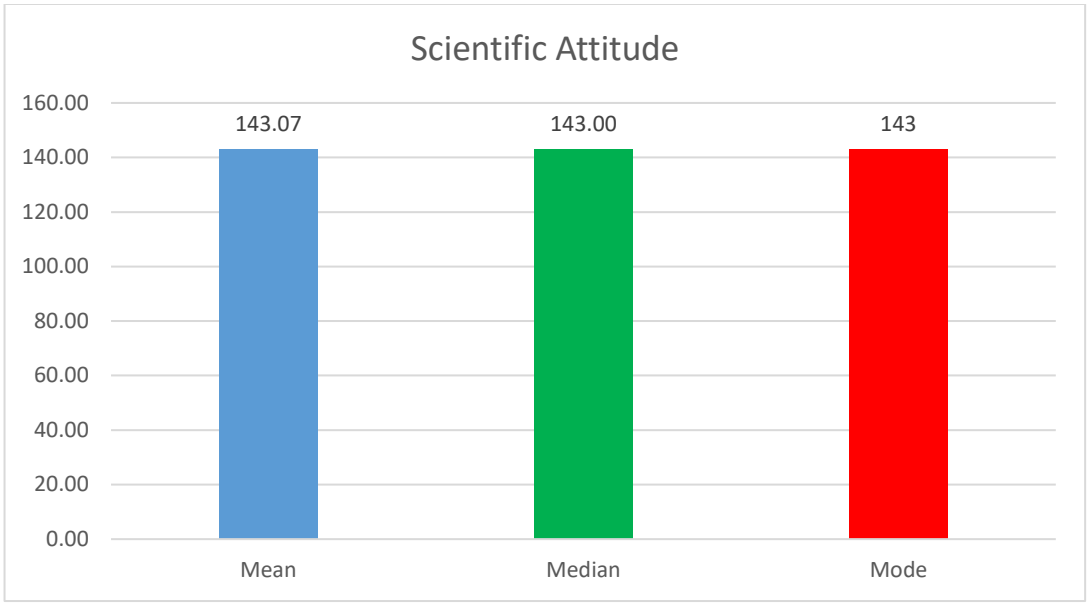
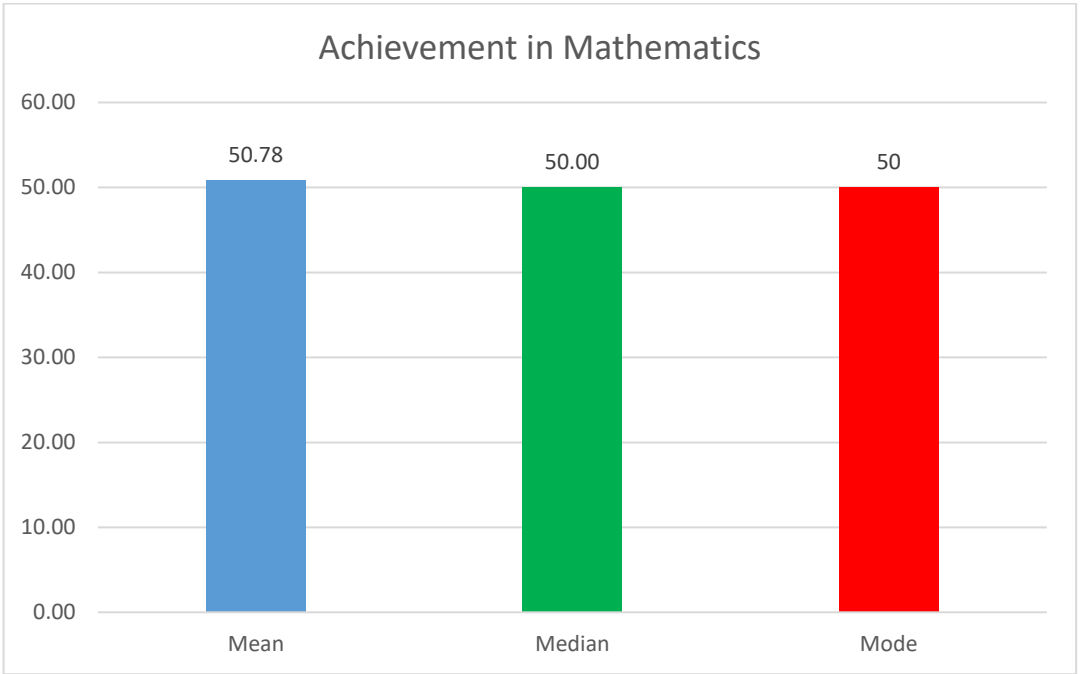


Figure 4.3

Comparison among Mean, Median and Mode of A.M. of Secondary School Tribal pupils.



4.3. Testing of Hypothesis:

4.3.1. Ho_1: There is no significant difference in the levels of S.I. in secondary school tribal students.

The following procedure is followed to test this hypothesis. The mean and standard deviation of the whole group is calculated based on social intelligence scores obtained from the secondary school tribal students of Adilabad District

Tribal students from secondary schools of Adilabad are divided into the above average (high), average, and below average (low) groups according to their S.I., scores obtained in the test in order to determine their degree of social intelligence. The traditional method of categorizing the sample using sigma distances was utilized, assuming a normal distribution of S.I., scores. When we consider a baseline of the normal curve representing the distribution which is extending from -3σ to +3σ, i.e. over a range of 6σ; The students whose S.I., scores falls between M+ σ and M-σ of the curve were classified as 'Average- S.I., Group' (ASI), The students whose scores were below M-σ of the curve were classified as 'Low- S.I., Group' (LSI), and The students whose scores were above M+σ of the curve were classified as 'High- S.I., Group' (HSI). For the distribution of S.I. scores, Mean was 144.97 and Standard Deviation was 14.67. Therefore, tribal students of secondary school whose S.I. scores were 159.577 or more (round of value of M+σ) were considered to possess High S.I., while those whose scores were less than 130.36 (round of value of M-σ) were considered to possess Low-S.I, and the remaining who came in between these scores were classified as having Average S.I., The data obtained and results of the classification are tabulated in the Table 4.2 given below.

Table 4.2

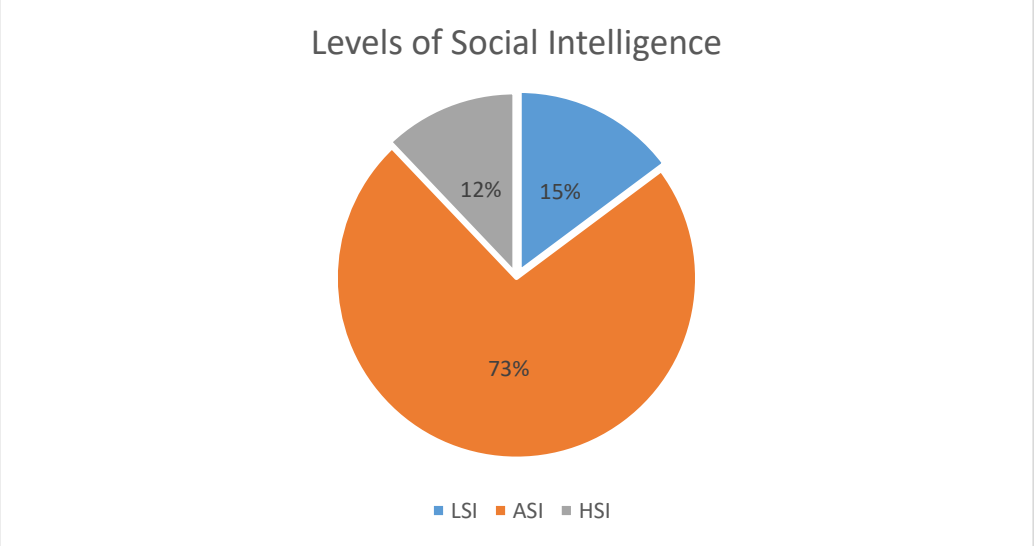
Number and Percentage of Secondary School Tribal pupils With respect to the Level of S.I.

Categories	High Social Intelligence (HEIG)	Average Social Intelligence (AEIG)	Low Social Intelligence (LEIG)
Norms	**≥ M+σ**	**Between M+σ to M-σ**	**≤ M-σ**
Number of students	**51**	**307**	**62**
Percentage of students	**12.10%**	**73.10%**	**14.80%**

Analyzing the data tabulated in Table 4.2 shows that 73.10 percent of tribal students of secondary school have an average S.I., 12.10 percent have high S.I., and 14.80 percent have low S.I. The findings show that the majority of tribal students in secondary schools have average levels of S.I.

Figure 4.4.

Comparison of the Levels of S.I. of Secondary School Tribal Students.



4.3.2. Ho2: There is no significant difference in the levels of S.A. in secondary school tribal students.

Secondary school tribal pupils were divided into the high, average, and low groups according to their Scientific Attitude scores in the test in order to determine their degree of Scientific Attitude. The traditional method of categorizing the sample using sigma distances was utilized, assuming a normal distribution of Scientific Attitude scores. Considering the normal curve which representing the distribution that extends from the value -3σ to +3σ, i.e. over a range of 6σ; Tribal pupil of secondary school whose Scientific Attitude scores obtained between M+ σ and M-σ were classified as 'Average- S.A Group' (ASA), Secondary School Tribal pupils whose obtained scores were below M-σ were classified as 'Low- S.A. Group' (LSA), and Tribal pupil whose scores were above M+σ were classified as 'High- S.A., Group' (HSA). For the distribution of Scientific Attitude scores, Mean was 143.07 and Standard Deviation was 15.65. Hence, secondary school tribal pupils whose Scientific Attitude scores were 158.72 or more (round off value of M+σ) were considered to possess High S.A., while those whose scores were less than 127.41 (round off value of M-σ)) were considered to possess Low- S.A and the remaining who came in between these scores were classified as having "Average S.A., The data and assessment results are displayed in Table 4.3, which is provided below.

Table No. 4.3:

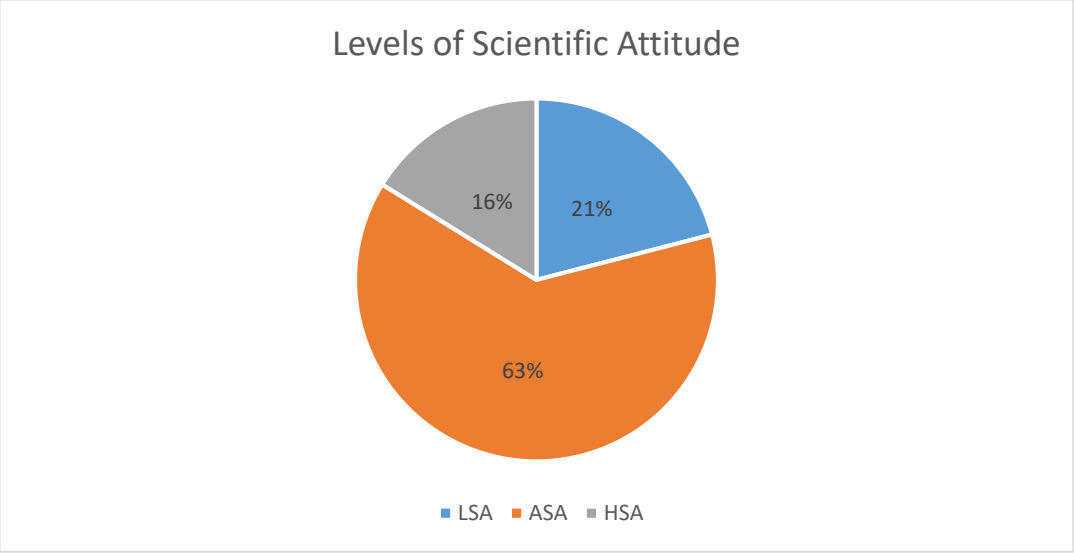
Number and Percentages of Tribal Students with respect to the Levels of Scientific Attitude.

Categories	High Scientific Attitude Group (HSG)	Average Scientific Attitude Group (ASG)	Low Scientific Attitude Group (LSG)
Norms	≥ M+σ	Between M+σ to M-σ	≤ M-σ
Number of students	68	264	88
Percentage of students	16.20%	62.90%	21.00%

Table 4.3 reveals that 62.90 percent of tribal secondary school pupils have average scientific attitude, 16.20 percent have high scientific attitude, and 21.00 percent have low scientific attitude. The findings show that the majority of tribal students in secondary schools have average levels of Scientific Attitude.

Figure 4.5

Comparison of the Levels of S.A Tribal Students of secondary school



4.3.3. Ho3: There is no significant difference in the levels of A.M. in tribal students of secondary school.

Secondary school tribal pupils were divided into the high, average, and low groups according to their Achievement in Mathematics scores in the test in order to determine their degree of Achievement in Mathematics. The traditional method of categorizing the sample using sigma distances was utilized, assuming a normal distribution of Achievement in Mathematics scores. Curve obtained represents the distribution which is extending from -3σ to +3σ, i.e. over a range of 6σ; Tribal pupils whose Achievement in Mathematics scores occurred in between M+ σ and M-σ were classified as 'Average- A.M. Group' (AAM), Tribal pupils whose scores obtained were below M-σ were classified as 'Low- A.M. Group' (LAM), and Tribal pupils whose scores were above M+σ were classified as 'High- A.M. (HAM). For the distribution of Achievement in Mathematics scores, Mean was 49.91 and Standard Deviation was 11.15. Therefore, tribal pupils whose Achievement in Mathematics scores were 61.07 or more (round off value of M+σ) were considered to possess High-A.M., while those whose scores were less than 38.75 (round off value of M-σ)) were considered to possess "Low- A.M., and the remaining who came in between these scores were classified as having "Average A.M. The data and assessment results are displayed in Table 4.4, which is provided below.

Table 4.4.

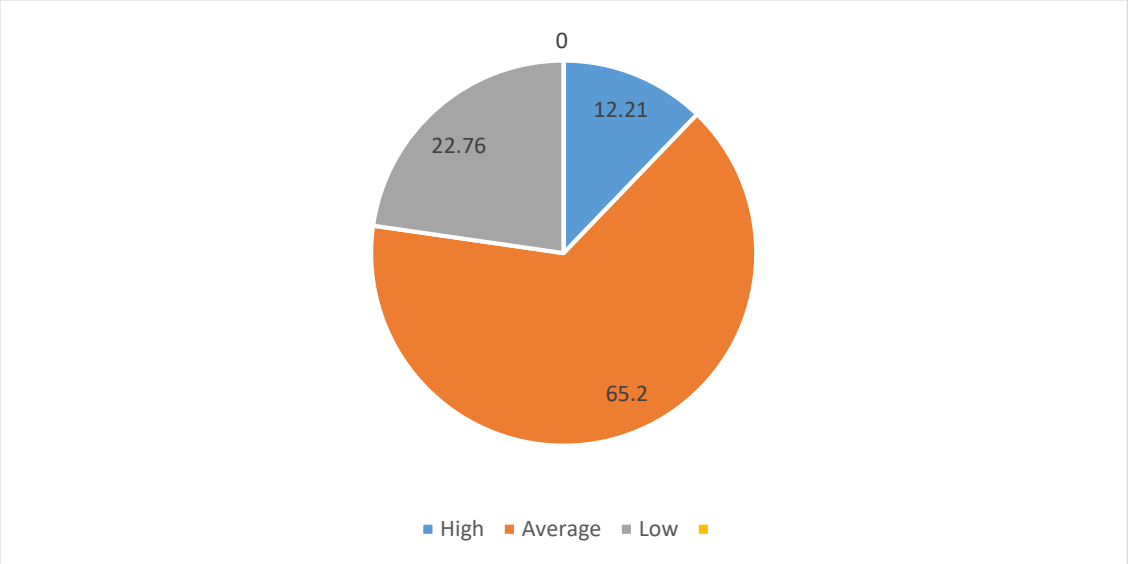
Number and Percentage of Secondary School Tribal pupils with respect to the Levels of Achievement in Mathematics.

Categories	High Achievement in Mathematics Group (HAM)	Average Achievement in Mathematics Group (AAM)	Low Achievement in Mathematics Group (LAM)
Norms	≥ M+σ	Between M+σ to M-σ	≤ M-σ
Number of students	97	517	181
Percentage of students	12.21%	65.2%	22.76%

According to Table 4.4, secondary school tribal students represent 12.21%, 65.2%, and 22.67% of the groups with high, average, and low achievement in mathematics. The results show that most secondary school Tribal pupils have an average level of mathematics achievement, but when compared to percentages for social intelligence and scientific attitude, the percentage of Tribal pupils comes under the high group had decreased considerably and Tribal pupils comes under in the low group has increased.

Figure 4.6

Comparison of the Levels of A.M. of Secondary School Tribal Students.



4.3.4. Ho4: There is no significant difference in the S.I., of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.

The following sub hypothesis are formulated and tested individually.

- Gender of secondary school tribal students doesn't make any considerable difference in their S.I.
- Locality of secondary school tribal students doesn't make any considerable difference in their social intelligence.
- Medium of instruction of secondary school tribal students doesn't make any significant difference in their social intelligence.

A test of significance of difference (t-test) was conducted to determine whether there exist significant gender differences in Social Intelligence of Secondary School Tribal Students. Present research analysis is presented in detail in Table 4.5.

4.3.4.1. H_{04}: Gender of secondary school tribal students doesn't make any significant difference in their social intelligence.

Tabulated the data and results of Test of Significant Difference in the Mean Scores of Social Intelligence, of Tribal Students of secondary school on the basis of gender.

Table 4.5.

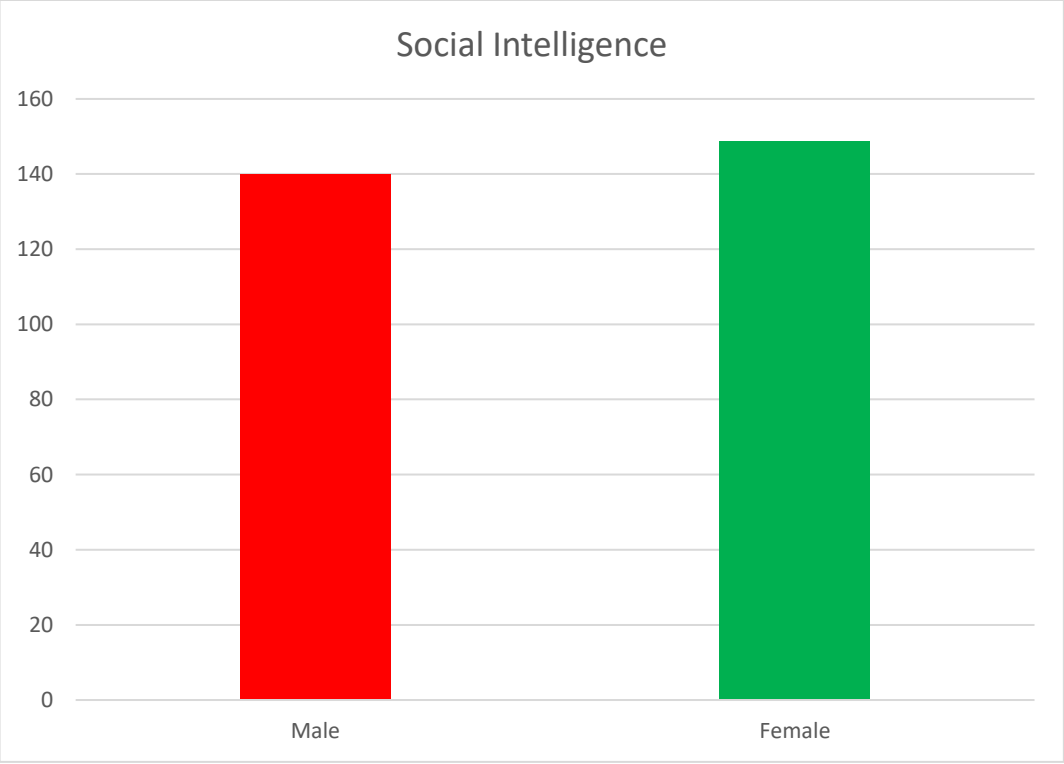
Data and result of test of significance difference in the mean score of S.I. based on gender.

Variables	Gender of student	N	Mean	Standard Deviation	Critical Ratio (t)	p value
Social Intelligence	Male	181	139.96	13.547	6.403	.000
	Female	239	148.77	14.257		

The critical ratio obtained for Social Intelligence is 6.40 and for S.I. is 6.40 which is greater than the table value 1.96 at 0.05 level of significance. It reveals that there is a considerable mean variation in S.I. of secondary school tribal students with respect to background variable such as Gender. So the hypothesis **Gender of secondary school tribal students doesn't make any significant difference in their social intelligence** is rejected. The mean score of female 148.77 is greater than the mean score of Male students 139.96.so it can be interpreted that female students have high social intelligence.

Figure 4.7.

Significance variance in the Mean score of S.I. based on Gender.



4.3.4.2.H_{04}: locality of secondary school tribal students doesn't make any significant difference in their social intelligence.

To determine whether there exist significant gender differences in Social Intelligence of Tribal Students of secondary school, a test of significance of difference (t-test) was conducted. Research analysis is presented in detail in Table 4.6.

Table 4.6.

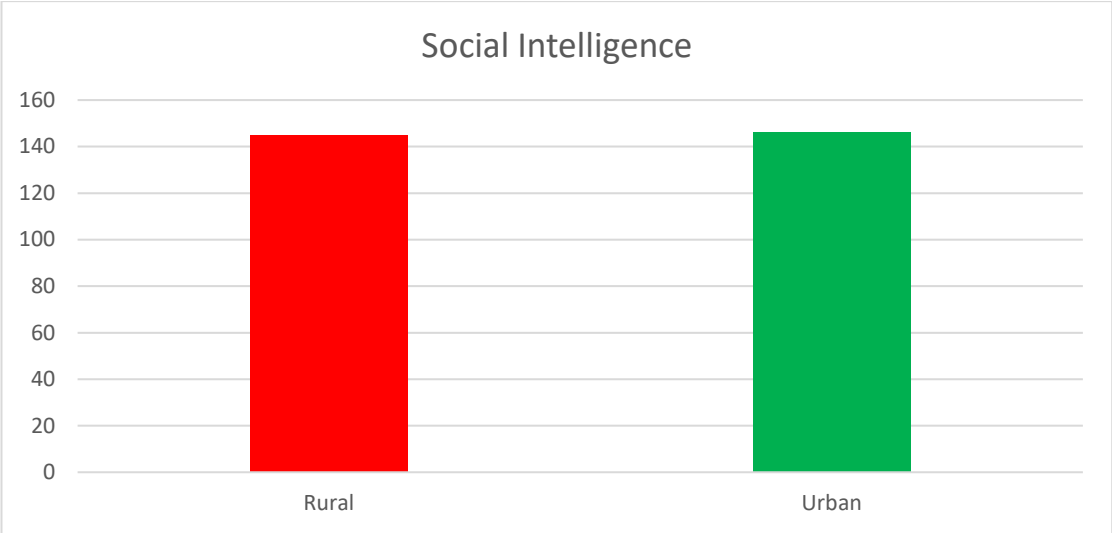
Data and Results of Test of Significant Difference in the Mean Scores of Social Intelligence, of Secondary School Tribal Students on the Basis of locality.

Variables	Locality	N	Mean	Standard Deviation	Critical Ratio (t)	p value
Social Intelligence	Rural	360	144.79	15.209	.608	.544
	Urban	60	146.03	10.307		

The critical ratio obtained for Social Intelligence is .608. The critical ratio for S.I obtained is .608 which is less than the table value 1.96 at significance level of 0.05. It reveals that there is no considerable mean variation in S.I of secondary school tribal students with respect to background variable such as locality. So the hypothesis **locality of secondary school tribal students doesn't make any significant difference in their social intelligence** is accepted.

Figure 4.8:

Considerable Difference in the Mean Scores of Social Intelligence, of Secondary School Tribal Students on the Basis of locality.



4.3.4.3.H_{04}: Medium of instruction of secondary school tribal students doesn't make any significant difference in their social intelligence.

To check whether there exist significant gender differences in Social Intelligence of Secondary School Tribal Students, a significance of difference test (t-test) was conducted. This research analysis is presented in detail in Table 4.7.

Table 4.7:

Data and Results of Test of Significant Difference in the Mean Scores of Social Intelligence, of Secondary School Tribal Students on the Basis of medium of instruction.

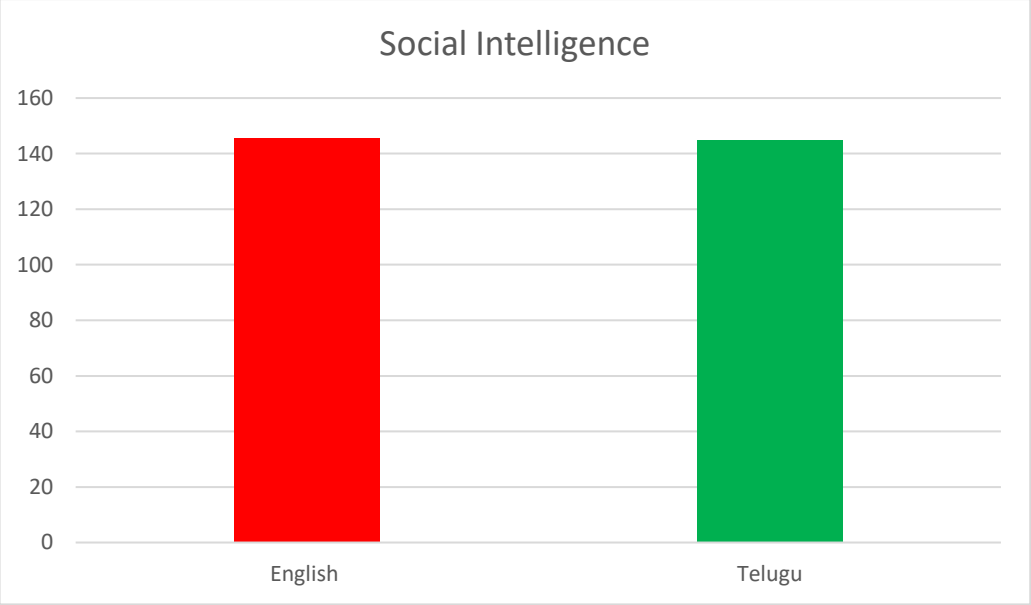
Variables	Medium of instruction	N	Mean	Standard Deviation	Critical Ratio (t)	p value
Social Intelligence	English	103	145.64	12.622	.535	.593
	Telugu	317	144.75	15.208		

The critical ratio obtained for Social Intelligence is 0.535. Critical ratio for S.I. obtained is 0.535 it is less than the table value 1.96 at 0.05 level of significance. It

reveals that there is no considerable mean variation in S.I. of secondary school tribal students with respect to background variable such as Medium of instruction so the hypothesis **Medium of instruction of secondary school tribal students doesn't make any significant difference in their social intelligence** is accepted.

Figure 4.9.

Considerable variation in the Mean Scores of Social Intelligence, of Secondary School Tribal Students on the Basis of medium of instruction.



4.3.5. H_{05}: There is no significant difference in the S.A. of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction

The following sub hypothesis are formulated and tested individually

- Gender of secondary school tribal students doesn't make any significant difference in their S.A.
- Locality of secondary school tribal students doesn't make any significant difference in their S.A.

- Medium of instruction of secondary school tribal students doesn't make any significant difference in their S.A.

4.3.5.1 H_{05}: Gender of secondary school tribal students doesn't make any significant difference in their scientific attitude

To determine whether there are gender-based differences in the scientific attitudes of secondary school tribal pupils, a significance of difference test (t-test) was conducted. Table 4.8 presents the results of the analysis.

Table 4.8

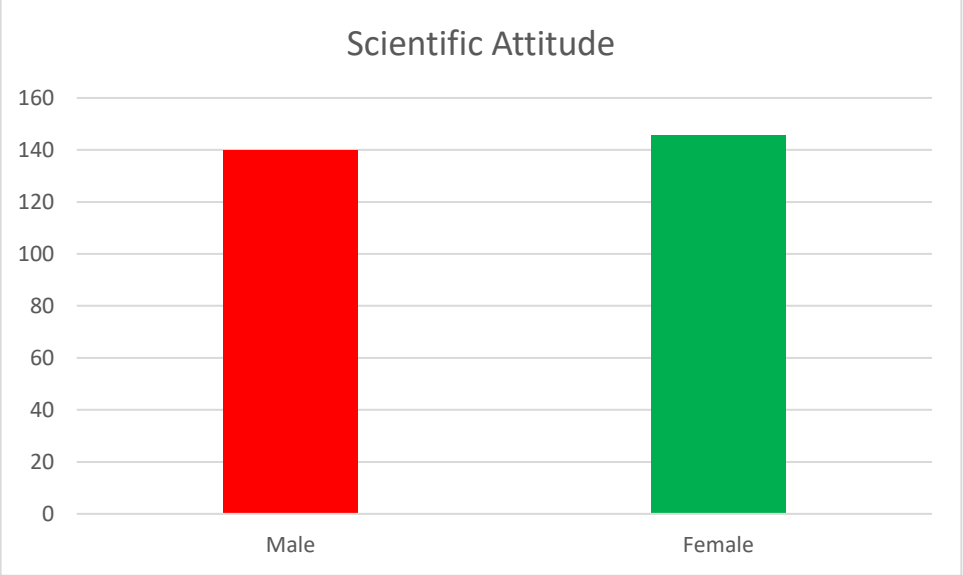
Data and Results of Significant Difference of test in the Mean Scores of Scientific Attitude of Tribal Students on the Basis of Gender.

Name of Variables	Gender	N	Mean	Standard Deviation	Critical Ratio (t)	p value
Scientific Attitude	Male	181	139.94	15.400	3.614	.000
	Female	239	145.44	15.460		

The critical ratio obtained for Scientific Attitude is 3.614. Obtained critical ratio for Scientific Attitude is 3.61 it is also greater than the table value 1.96 at significance level of 0.05, it reveals that male and female Secondary School Tribal Students significantly differ in Scientific Attitude. The mean score of female 145.44 is greater than the mean score of Male students 139.94.so it can be interpreted that female students have high Scientific Attitude. So the hypothesis **Gender of secondary school tribal students doesn't make any significant difference in their scientific attitude** is rejected.

Figure 4.10:

Considerable variation in the Mean Scores of Scientific Attitude of Secondary School Tribal Students on the Basis of Gender.



4.3.5.2. H_{05}: locality of secondary school tribal students doesn't make any significant difference in their scientific attitude

A test of significance of difference (t-test) was used to determine whether there is a considerable difference in the scientific attitude of Secondary School Tribal Students based on their locality. Table 4.9 presents the results of the analysis.

Table 4.9

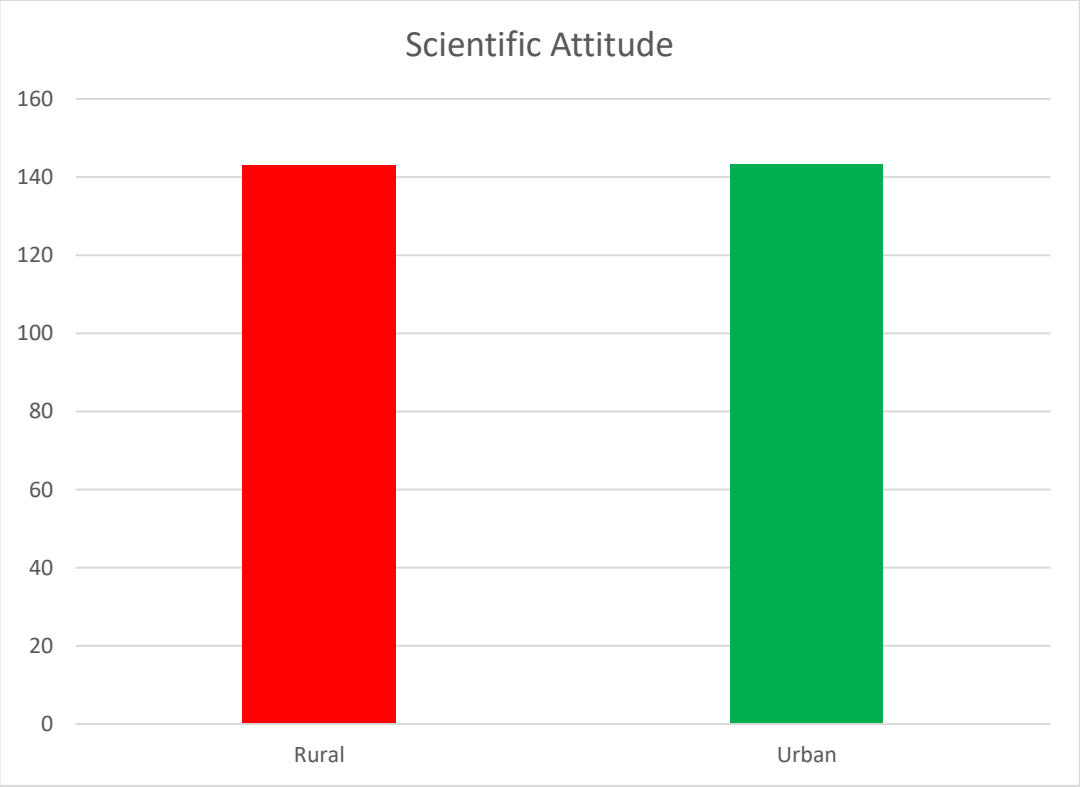
Data and Results of Test of Significant Difference in the Mean Scores of Scientific Attitude of Secondary School Tribal Students on the Basis of locality.

Variables	Locality	N	Mean	Standard Deviation	Critical Ratio (t)	p value
Scientific Attitude	Rural	360	143.02	15.458	.142	.887
	Urban	60	143.33	16.920		

The critical ratio obtained for Scientific Attitude is .142. The critical ratio obtained for Scientific Attitude is .142 which is less than the table value 1.96 at 0.05 significance of 0.05, which means that Rural and Urban Secondary School Tribal Students did not differ considerably in their Scientific Attitude. So it can be concluded that both rural and urban students have same level Scientific Attitude. So the hypothesis **locality of secondary school tribal students doesn't make any significant difference in their scientific attitude** is accepted.

Figure 4.11.

Considerable variation in the Mean Scores of Scientific Attitude of Secondary School Tribal Students on the Basis of locality.



4.3.5.3. H_{05}: Medium of instruction of secondary school tribal students doesn't make any significant difference in their scientific attitude.

A test of significance of difference (t-test) was used to determine whether there is a considerable difference in the scientific attitude of secondary school tribal pupils based on their medium of instruction. The table 4.10 contains the analysis's specifics.

Table 4.10.

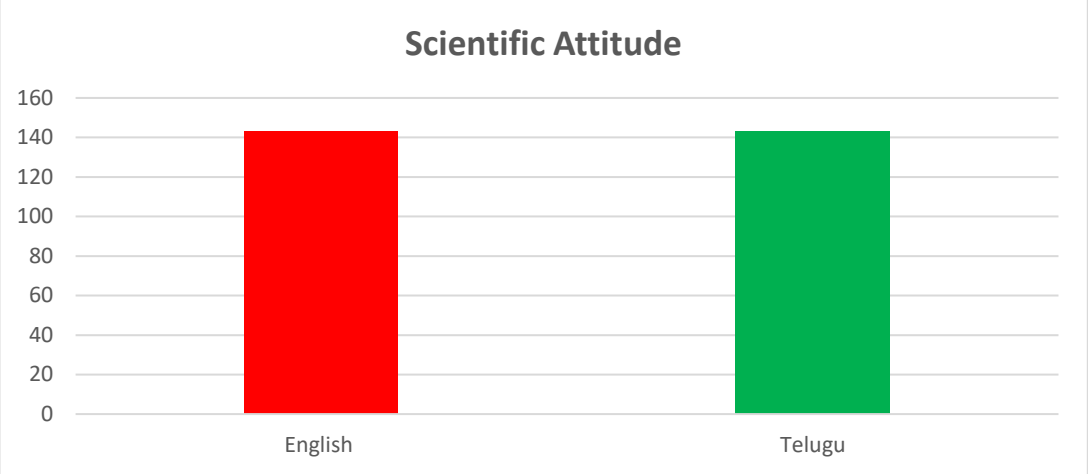
Data and Results of Test of Significant Difference in the Mean Scores of Scientific Attitude of Secondary School Tribal Students on the Basis of Medium of instruction.

Variables	Medium of instruction	N	Mean	Standard Deviation	Critical Ratio (t)	p value
Scientific Attitude	English	103	142.98	16.640	.064	.949
	Telugu	317	143.09	15.348		

The critical ratio obtained for Scientific Attitude is .064. The critical ratio obtained for Scientific Attitude is 0.064 which is less than the table value of 1.96 at 0.05 level of significance; it reveals that, English medium and Telugu medium of Secondary School Tribal Students do not differ considerably in their Scientific Attitude. So it can be concluded that both English medium and Telugu medium students have same level Scientific Attitude. So the hypothesis **Medium of instruction of secondary school tribal students doesn't make any significant difference in their scientific attitude** is accepted.

Figure 4.12.

Considerable variation in the Mean Scores of Scientific Attitude of Secondary School Tribal Students on the Basis of Medium of instruction.



4.3.6. H_{06}: There is no significant difference in the A.M. of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.

The following sub hypothesis are formulated and tested individually

- Gender of secondary school tribal students doesn't make any significant difference in their A.M.
- Locality of secondary school tribal students doesn't make any significant difference in their A.M.
- Medium of instruction of secondary school tribal students doesn't make any significant difference in their A.M.

4.3.6.1. H_{06}: Gender of secondary school tribal students doesn't make any significant difference in their achievement in mathematics

To determine whether there is a considerable difference in the mathematics achievement of Secondary School Tribal pupils based on gender, a test of significance

of difference test (t-test) was conducted. The table 4.11 presents the analysis's specifics.

Table 4.11.

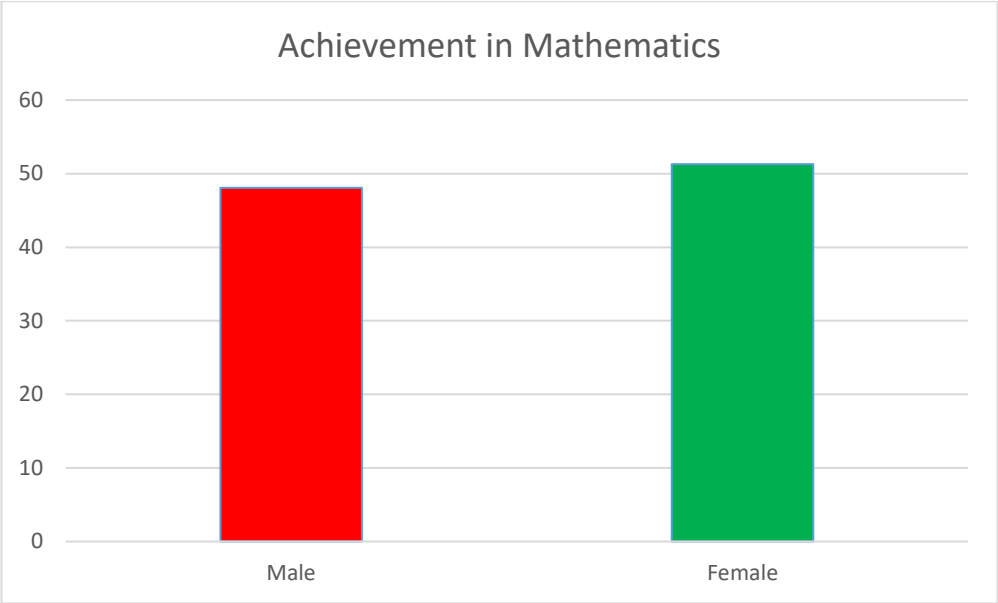
Data and Results obtained from a Significant Difference Test in the Mean Scores of Achievement in Mathematics of Tribal Students of secondary school on the Basis of Gender.

Variables	Gender	Number of students	Mean	Standard Deviation	Critical Ratio (t)	p value
Achievement in Mathematics	Male	181	48.09	8.030	2.936	.004
	Female	239	51.29	12.886		

The critical ratio obtained for Achievement in Mathematics is 2.93. Critical ratio obtained for Achievement in Mathematics is 2.93 which is greater than the table value of 1.96 at 0.05 level of significance, it means that male and female Secondary School Tribal pupils considerably differ in Achievement in Mathematics. The mean score of female 51.29 is greater than the mean score of Male students 48.09. So it can be interpreted that female students have high Achievement in Mathematics. So the hypothesis **Gender of secondary school tribal students doesn't make any significant difference in their achievement in mathematics** is rejected.

Figure 4.13.

Considerable variation in the Mean Scores of Achievement in Mathematics of Tribal Students of secondary school on the Basis of Gender.



4.3.6.2. H_{06}: Locality of secondary school tribal students doesn't make any significant difference in their achievement in mathematics.

t-test was used to see whether there is any considerable difference in the mathematics achievement of tribal students of secondary school secondary based on their locality. The Table 4.12 presents the analysis's details.

Table 4.12

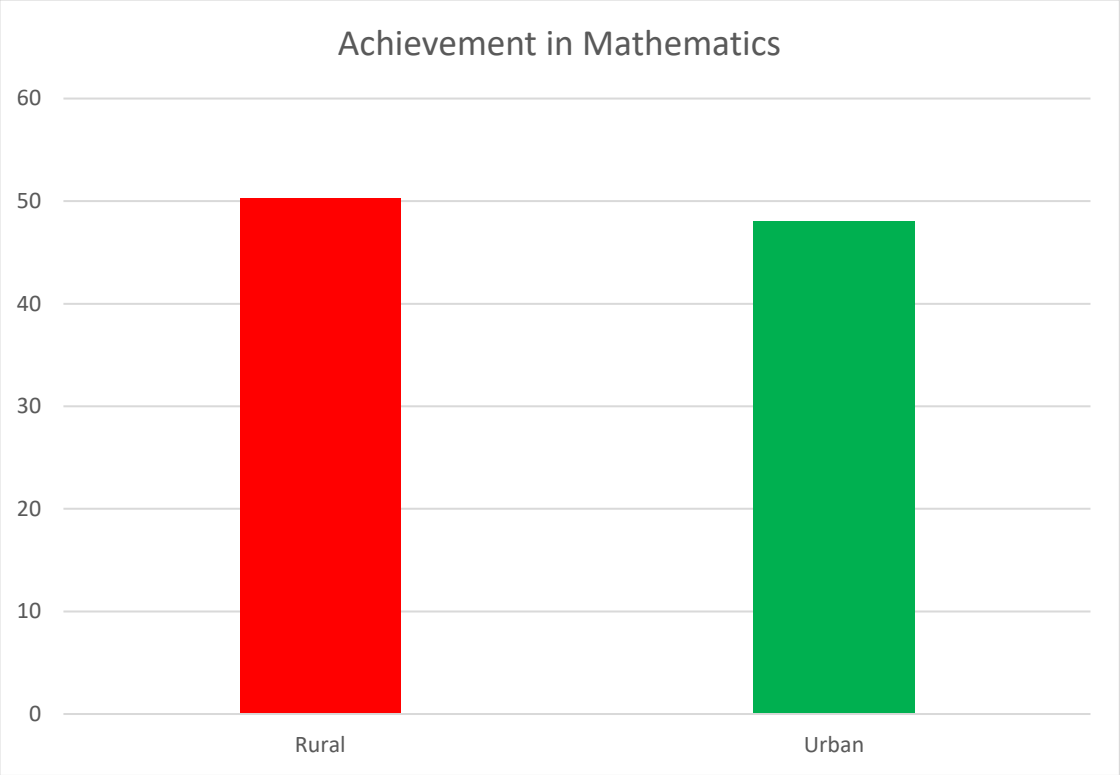
Data and Results of Test of considerable Difference in the Mean Scores of Achievement in Mathematics of Secondary School Tribal Students on the Basis of locality.

Variables	Locality	N	Mean	Standard Deviation	Critical Ratio (t)	p value
Achievement in Mathematics	Rural	360	50.24	11.755	1.450	.148
	Urban	60	47.98	6.256		

The critical ratio obtained for Achievement in Mathematics is 1.450. The critical ratio obtained for Achievement in Mathematics is 1.45 which is less than that of table value 1.96 at 0.05 level of significance, it means that Rural and Urban Secondary School Tribal pupils did not differ considerably in their Achievement in Mathematics. So it can be concluded that Rural and urban students have same level Achievement in Mathematics. So the hypothesis **Area/ locality of secondary school tribal students doesn't make any significant difference in their achievement in mathematics** is accepted.

Figure 4.14.

Considerable variation in the Mean Scores of Achievement in Mathematics of Secondary School Tribal Students on the Basis of locality.



4.3.6.3. H_{06}: Medium of instruction of secondary school tribal students doesn't make any significant difference in their achievement in mathematics

A test of significance of difference (t-test) was used to determine, if there is a considerable difference in the mathematics achievement of Secondary School Tribal pupils based on their Medium of Instruction. The research work analysis is presented in detail in Table 4.13.

Table 4.13.

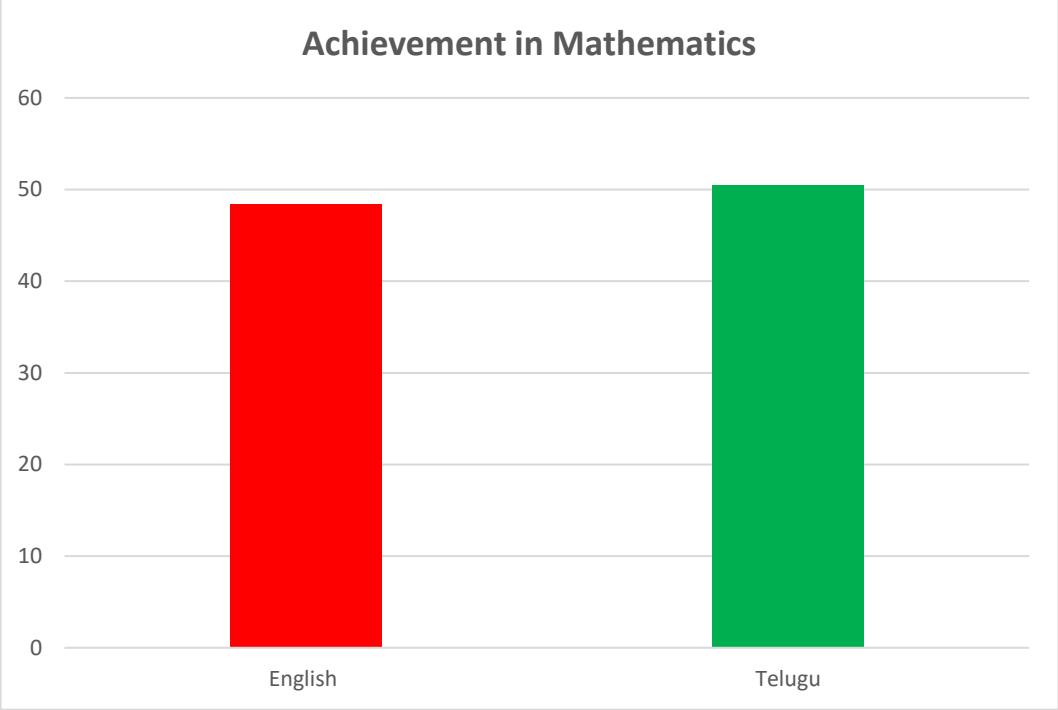
Data and Results of Test of significant Difference in the Mean Scores of Achievement in Mathematics of Secondary School Tribal Students on the Basis of Medium of instruction.

Variables	Medium of instruction	Number of students	Mean	Standard Deviation	Critical Ratio (t)	p value
Achievement in Mathematics	English	103	48.36	8.352	1.631	.104
	Telugu	317	50.42	11.898		

The critical ratio value obtained for Achievement in Mathematics is 1.63 it is also less than the value of table 1.96 at significance level of 0.05, it reveals that English and Telugu medium Tribal pupils do not differ considerably in their Achievement in Mathematics. So it can be concluded that English and Telugu medium students have same level Achievement in Mathematics. So the hypothesis **Medium of instruction of secondary school tribal students doesn't make any significant difference in their achievement in mathematics** is accepted.

Figure 4.15.

Considerable variation in the Mean Scores of Achievement in Mathematics of Secondary School Tribal Students on the Basis of Medium of instruction.



4.3.7. H_{07}: There is no significant relationship between S.I. and A.M., of secondary school tribal students

The objective of the study was "To determine the relationship between social intelligence and achievement in mathematics of secondary school tribal students". The concern hypothesis "**There exists no significant relationship between social intelligence and achievement in mathematics of secondary school tribal student'**s .Correlations were discovered by examining the degree of association between the variables S. I. and Achievement in Mathematics.

The scores for S.I., and the scores for A.M., of the entire sample of Secondary School Tribal Students were subjected to Pearson's Product-Moment Correlation

analysis to determine the extent of the relationship between S.I., and A. M. Table 4.14 provides the specific details.

Table 4.14.

Data and Results of the relationship between Social Intelligence and Achievement in Mathematics of Secondary School Tribal Students of Telangana.

Variables	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
				Lower	Upper		
Social Intelligence & Achievement in Mathematics	0.47	10.89*	0.03827	-0.3955	0.5445	22.09	Substantial Relationship

The co-efficient of correlation between S.I and A.M., for the entire sample is 0.47 which is more than the value set for significance at 0.05 level. The obtained't' value (10.89) is greater than the table value (1.96) at 0.05 level of significance with 418 degrees of freedom and the obtained correlation is significant level value 0.05 which lies in between the confidence interval --03955 and 0.5445. Hence the hypothesis **there is no significant relationship between S.I., and A.M., of secondary school tribal students** is rejected.

The result reveals that there is a considerable relationship between S.I and A.M., of the Tribal pupil of secondary school which indicates there is a significant dependence between the variables. Hence we can conclude higher S.I of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in S.I will affect a corresponding increase in the Achievement in

Mathematics of Tribal pupil of secondary school. The obtained ‘r’ has a shared variance 22.09%. It suggests that about 22 % of shared variation can be attributed between the two variables.

4.3.8. H_{08}: There is no significant relationship between scientific attitude and achievement in mathematics of secondary school tribal students.

The objective of the study was “To determine the relationship between Scientific Attitude and achievement in mathematics of secondary school tribal students”. The corresponding hypothesis was that “**There is no significant relationship between scientific attitude and achievement in mathematics of secondary school tribal student’s** .Here Correlations were found out for examining the degree of association between the variables such as Scientific Attitude and achievement in mathematics.

The scores for Scientific Attitude and the scores for achievement in mathematics of the entire sample of Secondary School Tribal pupils were subjected to Pearson's Product-Moment Correlation analysis to determine the extent of the relationship between scientific attitude and achievement in mathematics. Table 4.15 details the information.

Table 4.15.

Data and Results of the Relationship between Scientific Attitude and Achievement in Mathematics of Secondary School Tribal Students of Telangana.

Variables	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
				Lower	Upper		
Scientific Attitude & Achievement In Mathematics	0.42	9.46*	0.040	-0.3412	0.4988	17.64	Substantial Relationship

The co-efficient of correlation between S.A., and A.M., for whole sample is 0.42 it is higher than the value set for significance at 0.05 level. The obtained't' value (9.46) is greater than the table value (1.96) at 0.05 level of significance with 418 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval -0.3412 and 0.4998. Hence the hypothesis **there is no significant relationship between scientific attitude and achievement in mathematics of secondary school tribal students** is rejected.

The findings reveals that there is a considerable relationship between Scientific Attitude and Achievement in Mathematics of the Tribal pupils of secondary school it shows, there is a significant correlation between the variables. Higher Scientific Attitude of a pupil will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Achievement in Mathematics will affect a corresponding increase in the Achievement in Mathematics of Tribal pupils of secondary school. The obtained 'r' has a shared variance 17.64%. It suggests that about17% of shared variation can be attributed between the two variables.

4.3.9. **H_{09}: There is no significant relationship between scientific attitude and social intelligence of secondary school tribal students**

The objective of the study was "To determine the relationship between Scientific Attitude and social intelligence of secondary school tribal students". The corresponding hypothesis was that "**There exists no significant relationship between Scientific Attitude and social intelligence of secondary school tribal students** .Correlations were found out for examining the degree of association between the variables Scientific Attitude and social intelligence

To find out the extent of relationship between Scientific Attitude and social intelligence of Secondary School Tribal Students , the scores of Scientific Attitude and the scores of and social intelligence of the total sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis. The details are presented in Table 4.16.

Table 4.16.

Data and Results of the Relationship between Scientific Attitude and social intelligence of Secondary School Tribal Students of Telangana**.**

Variables	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
				Lower	Upper		
Scientific Attitude & social intelligence	0.490	11.49*	0.037	-0.4173	0.5627	24.01	Substantial Relationship

The co-efficient of correlation between Scientific Attitude and social intelligence for whole sample is 0.49 which is higher than the value set for significance at 0.05 level. The obtained 't' value (11.49) is greater than the table value (1.96) at 0.05 level of significance with 418 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval -0.4173 and 0.5627. Hence the hypothesis **there is no significant relationship between scientific attitude and social intelligence of secondary school tribal students** is rejected.

The result shows a substantial relationship (Garret 2005, p;176) between Scientific Attitude and social intelligence of the Secondary School Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student may affect theirsocial intelligence and vice versa. Since the obtained 'r' is positive, increase in social intelligence will effect a corresponding increase in the social intelligence of Secondary School Tribal Students. The obtained 'r' has a shared variance 24.01%. This suggests that about twenty four percentage of shared variation can be attributed between the two variables.

4.3.10. H_{010}: There is no significant influence on relation among social intelligence, scientific attitude and achievement in mathematics secondary school tribal students with respect to background variables such as Gender, locality, and Medium of instruction.

The following sub hypothesis are formulated and tested individually.

4.3.10.1. H_{10}: There exists no significant influence on relationship between Social Intelligence and achievement in mathematics of Secondary School male and female secondary school Tribal Students.

4.3.10.2. H_{10}: There exists no significant influence on relationship between Social Intelligence and achievement in mathematics of Secondary School Rural and Urban secondary school Tribal Students.

4.3.10.3. H_{10}: There exists no significant influence on relationship between Social Intelligence and achievement in mathematics of Secondary School English andTelugu medium secondary school Tribal Students.

4.3.10.4. H_{10}: There exists no significant influence on relationship between scientific attitude and achievement in mathematics of Secondary School male and female secondary school Tribal Students.

4.3.10.5. H_{10}: There exists no significant influence on relationship between scientific attitude and achievement in mathematics of Secondary School Rural and Urban secondary school Tribal Students.

4.3.10.6. H_{10}: There exists no significant influence on relationship between scientific attitude and achievement in mathematics of Secondary School English andTelugu medium secondary school Tribal Students.

4.3.10.7. H_{10}: There exists no significant influence on relationship between scientific attitude and social intelligence of Secondary School male and female secondary school Tribal Students.

4.3.10.8. H_{10}: There exists no significant influence on relationship between scientific attitude and social intelligence of Secondary School Rural and Urban secondary school Tribal Students.

4.3.10.9. H_{10}: There exists no significant influence on relationship between scientific attitude and social intelligence of Secondary School English and Telugu medium secondary school Tribal Students.

4.3.10.1. H_{10}: There exists no significant influence on relationship between Social Intelligence and achievement in mathematics of Secondary School male and female Tribal Students

To find out the extent of relationship between Social Intelligence and achievement in mathematics of Secondary School Tribal Students , the scores of Social Intelligence and the scores of and achievement in mathematics of the Male and Female sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis. The details are presented in Table 4.17.

Table 4.17

Data and Results of the influence on Relationship between Social Intelligence and Achievement in Mathematics of Secondary School Tribal male and female students.

Variables	Gender	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
					Lower	Upper		
Social Intelligence & Achievement In Mathematics	Male N=181	0.430	6.37*	0.061	-0.3113	0.5487	18.49	Substantial Relationship
	Female N=239	0.450	7.76	0.052	-0.3489	0.5511	20.25	Substantial Relationship

The co-efficient of correlation between Social Intelligence and Achievement In Mathematics for male Tribal Students is 0.43 this is higher than the value set for the significance at 0.05 level. The obtained t' value 6.37 is greater than the table value 1.96 at 0.05 level of significance with 179 degrees of freedom and the obtained

correlation is significant at 0.05 level which lies in between the confidence interval 0-.3113 and 0.5487. Hence the hypothesis is rejected.

The result shows a substantial relationship between Social Intelligence and Achievement in Mathematics of the secondary school male Tribal Students which means that there is a considerable dependence between the variables. High Social Intelligence of a secondary school male Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding decrease in the Achievement of male Tribal Students. The obtained 'r' has a shared variance 18.49%. This suggests that about eighteen percentage of shared variation can be attributed between the two variables.

The co-efficient of correlation between Social Intelligence and Achievement in Mathematics for female sample is 0.45 which is higher than the value set for significance at 0.05 level. The obtained 't' value (7.76) is greater than the table value (1.96) at 0.05 level of significance with 237 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval -0.3489 and 0.5511. Hence the hypothesis is rejected.

The result shows a substantial relationship (Garret 2005, p;176) between Social Intelligence and Achievement in Mathematics of the Secondary School female Tribal Students which means that there is a considerable dependence between the variables. Higher Social Intelligence of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained 'r' has a shared variance 20.25%. This suggests that about twenty percentage of shared variation can be attributed between the two variables.

4.3.10.2. H_{10}: There exists no significant influence on relationship between Social Intelligence and achievement in mathematics of Secondary School Rural and Urban Tribal Students

To find out the extent of relationship between Social Intelligence and achievement in mathematics of Secondary School Tribal Students , the scores of Social Intelligence and the scores of and achievement in mathematics of the Rural and Urban sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis. The details are presented in Table 4.18.

Table 4.18.

Data and Results of the influence on Relationship between Social Intelligence and Achievement in Mathematics of Secondary School Tribal Rural and Urban students.

Variables	Locality	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
					Lower	Upper		
Social Intelligence & Achievement In Mathematics	Rural N=360	0.430	9.01*	0.043	-0.3113	0.5487	16.81	Substantial Relationship
	Urban N=60	0.41	3.42*	0.052	-0.3489	0.5511	20.25	Substantial Relationship

The co-efficient of correlation between Social Intelligence and Achievement in Mathematics for Rural Tribal Students is 0.43 this is higher than the value set for the significance at 0.05 level. The obtained t' value 9.01 is greater than the table value

1.96 at 0.05 level of significance with 358 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval 0-.3458 and 0.5142. Hence the hypothesis is rejected.

The result shows a substantial relationship between Social Intelligence and Achievement in Mathematics of the secondary school rural Tribal Students which means that there is a considerable dependence between the variables. High Social Intelligence of a rural Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding decrease in the Achievement of Rural Tribal Students. The obtained 'r' has a shared variance 16.81%. This suggests that about sixteen percentage of shared variation can be attributed between the two variables.

The co-efficient of correlation between Social Intelligence and Achievement in Mathematics for Urban sample is 0.45 which is higher than the value set for significance at 0.05 level. The obtained 't' value (7.76) is greater than the table value (1.96) at 0.05 level of significance with 237 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval -0.3489 and 0.5511. Hence the hypothesis is rejected.

The result shows a substantial relationship (Garret 2005, p;176) between Social Intelligence and Achievement in Mathematics of the Secondary School Urban Tribal Students which means that there is a considerable dependence between the variables. Higher Social Intelligence of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained 'r' has a shared variance 20.25%.

This suggests that about twenty percentage of shared variation can be attributed between the two variables.

4.3.10.3. H_{010}: There exists no significant influence on relationship between Social Intelligence and achievement in mathematics of Secondary School English and Telugu medium Tribal Students.

To find out the extent of relationship between Social Intelligence and achievement in mathematics of Secondary School Tribal Students , the scores of Social Intelligence and the scores of and achievement in mathematics of the English and Telugu sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis. The details are presented in Table 4.19.

Table 4.19

Data and Results of the influence on Relationship between Social Intelligence and Achievement in Mathematics of Secondary School Tribal English and Telugu medium students.

Variables	Medium	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
					Lower	Upper		
Social Intelligence & Achievement in Mathematics	English N=103	0.460	5.21*	0.078	-0.3077	0.6123	21.16	Substantial Relationship
	Telugu N=317	0.450	8.94*	0.045	-0.3622	0.5378	20.25	Substantial Relationship

The co-efficient of correlation between Social Intelligence and Achievement in Mathematics for English medium Tribal Students is 0.46 this is higher than the value set for the significance at 0.05 level. The obtained t' value 5.21 is greater than the table value 1.96 at 0.05 level of significance with 358 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval 0-.3077 and 0.6123. Hence the hypothesis is rejected.

The result shows a substantial relationship between Social Intelligence and Achievement in Mathematics of the secondary school English mediumTribal Students which means that there is a considerable dependence between the variables. High Social Intelligence of an English medium Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding decrease in the Achievement of English medium Tribal Students. The obtained 'r' has a shared variance 21.16%. This suggests that about twenty one percentage of shared variation can be attributed between the two variables.

The co-efficient of correlation between Social Intelligence and Achievement in Mathematics for Telugu medium sample is 0.45 which is higher than the value set for significance at 0.05 level. The obtained 't' value (8.94) is greater than the table value (1.96) at 0.05 level of significance with 237 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval -0.3622 and 0.5378. Hence the hypothesis is rejected.

The result shows a substantial relationship (Garret 2005, p;176) between Social Intelligence and Achievement in Mathematics of the Secondary School Telugu medium Tribal Students which means that there is a considerable dependence between the variables. Higher Social Intelligence of a student will affect his/her Achievement in

Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained 'r' has a shared variance 20.25%. This suggests that about twenty percentage of shared variation can be attributed between the two variables.

4.3.10.4. H_{010}: There exists no significant influence on relationship between Scientific Attitude and achievement in mathematics of Secondary School male and female Tribal Students.

To find out the extent of relationship between Scientific Attitude and achievement in mathematics of Secondary School Tribal Students , the scores of Scientific Attitude and the scores of and achievement in mathematics of the Male and Female sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis. The details are presented in Table 4.20.

Table 4.20

Data and Results of the Relationship between Scientific Attitude and Achievement in Mathematics of Secondary School Tribal male and female students

Variables	Gender	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
					Lower	Upper		
Scientific Attitude & Achievement in Mathematics	Male N=181	0.500	7.72*	0.056	-0.3907	0.6093	25.00	Substantial Relationship
	Female N=239	0.540	9.88	0.046	-0.4502	0.6298	29.16	Substantial Relationship

The co-efficient of correlation between Scientific Attitude and Achievement in Mathematics for male Tribal Students is 0.50 this is higher than the value set for the significance at 0.05 level. The obtained t' value 7.72 is greater than the table value 1.96 at 0.05 level of significance with 179 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval 0-.3907 and 0.6093. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Achievement in Mathematics of the secondary school male TribalStudents which means that there is a considerable dependence between the variables. High Scientific Attitude of a male Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of male Tribal Students. The obtained 'r' has a shared variance 18.49%. This suggests that about eighteen percentage of shared variation can be attributed between the two variables.

The co-efficient of correlation between Scientific Attitude and Achievement in Mathematics for female sample is 0.45 which is higher than the value set for significance at 0.05 level. The obtained't' value (7.76) is greater than the table value (1.96) at 0.05 level of significance with 237 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval -0.3489 and 0.5511. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Achievement in Mathematics of the Secondary School female Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Achievement in Mathematics and vice versa.

Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained ‘r’ has a shared variance 20.25%. This suggests that about twenty percentage of shared variation can be attributed between the two variables.

4.3.10.5. H_{010}: There exists no significant influence on relationship between Scientific Attitude and achievement in mathematics of Secondary School Rural and Urban Tribal Students.

To find out the extent of influence in relationship between Scientific Attitude and achievement in mathematics of Secondary School Tribal Students , the scores of Scientific Attitude and the scores of and achievement in mathematics of the Rural and Urban sample of Secondary School Tribal Students were subjected to Pearson’s Product - Moment Correlation analysis. The details are presented in Table 4.21.

Table 4.21

Data and Results of the influence on Relationship between Scientific Attitude and Achievement in Mathematics of Secondary School Tribal Rural and Urban students

Variables	Locality	r value	‘t’	S. Er	Confidence Interval		Shared Variance	Interpretation
					Lower	Upper		
Scientific Attitude & Achievement In Mathematics	Rural N=360	0.39	8.01 *	0.045	-0.3024	0.4776	15.21	Substantial Relationship
	Urban N=60	0.40	3.32 *	0.108	-0.1875	0.6125	16	Substantial Relationship

The co-efficient of correlation between Scientific Attitude and Achievement in Mathematics for Rural Tribal Students is 0.39 this is higher than the value set for the significance at 0.05 level. The obtained t' value 8.01 is greater than the table value 1.96 at 0.05 level of significance with 358 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval 0-.3024 and 0.4776. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Achievement in Mathematics of the secondary school rural Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of a rural Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of Rural Tribal Students. The obtained 'r' has a shared variance 15.21%. This suggests that about fifteen percentage of shared variation can be attributed between the two variables.

The co-efficient of correlation between Scientific Attitude and Achievement in Mathematics for Urban sample is 0.40 which is higher than the value set for significance at 0.05 level. The obtained 't' value (3.32) is greater than the table value (1.96) at 0.05 level of significance with 57 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval -0.1875 and 0.6125. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Achievement in Mathematics of the Secondary School Urban Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a

corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained 'r' has a shared variance 16%. This suggests that about sixteen percentage of shared variation can be attributed between the two variables.

4.3.10.6. H_{010}: There exists no significant influence on relationship between Scientific Attitude and achievement in mathematics of Secondary School English and Telugu medium Tribal Students.

To find out the extent of influence in relationship between Scientific Attitude and achievement in mathematics of Secondary School Tribal Students , the scores of Scientific Attitude and the scores of and achievement in mathematics of the English and Telugu sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis. The details are presented in Table 4.22.

Table 4.22

Data and Results of the influence on Relationship between Scientific Attitude and Achievement in Mathematics of Secondary School Tribal English and Telugu medium students.

Variables	Medium	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
					Lower	Upper		
Scientific Attitude & Achievement in Mathematics	English N=103	0.52	6.12*	0.072	-0.3077	0.6609	27.04	Substantial Relationship
	Telugu N=317	0.52	6.12*	0.072	-0.3077	0.6609	27.04	Substantial Relationship

The co-efficient of correlation between Scientific Attitude and Achievement in Mathematics for English mediumTribal Students is 0.52 this is higher than the value set for the significance at 0.05 level. The obtained t' value 6.12 is greater than the table value 1.96 at 0.05 level of significance with 101 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval 0-.3077 and 0.6609 Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Achievement in Mathematics of the secondary school Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of an Englishmedium Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of English Tribal Students. The obtained 'r' has a shared variance 27.04%. This suggests that about twenty seven percentage of shared variation can be attributed between the two variables.

The co-efficient of correlation between Scientific Attitude and Achievement in Mathematics for Telugu medium sample is 0.52 which is higher than the value set for significance at 0.05 level. The obtained 't' value (6.12) is greater than the table value (1.96) at 0.05 level of significance with 315degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval -0.3077and 0.6609. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Achievement in Mathematics of the Secondary School Telugu medium Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will

effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained 'r' has a shared variance 27.4%. This suggests that about twenty seven percentage of shared variation can be attributed between the two variables.

4.3.10.7. H_{010}: There exists no significant influence on relationship between Scientific Attitude and Social Intelligence of Secondary School male and female Tribal Students.

To find out the extent of influence in relationship between Scientific Attitude and Social Intelligence of Secondary School Tribal Students , the scores of Scientific Attitude and the scores of and Social Intelligence of the Male and Female sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis. The details are presented in Table 4.23.

Table 4.23

Data and Results of the influence in Relationship between Scientific Attitude and Social Intelligence of Secondary School Tribal male and female students.

Variables	Gender	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
					Lower	Upper		
Scientific Attitude & Social Intelligence	Male N=181	0.480	7.32	0.057	-0.3679	0.5921	23.04	Substantial Relationship
	Female N=239	0.440	7.54	0.052	-0.3378	0.5422	19.36	Substantial Relationship

The co-efficient of correlation between Scientific Attitude and Social Intelligence for male Tribal Students is 0.48 this is higher than the value set for the significance at 0.05 level. The obtained t' value 7.32 is greater than the table value 1.96 at 0.05 level of significance with 179 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval 0-.3679 and 0.5921. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Social Intelligence of the secondary school male Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of a male Tribal Students will affect his Social Intelligence and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of male Tribal Students. The obtained 'r' has a shared variance 23.04%. This suggests that about twenty three percentage of shared variation can be attributed between the two variables.

The co-efficient of correlation between Scientific Attitude and Social Intelligence for female sample is 0.44 which is higher than the value set for significance at 0.05 level. The obtained't' value (7.54) is greater than the table value (1.96) at 0.05 level of significance with 237 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval --0.3378 and 0.5422. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Social Intelligence of the Secondary School female Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect her Social Intelligence and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a corresponding increase in the

Social Intelligence of Secondary School Tribal Students. The obtained 'r' has a shared variance 19.36%. This suggests that about nineteen percentage of shared variation can be attributed between the two variables.

4.3.10.8. H_{010}: There exists no significant influence on relationship between Scientific Attitude and Social Intelligence of Secondary School Rural and Urban Tribal Students.

To find out the extent of relationship between Scientific Attitude and Social Intelligence of Secondary School Tribal Students , the scores of Scientific Attitude and the scores of and Social Intelligence of the Rural and Urban sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis. The details are presented in Table 4.24.

Table 4.24.

Data and Results of the influence in Relationship between Scientific Attitude and Social Intelligence of Secondary School Tribal Rural and Urban students.

Variables	Locality	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
					Lower	Upper		
Scientific Attitude & Social Intelligence	Rural N=360	0.30	5.95*	0.048	-0.2060	0.3940	9.00	Substantial Relationship
	Urban N=60	0.31	2.48*	0.117	-0.0813	0.5387	9.61	Substantial Relationship

The co-efficient of correlation between Scientific Attitude and Social Intelligence for Rural Tribal Students is 0.31 this is higher than the value set for the significance at 0.05 level. The obtained t' value 2.48 is greater than the table value 1.96 at 0.05 level of significance with 358 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval 0-.0813 and 0.5387. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Social Intelligence of the secondary school rural Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of a rural Tribal Students will affect his Social Intelligence and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of Rural Tribal Students. The obtained 'r' has a shared variance 9.61%. This suggests that about nine percentage of shared variation can be attributed between the two variables.

The co-efficient of correlation between Scientific Attitude and Social Intelligence for Urban sample is 0.31 which is higher than the value set for significance at 0.05 level. The obtained 't' value (2.48) is greater than the table value (1.96) at 0.05 level of significance with 57 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval -0.0813 and 0.5387. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Social Intelligence of the Secondary School Urban Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Social Intelligence and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a corresponding increase in the

Social Intelligence of Secondary School Tribal Students. The obtained 'r' has a shared variance 16%. This suggests that about sixteen percentage of shared variation can be attributed between the two variables.

4.3.10.9. H_{010}: There exists no significant influence on relationship between Scientific Attitude and Social Intelligence of Secondary School English and Telugu medium Tribal Students.

To find out the extent of influence in relationship between Scientific Attitude and Social Intelligence of Secondary School Tribal Students , the scores of Scientific Attitude and the scores of and Social Intelligence of the English and Telugu sample of Secondary School Tribal Students were subjected to Pearson's Product - Moment Correlation analysis. The details are presented in Table 4.25.

Table 4.25

Data and Results of the influence in Relationship between Scientific Attitude and Social Intelligence of Secondary School Tribal English and Telugu students.

Variables	Medium	r value	't'	S.Er	Confidence Interval		Shared Variance	Interpretation
					Lower	Upper		
Scientific Attitude & Social Intelligence	English N=103	0.47	5.35*	0.077	-3195	0.6205	22.09	Substantial Relationship
	Telugu N=317	0.45	8.94*	0.045	-0.3622	0.5378	20.25	Substantial Relationship

The co-efficient of correlation between Scientific Attitude and Social Intelligence for English medium Tribal Students is 0.47 this is higher than the value set for the significance at 0.05 level. The obtained t' value 5.35 is greater than the table value 1.96 at 0.05 level of significance with 101 degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval 0-.3195 and 0.6205 Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Social Intelligence of the secondary school English medium Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of an English medium Tribal Students will affect his Social Intelligence and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of English Tribal Students. The obtained 'r' has a shared variance 22.09%. This suggests that about twenty two percentage of shared variation can be attributed between the two variables.

The co-efficient of correlation between Scientific Attitude and Social Intelligence for Telugu medium sample is 0.45 which is higher than the value set for significance at 0.05 level. The obtained 't' value (8.94) is greater than the table value (1.96) at 0.05 level of significance with 315degrees of freedom and the obtained correlation is significant at 0.05 level which lies in between the confidence interval --0.3622 and 0.5378. Hence the hypothesis is rejected.

The result shows a substantial relationship between Scientific Attitude and Social Intelligence of the Secondary School Telugu medium Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Social Intelligence and vice versa. Since the obtained 'r' is positive, increase in Scientific Attitude will effect a corresponding

increase in the Social Intelligence of Secondary School Tribal Students. The obtained 'r' has a shared variance 20.25%. This suggests that about twenty percentage of shared variation can be attributed between the two variables.

4.3.11. H_{011}: There is no significant joint or combination effect of social intelligence and scientific attitude on achievement in mathematics of secondary school tribal students.

To find out the combination effect of social intelligence and scientific attitude on achievement in mathematics of Secondary School Tribal Students, were subjected to Regression Analysis.

In order to see the increment in the percentage variation accounted by the predictor variable, a second step analysis was taken up. The second input variable is the one which has the second highest value in partial correlation with the criterion variable which is 'Social Intelligence (X 1). So this variable is entered in the second step analysis. The results are shown in the below table 4.26.

Table 4.26.

Data and Results of the combination effect of social intelligence and scientific attitude on achievement in mathematics of Secondary School Tribal Students.

Model Summary

Multiple R	R Square	R^2 x 100	Adjusted R Square	Standard Error of the Estimate
0.379	0.144	14.4	0.142	32.21

ANOVA

Model	Sum of Squares	df	Mean Square	F	Level of Significance
Regression	1571.669	2	785.835	6.475	.002
Residual	50607.245	417	121.360		
Total	52178.914	419			

Coefficients

Variable	Unstandardized Coefficients		Standardized Coefficients		Level of Significance
	ß	Standard Error	Beta	t	
(Constant)	61.39	10.22	-	6.006	0.000
Social Intelligence (X_1)	2.242	0.268	0.290	8.35	0.000
Scientific Attitude (X_2)	3.282	0.674	0.169	4.87	0.00

Regression analysis suggests that the index of predictability is 0.379 and the percentage variance accounted by the variable 'Social Intelligence (X_1) and 'in predicting Coping Strategies is 14.4. The adjusted R square is 0.142. The multiple regression (R), the index of prediction on Achievement Mathematics has 0.379.

The obtained 'F' value, 6.47 with 2 and 417 degrees of freedom is greater than the table value 3.80 at 0.01 level of significance. This suggests that the predictor variable Social Intelligence (X_1) and Scientific Attitude is also significant in predicting Achievement Mathematics.

The **ß** coefficient of the variable 'Social Intelligence (X_1) and Scientific Attitude (X_2) 'in development of the regression equation is 2.42 and 3.28 respectively. So the equation for predicting the criterion variable 'Achievement Mathematics. From this regression model it can be concluded that scientific attitude and Social intelligence are significantly influence on Achievement Mathematics.

4.4. CONCLUSION:

The significance of the data that has been gathered using a variety of tools, both those that are standardized and those that have been self-constructed, can only be determined when the data has been properly and scientifically analyzed and interpreted. The investigator is provided with a roadmap regarding the probable outcomes based on the data analysis. Keeping this in mind, the investigator used appropriate statistical methods to examine the data.

Present chapter deals with statistical techniques such as descriptive statistics, it discuss about mean median mode etc., test of significance difference (T-test), it was seen the significant difference between variable, Pearson product movement correlation, this technique deals with relation between variable and regression analysis, it describes the combination effect of social intelligence and scientific attitude on achievement in mathematics of secondary school students of Adilabad district of Telangana state.

CHAPTER- FIVE

SUMMARY, FINDINGS, SUGGESTIONS, AND CONCLUSION

5.1. INTRODUCTION

The major concerns of the present chapter are the summary of the present study, major findings, discussion, recommendations, and conclusion.

There have been many different attempts made by psychologists all around the globe to describe intelligence in their own best possible terminology. However, a definition that is universally acknowledged has not yet been found in any of the literature that has been written on intelligence. In order to arrive at an intelligent definition of intelligence, it is highly crucial to mention some of the ideas presented here. The definition of the word ‘intelligence’ can be fairly broad and open to interpretation. Research into the origins of intelligence as well as methods for judging it has received a significant amount of attention over the past sixty years. There is a wealth of published material pertaining to the subject available. In the field of psychology, intelligence has always been regarded as a theoretical construct; consequently, no one can agree on a definition of the term. In recent years, the idea of intelligence has grown less acceptable and, as a result, more open to critique by psychologists. This is mostly due to the word's inherent ambiguity. Psychologists have proposed a number of meanings for the phrase, but no two psychologists can agree on a single interpretation of the term. People have a vague idea of what "intelligence" means, which makes it hard to understand what it means.

According to the Encyclopedia Dictionary and Directory of Education (2010), the term ‘social intelligence’ refers to the capacity to adapt to one's social surroundings

and to actively strive toward the enhancement of such surroundings. First and foremost, it is essential to have a comprehensive awareness of the social context as well as the problems and concerns that are prevalent nowadays. Second, the individual should have the ability to differentiate between different points of view. Third, a person should be able to take an active role in making society better so that he or she can use his or her knowledge and ability to discriminate for the good of society.

The study of science is accomplished globally. The integration of scientific study into the curriculum of schools is something that should absolutely take place. Science brought about a near revolution in human life and demonstrated that it is essential to the continued existence of man. At this point in time, scientific knowledge reigns supreme throughout all domains. Its significance to both man and society is so important that contemporary people are said to be living in an ‘age of science’. So, science should be an important part of the curriculum because it is the only subject that teaches specific facts and laws and helps people reach their full potential, which is the main goal of education.

Attitudes have an element of emotion and can range from mild to extreme and from specific to generic, depending on the scope of the objects or circumstances to which they are applied. It is sometimes difficult to differentiate attitudes that have been learned from the emotive aspects of a person's personality, such as interests, appreciations, likes, opinions, values, ideals, and character characteristics. A scientific attitude is a mental state that represents a propensity to react positively or unfavorably to a specific set of stimuli. This mental state might be considered more or less permanent. If this response adheres to the standards of scientific ethics, then it might be considered a scientific attitude. An investigation of a particular scientific deed or thought is what the scientific attitude is looking for. More consideration needed to have

been given to the kind of thinking that is connected with scientific thinking. To be scientific person required to possess a variety of personality traits like , including inquisitiveness, rationality, and readiness to suspend judgment, open-mindedness, critical-mindedness, objectivity, honesty, and humility, amongst others. A person's attitude can either encourage or discourage action that is directed toward a certain object or scenario, or even a collection of things or situations.

This present chapter will therefore portray the scientific attitude, social intelligence, and achievement in mathematics of secondary school tribal students in the Adilabad district of Telangana state.

5.2. THE EMERGENCE AND IMPORTANCE OF THE PROBLEM

We all know that education is the most important resource for growth and that the main goal of education is to help a person prosper in every way. It is very important for the teacher to help the students achieve their educational goals. Kothari commission said that , 'The future of our country will be built only in classrooms'. The above quote shows how important the teaching and learning process seems to be. As well as instructors who are concerned about scientific attitude, those who have a concern about scientific attitude will think about the scientific attitude of their students.

In the current study, 'Social intelligence and scientific attitude of secondary school tribal students of Adilabad district in relation to their achievement in mathematics.' the researcher looked at how social intelligence, scientific attitude, and achievement in mathematics were distributed among secondary school tribal students, as well as how social intelligence, scientific attitude, and achievement in mathematics were related to and affected each other.

Here the researcher investigated the levels of social intelligence and scientific attitude and achievement in mathematics among secondary school students from tribal schools. This will help us figure out how to improve those levels with the assistance of special attention given to the students by specialists in the relevant fields or relevant teachers who have been appointed by the appropriate authorities.

Identifying the relationship between social intelligence, scientific attitude, and mathematical achievement is extremely beneficial to both students and teachers. Because if social intelligence has a positive effect on mathematical achievement, we should be able to improve students' social intelligence. On the other hand, if the scientific attitude has a positive influence on the mathematical achievement of secondary school students from tribal communities, then we should work to improve the scientific attitude of secondary school students from tribal communities with the assistance of a science teacher or an expert in the relevant field.

In addition to all of the things listed above, many students and people in today's society are encountering many difficulties in relation to their lives and the society in which they live. These difficulties include conflicts and struggles in student life as well as at mature age, regardless of education, profession, or wealth. People who have a high social intelligence are able to analyze conflicts and struggles in such a perfect way, and they are able to emerge victorious from all of those conflicts and struggles with the assistance of their high social intelligence. This is because social intelligence can be defined as the capacity to understand not only men and women but also boys and girls and social situations as well.

According to the findings of several studies, those who have a strong scientific attitude are more likely to think creatively and scientifically when confronted with either their own challenges or those faced by society. The reason for this is that a

scientific attitude is nothing more than an attitude that reflects scientific thought with respect to the many different circumstances of life. People that think scientifically are able to solve any problem using scientific methods, such as coming to conclusions supported by facts and avoiding making assertions that aren't backed up by evidence. With the above method, not only will we be able to find scientific solutions to every problem that people and groups face, but people and groups will also be able to live together better.

5.3. METHOD OF THE STUDY

In order to do research, a researcher has to adopt a certain methods of research. It depends on the nature of the problem, the type of data, and etc. The problem of the study is the relationship and influence among social intelligence, scientific attitude, and secondary school student’s achievement in mathematics. The researcher has used a survey method to investigate the difference and relation variables of the study in relation to demographic variables such as medium of instruction gender, and locality.

Survey method is a frequent approach that is utilized when there is a need to collect data from a sizable number of individuals at one particular point in time. It does not take into consideration the peculiarities of persons in and of themselves. It is concerned with the statistics that emerge as a result of data being extracted from a variety of different individual cases. According to Kerlinger (1973), survey research is a type of social science research that focuses on individuals and the essential facts about people, as well as their views, opinions, attitudes, and motivations, in addition to their behaviors.

5.4. POPULATON OF THE STUDY

Any group of people with one or more traits that the researcher is interested in can be considered a population. The total number of individuals in a group from which you want to infer a conclusion is known as the population. The current study's population consists of ninth and tenth grade tribal secondary school students from the Adilabad district in Telangana state. And population size is **4298.**

5.5. SAMPLE OF THE STUDY

A portion of a population that is chosen for examination is called a sample. Tribal students from the ninth and tenth grades at secondary schools in the Adilabad district make up the sample size for the current study, which has a total of 420 participants. Two different parts of the Adilabad district in the Telangana state are used as the sources for the samples that are selected using the simple random sampling method. A random selection of 14 schools was made from the two revenue divisions. There were thirty students chosen at random from each school. Among the fourteen schools, seven schools are girls' schools.

5.6. OBJECTIVES OF STUDY

1. To determine the different levels of social intelligence of secondary school tribal students.
2. To find out the significant difference in the social intelligence of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.
3. To determine the different levels of the scientific attitude of secondary school tribal students.

4. To find out the significant difference in the scientific attitude of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.
5. To determine the different levels of achievement in mathematics of secondary school tribal students.
6. To find out the significant difference in the achievement in mathematics of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.
7. To determine the relationship between social intelligence and achievement in mathematics of secondary school tribal students.
8. To determine the relationship between scientific attitude and achievement in mathematics of secondary school tribal students.
9. To determine the relationship between scientific attitude and social intelligence of secondary school tribal students.
10. To determine the influence on the relationship among social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students, with respect to background variables such as gender, locality, and medium of instruction.
11. To find out the combined effect of social intelligence and scientific attitude on achievement in mathematics of secondary school tribal students of Adilabad district.

5.7. HYPOTHESES OF STUDY

H_{o1}. There is no significant difference in the levels of social intelligence of secondary school tribal students.

H_{o2}. There is no significant difference in the social intelligence of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.

H_{o3}. There is no significant difference in the levels of the scientific attitude of secondary school tribal students.

H_{O4}. There is no significant difference in the scientific attitude of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.

H_{O5}. There is no significant difference in the levels of achievement in mathematics of secondary school tribal students.

H_{O6}. There is no significant difference in the achievement of mathematics of secondary school tribal students with respect to background variables such as gender, locality, and medium of instruction.

H_{O7}. There is no significant relationship between social intelligence and achievement in mathematics of secondary school tribal students.

H_{O8}. There is no significant relationship between scientific attitude and achievement in mathematics of secondary school tribal students.

H_{O9}. There is no significant relationship between scientific attitude and social intelligence of secondary school tribal students.

H_{O10}. There is no significant influence on the relationship among social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students with respect to background variables such as Gender, locality, and Medium of instruction.

H_{O11}. There is no significant combined effect of social intelligence and scientific attitude on achievement in mathematics of secondary school tribal students.

5.8. TOOLS USED FOR DATA COLLECTON

The investigator has used the following tools for the study:

1. Personal data sheets
2. self-prepared and standardized social intelligence scale
3. Self-prepared and standardized scientific attitude scale

Personal data sheets

A personal data sheet was used by the researcher to collect information about the study's sample, which consisted of students in classes IX and X who attended secondary schools. This data was gathered so that we could have a better understand of the demographic variables of the study.

Data Collection

Data was collected from secondary school tribal students in the Adilabad district of Telangana state. Data was collected from classes ninth and tenth of secondary tribal schools.

Mode of Analysis:

The data that were collected were statistically analyzed using the statistical package for social sciences software in order to achieve the study's objectives (SPSS 26.0). For the variables in the study, descriptive statistical analysis was utilized, along with analyses of variance, product moment correlation analysis, the significance of the difference between the means, and regression for the combined effect. The analysis's findings are provided in exactly the same sequence as the hypotheses, with a brief explanation. The analysis's findings are provided, starting with the theories and proceeding on to the discussion.

5.9. MAJOR FINDINGS

- In current study tribal students of Secondary school, were divided into the low, average and high groups according to their S.I., scientific attitude and achievement in mathematics scores in the test in order to determine their degree of social intelligence, scientific attitude and achievement in mathematics. The traditional method of categorizing the sample using sigma distances was utilized, assuming a normal distribution of social intelligence scientific attitude and achievement in mathematics scores.
- Results shows that 73.10 percent of secondary school tribal pupils have average level social intelligence, 12.10 percent have high level of social intelligence, and 14.80 percent have low level social intelligence. The findings show that the majority of tribal students in secondary schools have average levels of social intelligence.
- Results shows that 62.90 percent of tribal secondary school students have average scientific attitude, 16.20percent have high scientific attitude, and 21.00 percent have low scientific attitude. The findings show that the majority of tribal students in secondary schools have average levels of Scientific Attitude
- Results shows that tribal students of secondary school represent 12.21%, 65.2%, and 22.67% of the groups with high, average, and low math achievement. The results show that most of the secondary school Tribal students have an average level of mathematics achievement, but when compared to percentages for social intelligence and scientific attitude, the percentage of Secondary School Tribal students falling in the high group has decreased and that in the low group has increased.

- The critical ratios obtained for Social Intelligence is 6.40. The critical ratio obtained for Social Intelligence is 6.40 which is greater than the table value 1.96 at 0.05 level of significance. This means there is significant mean difference in social intelligence of secondary school tribal students with respect to background variable such as Gender. So the hypothesis Gender of secondary school tribal students doesn't make any significant difference in their social intelligence is **rejected.** The mean score of female 148.77 is greater than the mean score of Male students 139.96. So it can be concluded that female students have high social intelligence.
- The critical ratios obtained for Social Intelligence is .608. The critical ratio obtained for Social Intelligence is .608 which is less than the table value 1.96 at 0.05 level of significance. This means there is no significant mean difference in social intelligence of secondary school tribal students with respect to background variable such as area/locality. So the hypothesis Area/ locality of secondary school tribal students doesn't make any significant difference in their social intelligence is **accepted.**
- The critical ratios obtained for Social Intelligence is .535. The critical ratio obtained for Social Intelligence is .535 which is less than the table value 1.96 at 0.05 level of significance. This means there is no significant mean difference in social intelligence of secondary school tribal students with respect to background variable such as Medium of instruction. So the hypothesis Medium of instruction of secondary school tribal students doesn't make any significant difference in their social intelligence is **accepted.**
- The critical ratios obtained for Scientific Attitude is 3.614. The critical ratio obtained for Scientific Attitude is 3.61 which is also greater than the table value

1.96 at 0.05 level of significance, which means that male and female Secondary School Tribal Students significantly differ in Scientific Attitude. The mean score of female 145.44 is greater than the mean score of Male students 139.94.so it can be concluded that female students have high Scientific Attitude. So the hypothesis Gender of secondary school tribal students doesn't make any significant difference in their scientific attitude is **rejected.**

- The critical ratios obtained for Scientific Attitude is .142. The critical ratio obtained for Scientific Attitude is .142 which is less than the table value 1.96 at 0.05 level of significance, which means that Rural and Urban Secondary School Tribal Students do not differ significantly in their Scientific Attitude. So it can be concluded that both rural and urban students have same level Scientific Attitude. So the hypothesis Area/ locality of secondary school tribal students doesn't make any significant difference in their scientific attitude is **accepted.**
- The critical ratios obtained for Scientific Attitude is .064. The critical ratio obtained for Scientific Attitude is .064 which is less than the table value 1.96 at 0.05 level of significance, which means that English medium and Telugu medium of Secondary School Tribal Students do not differ significantly in their Scientific Attitude. So it can be concluded that both English medium and Telugu medium students have same level Scientific Attitude. So the hypothesis Medium of instruction of secondary school tribal students doesn't make any significant difference in their scientific attitude is **accepted**.
- The critical ratio obtained for Achievement in Mathematics is 2.93. The critical ratio obtained for Achievement in Mathematics is 2.93 which is also greater than the table value 1.96 at 0.05 level of significance, which means that male

and female Secondary School Tribal Students significantly differ in Achievement in Mathematics. The mean score of female 51.29 is greater than the mean score of Male students 48.09. So it can be concluded that female students have high Achievement in Mathematics. So the hypothesis Gender of secondary school tribal students doesn't make any significant difference in their achievement in mathematics is **rejected.**

- The critical ratio obtained for Achievement in Mathematics is 1.450. The critical ratio obtained for Achievement in Mathematics is 1.45 which is less than the table value 1.96 at 0.05 level of significance, which means that Rural and Urban Secondary School Tribal Students do not differ significantly in their Achievement in Mathematics. So it can be concluded that Rural and urban students have same level Achievement in Mathematics. So the hypothesis Area/ locality of secondary school tribal students doesn't make any significant difference in their achievement in mathematics is **accepted.**
- Critical ratio obtained for Achievement in Mathematics is 1.63 it was also less than the table value 1.96 at 0.05 level of significance, which means that English and Telugu medium Secondary School Tribal Students do not differ significantly in their in Achievement in Mathematics. So it can be concluded that English and Telugu medium students have same level Achievement in Mathematics. So the hypothesis Medium of instruction of secondary school tribal students doesn't make any significant difference in their achievement in mathematics is **accepted.**
- Findings reveals that, considerable relationship between S.I. and Achievement in Mathematics of the Secondary School Tribal Students which means that there is a considerable dependence between the variables. Higher Social

Intelligence of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained 'r' has a shared variance 22.09 percent. It reveals that 22% of shared variation can be attributed between the two variables.

- Findings reveals a considerable relationship between S.A., and Achievement in Mathematics of the Secondary School Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Achievement in Mathematics will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained 'r' has a shared variance 17.64%. This suggests that about seventeen percentage of shared variation can be attributed between the two variables.
- Result reveals a considerable relationship (Garret 2005, p;176), between Scientific Attitude and social intelligence of the Secondary School Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her social intelligence and vice versa. Since the obtained 'r' is positive, increase in social intelligence will effect a corresponding increase in the social intelligence of Secondary School Tribal Students. The obtained 'r' has a shared variance 24.01%. This suggests that about twenty four percentage of shared variation can be attributed between the two variables.

- Results reveals that considerable relationship between S.I. and Achievement in Mathematics of the secondary school male Tribal Students which means that there is a considerable dependence between the variables. High Social Intelligence of a male Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding decrease in the Achievement of secondary school male Tribal Students. The obtained 'r' has a shared variance 18.49%. This indicates that around eighteen % of the variance in the two variables may be attributable to being shared between them.
- Result reveals that considerable relationship (Garret 2005, p; 176), between Social Intelligence and Achievement in Mathematics of the Secondary School female Tribal Students which means that there is a considerable dependence between the variables. Higher Social Intelligence of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained 'r' has a shared variance 20.25%. This suggests that about twenty percentage of shared variation can be attributed between the two variables.
- Result reveals that considerable relationship between S.I. and Achievement in Mathematics of the secondary school rural Tribal Students which means that there is a considerable dependence between the variables. High Social Intelligence of a rural Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding decrease in the Achievement of Rural Tribal Students. The obtained 'r' has a shared variance 16.81%. This

suggests that about sixteen percentage of shared variation can be attributed between the two variables.

- Findings reveals that considerable relationship (Garret 2005, p; 176), between S.I and A.M., of the Secondary School Urban Tribal pupils it reveals that there is a significant dependence between the variables. Higher Social Intelligence of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained 'r' has a shared variance 20.25%. This suggests that about twenty percentage of shared variation can be attributed between the two variables.
- The findings that considerable relationship between S.I. and Achievement in Mathematics of the secondary school English medium Tribal Students which means that there is a considerable dependence between the variables. High Social Intelligence of an English medium Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained 'r' is positive, increase in Social Intelligence will effect a corresponding decrease in the Achievement of English medium Tribal Students. The obtained 'r' has a shared variance 21.16%. This suggests that about twenty one percentage of shared variation can be attributed between the two variables.
- The findings reveals that, considerable relationship (Garret 2005, p;176) between Social Intelligence and Achievement in Mathematics of the Secondary School Telugu medium Tribal Students which means that there is a considerable dependence between the variables. Higher Social Intelligence of a student will affect his/her Achievement in Mathematics and vice versa. Since

the obtained ‘r’ is positive, increase in Social Intelligence will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained ‘r’ has a shared variance 20.25%. This suggests that about twenty percentage of shared variation can be attributed between the two variables.

- The findings reveals that considerable relationship between S.A. and A. M. in Mathematics of the secondary school male Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of a male Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of male Tribal Students. The obtained ‘r’ has a shared variance 18.49%. This suggests that about eighteen percentage of shared variation can be attributed between the two variables.
- Results of the study reveals that there is a considerable relationship between Scientific Attitude and Achievement in Mathematics of the Secondary School female Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained ‘r’ has a shared variance 20.25%. This suggests that about twenty percentage of shared variation can be attributed between the two variables.
- Result shows there is a considerable relationship between S.A., and Achievement in Mathematics of the secondary school rural Tribal Students

which means that there is a considerable dependence between the variables. High Scientific Attitude of a rural Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of Rural Tribal Students. The obtained ‘r’ has a shared variance 15.21%. This suggests that about fifteen percentage of shared variation can be attributed between the two variables.

- The study’s results reveals that there is significant relationship between Scientific Attitude and Achievement in Mathematics of the Secondary School Urban Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The obtained ‘r’ has a shared variance 16%. This suggests that about sixteen percentage of shared variation can be attributed between the two variables.
- The study results reveals that there is a considerable relationship between Scientific Attitude and Achievement in Mathematics of the secondary school Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of an English medium Tribal Students will affect his Achievement in Mathematics and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of English Tribal Students. The shared variance for the calculated 'r' is 27.04 percent. This means that 27% of the variance in the two variables may be attributable to shared variation.

- The results of the research work reveals that there is a considerable relationship between Scientific Attitude and Achievement in Mathematics of the Secondary School Telugu medium Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Achievement in Mathematics and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding increase in the Achievement in Mathematics of Secondary School Tribal Students. The shared variance for the calculated 'r' is 27.04 percent. This means that 27% of the variance in the two variables may be attributable to shared variation.
- The results of research work reveals that there is a significant relationship between Scientific Attitude and Social Intelligence of the secondary school male Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of a male Tribal Students will affect his Social Intelligence and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of male Tribal Students. The obtained ‘r’ has a shared variance 23.04%. This suggests that about twenty three percentage of shared variation can be attributed between the two variables.
- Study results reveals that there is a considerable relationship between Scientific Attitude and Social Intelligence of the Secondary School female Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect her Social Intelligence and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding increase in the Social

Intelligence of Secondary School Tribal Students. The obtained ‘r’ has a shared variance 19.36%. This suggests that about nineteen percentage of shared variation can be attributed between the two variables.

- The results of the research work reveals that there is a considerable relationship between S.A., and S.I., of the secondary school rural Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of a rural Tribal Students will affect his Social Intelligence and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of Rural Tribal Students. The obtained ‘r’ has a shared variance 9.61%. This suggests that about nine percentage of shared variation can be attributed between the two variables.
- Study reveals that there is a considerable relationship between Scientific Attitude and Social Intelligence of the Secondary School Urban Tribal Students which means that there is a considerable dependence between the variables. Higher Scientific Attitude of a student will affect his/her Social Intelligence and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding increase in the Social Intelligence of Secondary School Tribal Students. The obtained ‘r’ has a shared variance 16%. This suggests that about sixteen percentage of shared variation can be attributed between the two variables.
- The Results reveals that there is a considerable relation between S. A., and Social Intelligence of the secondary school English medium Tribal Students which means that there is a considerable dependence between the variables. High Scientific Attitude of an English medium Tribal Students will affect his

Social Intelligence and vice versa. Since the obtained ‘r’ is positive, increase in Scientific Attitude will effect a corresponding decrease in the Achievement of English Tribal Students. The obtained ‘r’ has a shared variance 22.09%. This suggests that about twenty two percentage of shared variation can be attributed between the two variables.

- Study reveals that there is a considerable relationship between Scientific Attitude and S.I of the Secondary School Telugu medium Tribal pupils it reveals that there is a significant dependence between the variables. Higher Scientific Attitude of a student will affect his/her S.I and vice versa. Since the calculated "r" is positive, an increase in the scientific attitude of secondary school tribal pupils will result in a proportional rise in social intelligence. Shared variance for the calculated 'r' is 20.25%. This implies that the two variables' common variance, which is approximately 20%, can be described.
- Regression analysis recommends that the predictability index is 0.379, and the percentage variance accounted by the variable ‘Social Intelligence (X1), and ‘in predicting Coping Strategies is 14.4. The adjusted R square is 0.142. The multiple regression (R), the index of prediction on Achievement Mathematics has 0.379. The obtained ‘F’ value, 6.47 with 2 and 417 degrees of freedom is greater than the table value 3.80 at 0.01 level of significance. This suggests that the predictor variable Social Intelligence (X1), and Scientific Attitude is also significant in predicting Achievement Mathematics. The ß coefficient of the variable ‘Social Intelligence (X1) and Scientific Attitude (X2) ‘in development of the regression equation is 2.42 and 3.28 respectively. So the equation for predicting the criterion variable ‘Achievement Mathematics. From this

regression model it can be concluded that scientific attitude and Social intelligence are significantly influence on Achievement Mathematics.

5.10. EDUCATIONAL IMPLICATIONS

The following list represents the most significant educational ramifications that can be inferred from the study's analysis and findings:

- As a result of the large percentage of tribal students in secondary school having a social intelligence level that is average, there is a need to improve the social intelligence of tribal students in secondary schools. There is a very positive relationship between S.I and A.M., so improving the social intelligence of tribal students in secondary school is very important. If we are able to improve students' social intelligence, then we will achieve high achievement in mathematics.
- More number of secondary school tribal pupils have an average level of scientific attitude, so there is a need to increase it because there is a strong correlation between scientific attitude and performing well in math classes. Students will perform well in mathematics if we can raise their levels of scientific attitude.
- Male students need particular attention because they have lower levels of social intelligence and scientific attitudes than female students.
- Female students are having much achievement in mathematics compare to male students, so male students needs special attention regarding this
- The students those who have high social intelligence also have a high scientific attitude. As well as students, those who have a high scientific attitude also have high social intelligence and high achievement. So there is a positive influence

among S.I., scientific attitude, and achievement in mathematics. One can influence the other two variables.

5.11. SUGGETIONS FOR FURTHUR RESERCH

- The present study focuses on only ninth and tenth class secondary school tribal students. It can be done at an intermediate level and a degree level also.
- The present study was done on the achievement in mathematics of secondary school tribal students. We can do same study with achievement in science also.
- Present study is limited to the Adilabad district only. The studies are suggested to be conducted in other related districts of Adilabad.
- The same research was carried out with a different size of sample.
- The same research could be carried out with the different variables like emotional intelligence, social economic status, and family background.
- Similar research should be carried out in at regional and state level also.

5.12. LIMITATIONS OF THE STUDY:

- Present research work limited to
  - Adilabad District of Telangana state only
  - Tribal welfare Ashram schools of Adilabad district only
  - Secondary school tribal welfare students only
  - Class ninth and tenth of tribal welfare ashram schools only
  - Demographic variables such as Gender, locality and medium of instruction only.
  - English and Telugu medium secondary school students only.

5.13. CONCLUSION

In this chapter, the findings and conclusions of the present research are summarized. Additionally, it contrasts the results of the current study with those of the earlier studies. It also emphasizes the consequences of the study and its value to the area of education. Finally, it suggests areas for more investigation.

It may be concluded from the findings of the study, more number of female children are have an average level of S.I, scientific attitude, and achievement in mathematics. As well as female students have higher social intelligence, scientific attitude, and achievement in mathematics compare to male tribal students. High social intelligence leads towards high achievement in mathematics. As well as high scientific attitude also leading towards high achievement in mathematics. There is a very positive relationship between social intelligence and achievement in mathematics, scientific attitude and achievement in mathematics. There is an influence between three variables such as social intelligence, scientific attitude, and achievement in mathematics with respect to back ground variables such as medium of instruction, locality and gender. Hence teacher institutions, organisations, are advised to take necessary steps to promote social Intelligence, scientific attitude and achievement in mathematics.

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Appendix

UNIVERSITY OF HYDERABAD

Social intelligence scale
(S I S)

Dear student I am doing Ph.D in Education at Department of Education and Education Technology, School of Social Sciences, University of Hyderabad, Hyderabad. Title of my Research work is ***A Study of relationship among social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students of Adilabad District of Telangana state.*** *I need* your valuable information and details in the given format for my Ph.D. work. The information which is going to be provided by you will be used for my research work only. It is not a test so feel free when you respond to the statements. Thank you for your kind cooperation

Supervisor
Prof: G. Bhuvaneswara lakshmi,
Department of Education and
Education Technology,
School of Social Sciences
University of Hyderabad, Hyderabad

By
Srinivas Ghodam
Doctoral Research Scholar,
Department of Edn and
Edn Technology, School of Social Sciences
University of Hyderabad Hyderabad

General information

Name of the student…….....Age…….

Class …….Fathers name…….,.....

Sex…….. School…….

Rural / Urban……Medium……..

Instructions

The following statements are concerned with social intelligence. Read each statement carefully and then mark your response on a sheet such as,

1= Strongly Disagree (SD), 2=Disagree (D), 3= Neutral (N), 4= Agree (A), 5=Strongly Agree (SA)

SN	STATEMENTS	SD	D	N	A	SA
01	I know how to adapt the new people కొత్త వ్యక్తులతో ఎలా వ్యవహరించాలో నాకు తెలుసు					
02	I feel nervous when I come in contact with others నేను ఇతరులతో కలిసినప్పుడు ఆందోళనకు గురి అవుతాను					
03	In groups, I speak more than listening సమూహాలలో నేను వినడం కంటే ఎక్కువ మాట్లాడుతాను					
04	I feel difficult to follow the rules of traditional society సాంప్రదాయ సమాజ నియమాలు పాటించడం నాకు కష్టంగా అనిపిస్తుంది					
05	I am respectable among my friends నేను మా స్నేహితులలో గౌరవించ దగిన వ్యక్తిని					
06	I keep smiling even others criticize me ఇతరులు నన్ను విమర్శించినా నేను నవ్వుతూనే ఉంటాను					
07	I never make friendship with new people నేను నూతన వ్యక్తులతో స్నేహం చేయను					
08	I make new friends frequently నేను తరచుగా కొత్త వ్యక్తులతో స్నేహం చేస్తూ ఉంటాను					
09	I know how to act in accordance with the feelings of others ఇతరుల ఆలోచనలకు అనుగుణంగా వ్యవహరించడం నాకు తెలుసు					
10	I know how to deal with others for my own benefit. నా సొంత ప్రయోజనాల కొరకు ఇతరులతో ఎలా వ్యవహరించాలో నాకు తెలుసు					
11	I feel happy even making inconvenience /troubles to others for my own benefit నా లాభం కొరకు ఇతరులను బాధించడం నాకు సంతోషం కలిగించును					
12	I do know a way to persuade others to require my aspect నా అవసరానికి ఇతరులను ఒప్పించడం నాకు తెలుసు					
13	I will try to keep in mind all dimensions of the situation for taking a decision నేను పరిస్థితులను అన్ని వైపుల నుండి గమనించి నిర్ణయం తీసుకోవడానికి ప్రయత్నిస్తాను					
14	I don't misuse my plentiful time in taking note of other people's arguments ఇతరుల వాదనల గురించి ఆలోచిస్తూ నేను నా విలువైన సమయాన్ని వ్యర్థం చేయను					
15	I maintain good relations with all నేను అందరితో మంచి సంబంధాలు కలిగివుంటాను					
16	I learn from past experiences గత అనుభవాల నుండి నేను కొత్త విషయాలు నేర్చుకుంటాను					

SN	STATEMENTS	SD	D	N	A	SA
17	I feel difficulty while dealing with different nature people విభిన్న స్వభావం కల వ్యక్తులతో వ్యవహరించేటప్పుడు నాకు కష్టంగా ఉంటుంది					
18	I easily impress others నేను ఇతరులను తొందరగా ఆకర్షించగలను					
19	Using others for my own wishes pleases me ఇతరులను నా స్వంత కోరికల కోసం ఉపయోగించడం నాకు సంతోషాన్నిస్తుంది					
20	I learn from others mistakes నేను ఇతరుల తప్పుల నుండి నేర్చుకుంటాను					
21	People usually praise me for my good behavior ప్రజలు సాధారణంగా నా మంచి ప్రవర్తనను పొగుడుతూ ఉంటారు					
22	I don't take a risky job in social group సమాజ సమూహాలలో సమస్యలతో కూడిన పనులు చేయను					
23	I easily manage any worst condition of society నేను సమాజంలో ఉన్న కఠిన పరిస్థితులను సులభంగా మేనేజ్ చేయగలను					
24	Many times I fail to keep my promises చాలా సందర్భాలలో ఇచ్చిన మాటను నిలబెట్టుకోలేక పోయాను					
25	I will predict alternative behavior of people వ్యక్తుల ప్రత్యామ్నాయ ప్రవర్తనను నేను అర్థం చేసుకోగలను					
26	Before criticizing someone, I imagine how I feel, if I were in their place ఇతరులను విమర్శించే ముందు వారి స్థానంలో నేనుంటే ఎలా ఆలోచిస్తానో ఊహించగలను					
27	Feelings of others confused me ఇతరుల ఆలోచనలు నన్ను కన్ఫ్యూజ్ చేస్తాయి					
28	I am ready to recognize the wishes of others. ఇతరుల కోరికలను గుర్తించడానికి నేను సిద్ధంగా ఉన్నాను					
29	The needs of others makes me worried ఇతరుల అవసరాలు నన్ను చింతింపజేస్తాయి					
30	I will help those people those who are very close to me నేను నాకు సన్నిహితంగా ఉన్న వ్యక్తులకు మాత్రమే సహాయం చేస్తాను					
31	In touch with people, I will acknowledge their intention వ్యక్తులతో కలిసి ఉండడం వలన వారి ఉద్దేశాలను తెలుసుకోగలను					
32	I criticize others plan if it is not correct ప్రణాళిక సరిగా లేని వారిని నేను వివరిస్తాను					
33	I use to scold others for their failures ఇతరుల అపజయాలను చూసి నేను వారిని తిడతాను.					

SN	STATEMENTS	SD	D	N	A	SA
34	I appreciate others for their successes ఇతరులు విజయం సాధించినప్పుడు నేను వారిని ప్రసంసిస్తాను					
35	I feel afraid to organize stage programs వేదికమీద సభను నిర్వహించడానికి నాకు భయం అనిపిస్తుంది					
36	I change my thoughts to make others happy ఇతరులను సంతోష పెట్టడానికి నేనూ నా ఆలోచనలను మార్చుకుంటాను					
37	I feel uncomfortable when I get some social responsibility నాకు సామాజిక బాధ్యత అప్పగించినప్పుడు అసౌకర్యంగా ఉంటుంది					
38	Sometimes it is very difficult for me to see problems from others' points of View. కొన్ని సందర్భాలలో ఇతరుల వైపు నుండి సమస్యలు గమనించడం నాకు చాలా కష్టంగా ఉంటుంది					
39	I change my plan according to the need of the group సమూహ అవసరాల కొరకు నా ప్రణాళికను నేను మారుస్తాను					
40	Generally I will try and perceive నేను సాధారణంగా ప్రయత్నించి తెలుసుకుంటాను					
41	I can easily understand and sallow problems of others నేను ఇతరుల సమస్యలను సులభంగా అర్థం చేసుకొని పరిష్కరించగను					
42	I feel happy to serve others ఇతరులకు సేవ చేయడం నాకు సంతోషం కలిగించును					

UNIVERSITY OF HYDERABAD

Scientific attitude scale
(SAS)

Dear student I am doing Ph.D in Education at Department of Education and Education Technology, School of Social Sciences, University of Hyderabad, Hyderabad. Title of my Research work is ***A Study of relationship among social intelligence, scientific attitude, and achievement in mathematics of secondary school tribal students of Adilabad District of Telangana state.*** *I need* your valuable information and details in the given format for my Ph.D. work. The information which is going to be provided by you will be used for my research work only. It is not a test so feel free when you respond to the statements. Thank you for your kind cooperation

Supervisor
Prof: G. Bhuvaneswara lakshmi,
Department of Education and
Education Technology,
School of Social Sciences
University of Hyderabad, Hyderabad

By
Srinivas Ghodam
Doctoral Research Scholar,
Department of Edn and
Edn Technology, School of Social Sciences
University of Hyderabad Hyderabad

General information

Name of the student…….....Age…….

Class …….Fathers name……,.....

Sex…….. School…….

Rural / Urban……Medium……..

Instructions

The following statements are concerned with a scientific attitude. Read each statement carefully and then mark your response on a sheet such as,

1= Strongly Disagree (SD), 2=Disagree (D), 3= Neutral (N), 4= Agree (A), 5=Strongly Agree (SA)

S N	STATEMENTS	SD	D	N	A	SA
01	Conventional society hampers the growth of science. సాంప్రదాయ సమాజం విజ్ఞానశాస్త్ర అభివృద్ధికి అవరోధం కలిగిస్తుంది.					
02	Science is suitable for all students irrespective of gender స్త్రీ, పురుష భేదం లేకుండా విజ్ఞానశాస్త్రం ఎవరైనా చదవచ్చు.					
03	Studying science subjects enhances our intellect. విజ్ఞాన శాస్త్రం చదవడం వలన ప్రజ్ఞ పెరుగుతుంది.					
04	Ideas are true if some facts support them. విజ్ఞానశాస్త్ర ఆలోచనలకు కొన్ని వాస్తవాలు కలిస్తే కార్యరూపం దాలు స్తాయి					
05	Science students should be eager for new experiments విజ్ఞానశాస్త్రం చదివే విద్యార్థు లు నూ తన ప్రయోగాల పట్ల ఉత్సాహం కలిగి ఉండాలి.					
06	A senior scientist should not accept new ideas from a learner. పై స్థాయిలో గల శాస్త్రవేత్త మామూలు మనిషి ఆలోచనలను పరిశీలించరాదు .					
07	Science teachers should follow the scientific theory as well as Traditional theory also విజ్ఞానశాస్త్రం బోధించే ఉపాధ్యాయులు విజ్ఞానశాస్త్ర సిద్ధాంతాలతో పాటు సాంప్రదాయ సిద్ధాంతాలు కూడా పాటించాలి.					
08	Positive criticism is very useful for the updating of knowledge. సానుకూల విమర్శ జ్ఞాన అభివృద్ధికి తోడ్పడును.					
09	Science makes us dependent on machines. విజ్ఞానం మనలను యంత్రాల మీద ఆధారపడే టట్లు చేస్తుంది.					
10	Sharing knowledge with others is harmful. జ్ఞానం ఇతరులతో పంచుకోవడం ప్రమాదకరం					
11	Any new thing can be criticized in the absence of facts. ఏదైనా కొత్త విషయంలో వాస్తవం లేకుంటే అది దివిమర్శలకు దారితీస్తోంది					
12	Science subject have infinite opportunities విజ్ఞానశాస్త్రం అనంతమైన అవకాశాలను కల్పిస్తుంది.					
13	Science is responsible for low moral standards. సామాజిక విలువలు తగ్గడానికి కారణం విజ్ఞానశా స్త్రం .					
14	Scientific advancements have only adverse effects on mankind విజ్ఞానశాస్త్ర అభివృద్ధి మాత్రమే మానవ జీవితం మీద విశేష ప్రభావం చూ పించును					

SN	STATEMENTS	SD	D	N	A	SA
15	Study of science helps in thinking new ideas విజ్ఞానశాస్త్రం చదవడం అనేది నూతన ఆవిష్కరణలకు దారితీయును					
16	Testing of knowledge should be procedural జ్ఞానంను పరీక్షించడం అనేది నిరంతర ప్రక్రియ.					
17	One should be honest and truthful in collecting and recording data సమాచార సేకరణలో మరియు భద్రపరచడం లో నిజాయితీగా వ్యవహరించాలి.					
18	Data can be manipulated according to the need or requirements. సమాచారంను అవసరానికి అనుగుణంగా మర్చవచ్చు					
19	One should suspend (delay) his/her decision in the absence of sufficient data విజ్ఞాన పరమైన సమాచారం లేనిచో తన నిర్ణయాలను మార్చుకోవాలి.					
20	Knowing is the basis to know to unknown తెలుసుకోవడం అనేది తెలిసిన విషయం నుంచి తెలియని విషయానికి జరగా లి.					
21	Questioning attitude helps in defining a problem. ప్రశ్నించే వైఖరి సమస్య లు పరిష్కరించడం లో సహాయపడును					
22	Any hypothesis should be accepted or rejected on the basis of sufficient evidence. ఏదైనా ఊహ తగిన ఆధారాలు ఉంటేనే అంగీకరించబడును లేదా తిరస్కరించ బడును					
23	A Result based on sufficient proofs should neither accept nor rejected. శాస్త్రీయ రుజువుల ఆధారంగా ఫలితం ఆమోదించబడాలి లేదా తిరస్క రిం చబడాలి.					
24	We should not trust astrologers for weather forecasts వాతావరణ అంచనాలు కొరకు జ్యోతిష్యుని సంప్రదించరాదు.					
25	One should explore the unknown. ప్రతి ఒక్కరూ తెలియని వాటిని అన్వే షించాలి					
26	There is no conclusion as final or ultimate దేనికైనా అంతిమ ముగింపులేదు.					
27	There is a scientific cause for everything that takes place in this World. ఈ ప్రపంచంలో జరిగే ప్రతిదానికి శాస్త్రీయ కారణం ఉంటుంది.					
28	One should search for the reality behind appearances. మన కంటి కి కనిపించే విషయాల వెనుక ఉన్న వాస్తవాల కోసం అన్వేషించాలి.					

29	Searching for new things is the duty of scientists not a job of the common man కొత్తవిషయాల కోసం వెతకడం శాస్త్ర వేత్త పని మా త్రమే సామాన్య మానవుని పనికాదు					
30	Science students should be eager to conduct new experiments సైన్స్ విద్యార్థులు కొత్త ప్రయోగాలు చేసేందుకు ఉత్సాహం చూపాలి					
31	Use of lemon and green chilies protects from the evil eye. నిమ్మకాయలు మరియు పచ్చి మిరపకాయలు ఉపయోగించడం వలన చెడు దృష్టి నుంచి తప్పించు కోవచ్చు .					
32	Ghosts exist. దయ్యా లు ఉన్నా యి.					
33	For the solution to family-related problems one should go to an astrologer. కుటుంబానికి సంబంధించిన సమస్యకు పరిష్కారం కోసం జ్యోతిష్యుని వద్దకు వెళ్లాలి.					
34	Praying/recitation of mantras before an exam helps to score more Marks.. పరీక్షలకు ముందు ప్రార్థన చేయడం మరియు ధ్యానించడం వలన అధిక మార్కులు పొందవచ్చు .					
35	A black cat, when it crosses one's path, brings bad luck మనము వెళ్ళేదారిలో నల్లపిల్లి ఎదురు వచ్చి నట్లయితే చెడు సంభవించును.					
36	Persons who are died in an accident or suicide, turn out as a Ghost. ప్రమాదంలో లేదా ఆత్మహత్య చేసి చనిపోయిన వ్యక్తులు దయ్యాలు గా మారుతారు					
37	Lack of health is the curse of God or ghosts. అనారోగ్యం గా ఉండడం అనేది దేవుడు లేదా దయ్యం యొక్క శాపము					
39	Some health problems are treated by reciting mantras. కొన్ని ఆరోగ్య సమస్య లు మంత్రాలనూ జపించడం ద్వారా తగ్గును					
40	God will do miracles for some people only. దేవుడు కొంతమంది జీవితం లో మా త్రమే అద్భుతాలు చేస్తాడు					
41	We should not believe that smallpox and cholera diseases are due to Divine anger. కలరా , మసూచి, లాంటి వ్యాధులు దైవ ఆగ్రహం వలన వస్తాయని నమ్మకూడదు .					
42	If anyone sneezes before start some important work, we should stop that work for some time మనము ఏదైనా ముఖ్యమైన పని మొదలు పెట్టినప్పుడు ఎవరైనా తుమ్మి నట్లయితే ఆ పనిని కొంతసేపు ఆపాలి					

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DEVELOPMENT AND STANDARDIZATION OF SOCIAL INTELLIGENCE SCALE FOR SECONDARY SCHOOL TRBAL STUDENTS

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- **ABSTRACT**

Present paper discusses about development and standardization of social intelligence scale for students of secondary level. Before going to prepare the social intelligence scale researcher deeply read the related literature of social intelligence. Based on review of related literature researcher framed the four dimensions for social intelligence scale such as Social leadership, Social skills, Social competency and Social adjustment. Based on these dimensions researcher wrote the items for pilot study, before the pilot study researcher got checked the items with help of subject experts from various state and central universities. After pilot study researcher did item analysis (difficulty level and discrimination index) and seen reliability with the help of Cronbach alpha (Reliability of overall items is, 0.803676843. And Reliability of each item is above 0.40) test values are satisfactory. Again researcher sent to various experts for content validity. Finally researcher constructed and standardized the tool to measure the social intelligence of secondary school tribal students Adilabad District.

- **KEY WORDS**

Construction, Standardization, Social intelligence, Reliability, Validity and Secondary school students

- **INTRODUCTION**

Social intelligence is characterized as the capability to shape relations with other people, just as Intrapersonal knowledge. It is like potential to comprehend other individual's sentiments, Demeanors, powerful friendly conduct, capacity to relate, understanding for nonverbal Signals during association.

Research evidences show that the term social intelligence first used by famous psychologist and social scientist, Dewey in 1909**.** And Lull in 1911 also used term social intelligence. After that Moss and Hunt (1927) defined that it is a “ability to get along with others” (R1) There are so many social intelligence related scales in the market at school level as well as higher education level with various dimensions but here researcher has constructed a tool for secondary school students from rural and urban areas to measure the social intelligence of secondary school students with four dimensions such as Social leadership, Social skills, Social competency and Social adjustment.

- OBJECTIVES

To analyze the components of existing Social intelligence scales

To develop the Social intelligence Scale for the students of secondary school

To standardize the Social intelligence Scale for the students of secondary school

- VARIOUS DEFFINATIONS FOR SOCIAL ITELLIGENCE
  - **definitions for social intelligence based on Behavioral components**

AUTHOR	DEFINITION
Thorndike	Ability to act wisely in human relations
Vernon	Ability to mingle with others and ease in society
Moss&hunt	Ability get along with others
Orlik	Capacity of dealing with other people and application of means to manipulate the responses of others
Weinstein	A Capacity of manipulate responses of others
Mayer & solevey	Capacity of adapt various social conditions or situations
Archer	Construct Accurate interpretations Based on nonverbal behavior.
Silvera et all	Ability to respond to different social situations

Social intelligence definitions based on cognitive components

AUTHOR	DEFINITION
Thorndike	Understanding ability of men and women, boy and girl
Wedeck	Judge the feelings and moods of persons correctly
Guilford	Awareness of action , attention of other persons
Henricks et all,	Ability of making recognizable categories of behavioral acts and future imaginations of outcomes
O sullivan and Guilford	Ability to interpretation of social cues and prediction of future
Guilford	Information of nonverbal involved in human interactions
Vernon	Knowledge regarding social situations an insight in to moods
Robert	Degree of eased effectiveness displayed by a person with social relationships
Gardener	Knowledge of understanding himself and others
Sternberg and Barne	The ability of decoding cues
Wong, Maxwell,and meara	Ability of comprehend, observes behavior in the social relation context
Karren williamsen	Ability to imagine hypothetically about future responses and creative inductive ability and virtue itself
Wong et all	Awareness regarding rules of etiquettes

MAJOR COMPONENTS OF SCIAL INTELLIGENCE

Social intelligence is the process of adjustment and understanding others in various situations. Social intelligence is an ability of understand and manage inter personal relations. It is clearly differs from intelligent quationant. Social intelligence consist individual's ability to understand and acting according to that particular situation with respect to their feelings, thoughts, and behaviors. It can take

place in eye to eye conversations and it reflects at deliberative thinking.

MAJOR COMPONENTS OF SOCIAL INTELLIGENCE			
SOCIAL LEADERSHIP	SOCIAL SKILLS	SOCIAL COMPETENCY	SOCIAL ADJUSTMENT

Social intelligence helps us for day to day workouts, it helps to build good relationships and it is very important aspect of human beings life. People those who are having high social intelligence they understand easily others feelings and intensions and they will act according to the situation. As we are social beings by understanding each other with help of social intelligence we can find ways to work collaboratively and we will get benefit each other in society. History says that strong and eminent political leaders poses high social intelligence, due high social intelligence they easily inspires the people and got higher positions in politics.

- Well known social scientist **Albercht,** divided 5 parts as social intelligence for better Understanding to it. Such as SPACE as

S P A C E				
Situational awareness	Presence	Authenticity	Clarity	Empathy

S= Situational awareness

This is the ability of identify particular situations and interpret the behaviors of public in those particular situations

P= presence

This the whole range of verbal and nonverbal and verbal behaviors that define you in the minds of other people

A= Authenticity

With this dimension people will judge, honestly, openly and accurately

C= Clarity

This the ability of explain your ideas and opinion very particularly and clearly

E = Empathy

This the ability of connect with others and make good atmosphere for relations (R3)

Albrecht says that the high level of social intelligence can be creates platform for either “toxic” or “nourishing”. He explained that toxic behaviors makes other people, to feel devalued, inadequate,

angry, frustrated or guilty etc. Apart from all above things he added that people those who are having high social intelligence, attracts towards them and those who are having low social intelligence repel others. (R3)

- Acording to social scientist Silvera et al. (2001) social intelligence has 3 components such as

Social skills, social information processing and social awareness(R5)

A) **Social skills:** Social skills are ability to to deal with social conditions effectively. The people those who are good in social skills, they know when and where to show their emotions and feelings(Nwkah and Ahizu, 2009)
B) **Social information processing:** this component shows individuals capacity of managing conflict emotional conditions such as anxiety and capable to manage social situations responsible for it.
C) **Social awareness**: it shows the ability of individual to be aware about others feelings, emotions and needs. (R5)

According to the Daniel Goleman social intelligence is the capacity of make friendly relationships, Good communication skills and empathy with others personalities. Daniel Goleman expressed that, people those who are having high social intelligence, they will manage their emotions as well as they easily understand the emotions of others. Since social intelligence nothing but ability of manage emotions and feelings.

- Acording to the Goleman, social intelligence can divide in to 2 dimensions (R5)

Social awareness: with the help of this component or dimension we can understand another person's internal feelings. It explains how indigividual is thinking about another individual.it has following sub factors

- **Primary empathy**

Observation of nonverbal emotional signals

- **Empathic accuracy**

Receiving and comprehension of other individuals' feelings

- **Attunement**

Listen very carefully feelings of other individual

- **Social cognation**

Knowing about social world and how it works and its knowledge

Social facility: social facility deals with how can individual deal with others in smooth way in their effective interactions. It is about how individual will, then, do with that awareness and things. It has below factors such as

- **Influence**

Creating effects on the social exchange results

- **Concern**

Put attention on requirements of other person and act based on need

- **Synchrony**

Effortless interaction with others for nonverbal cues.

- **Self-presentations**

Self-presentation with efficiency

- **social intelligence hierarchical model of Greenspan (1979)**

This social intelligence model consists 3 dimensions

- ❖ Social insight
- ❖ Social sensitivity
- ❖ Social communication

- **Social intelligence model of Williamson(19195)**

This model includes six abilities

- ❖ Ability of reason tentatively
- ❖ Abstract ability
- ❖ Ability of imagination
- ❖ Creative and imaginative ability
- ❖ Ability of intellectual virtue recharge
- ❖ Ability of inductiveness

- **CONSTRUCTION OF SOCIAL INTELLIGENCE SCALE**

- For construction standardization of scale researcher followed three steps

Such as

1. Analysis of literature to find components of social intelligence

As researcher reviewed the contemporary literature of **social intelligence** and gone deeply in concerned area of research. Based on this work researcher decided to take four components for construction of **social intelligence** scale such as

- Social leadership
- Social skills
- Social competency
- Social adjustment

2. Development of scientific attitude scale and

- **Writing the statements or items**

In development of scale it is very significant step. Based on the operational deflations of the major components researcher wrote the statements for scale. As this scale is for the secondary school students, there day to day life situations considered while writing statements.

- **Checking the statements**

It is the foremost important task to check the statements again and again by researcher after that researcher sent to experts in concerned area to evaluate its appropriateness and usefulness. Therefore 10 expert members selected from various areas. These expert members from various fields such as sociology social sciences, psychology, philosophy and education and etc.

Fifty eight (positive and negative) statements along with major and minor components were sent to expert members. In front of each statement 2 options were given such as 1. Suitable to measure **social intelligence**. 2. Not suitable to measure **social intelligence.**

Among those 58 statements 52 statements retained. These statements were selected more than 60 percent experts, remaining 6 statements were removed as per recommendations of the experts

after that researcher checked the grammatical mistakes as well as topological mistakes in the statements.

- **Instructions for respondents**

The following statements are concerned with **Instructions for respondents**

Before actual implementation of the scale, it was important to give some basic instructions to respondents about scale and how to solve it. Some instructions given in front page of scale such as

The following statements are concerned with **social intelligence**. Read each item carefully and then mark your response on a sheet such as,

1= Strongly Disagree1 (SD),
2=Disagree (D2),
3= Neutral (N)3,
4= Agree (A)4,
5=Strongly Agree (SA)5

Marking scheme for positive statements

Response	SA	A	N	D	SD
Marks	5	4	3	2	1

Marking scheme for negative statements

Response	SD	D	N	A	SA
Marks	5	4	3	2	1

3. Standardization of social intelligence scale

A) Pilot study

For pilot study researcher selected tribal welfare ashram schools of Adilabad district of Telangana state. For pilot study sample size is 60. Researcher collected data from 6 secondary (8, 9 and 10 th classes) tribal welfare ashram schools among them 3 schools are girl's schools.

Schools, which are collected data for pilot study

S/N	Name of the school	Number of students (respondents)
01	A.H.S(S) UTNOOR	10
02	A.H.S (B) UTNOOR	10
03	A.H.S (G) UTNOOR	10
04	A.H.S ADILABAD	10
05	A.H.S (G) MEDIGUDA	10
06	A.H.S (G) INDERVELLY	10
	TOTAL	60

While collecting the data, researcher gave proper instructions to respondents and researcher supervised the every respondents. After collecting the data from respondents researcher divided AS 2 parts of the sample such as top 27% scorers among 60 sample and low 27% scorers among 60 sample.(

i.e. the top and bottom twenty seven percent of the sixty respondents). After that researcher tabulated the scores of both groups in excel sheet.

- **Item analysis**

Item analysis comprises of item selection, item difficulty and item discrimination.

- **Difficulty level**

Difficulty level of item is defined as proportion of the respondents that marked the item or statement correctly. This is the percentage of the respondents that rightly marked the statement or item. For calculating difficulty index researcher followed the below given formula (Garrett H.E, 2008, pp.362)

$$DL = \frac{Ru + Rl}{Nu + Nl}$$

Here

Ru- Upper group students who are correctly responded
Rl- lower group students who are correctly responded
Nu- Upper group total students
Nl- Lower group total students

With the help of above formula researcher calculated the difficulty level of each item or statements. Value below 0.25 indicates the difficult item and value above the 0.90 indicates that very easy item

- **Discrimination index**

For calculating discrimination index researcher adopted given formula

$$DI = \frac{Ru - Rl}{Nu}$$

Here

Ru- Upper group students those who are responded correctly
Rl- Lower group students those who are responded correctly,
Nu- Total number of students in upper group

This value can range from -1.00 to +1.00. , all the items are having positive discrimination with values above 0.20. It means discrimination is satisfactory (Agarwal 1986).

Difficulty level and discrimination index values

➢ **Social Intelligence** ➢ **(Difficulty level & Discrimination Index)**					
S.NO	**DL**	**DI**	**S.NO**	**DL**	**DI**
1	0.294117647	0.352941176	30	0.264705882	0.411764706
2	0.294117647	0.235294118	31	0.588235294	0.352941176
3	0.147058824	0.058823529	32	0.294117647	0.235294118

4	0.294117647	0.352941176	33	0.323529412	0.294117647
5	0.264705882	0.294117647	34	0.264705882	0.529411765
6	0.294117647	0.470588235	35	0.264705882	0.294117647
7	0.264705882	0.411764706	36	0.382352941	0.411764706
8	0.264705882	0.294117647	37	0.264705882	-0.058823529
9	0.264705882	0.411764706	38	0.411764706	0.117647059
10	0.323529412	0.294117647	39	0.382352941	0.294117647
11	0.264705882	0.294117647	40	0.352941176	0.352941176
12	0.294117647	0.352941176	41	0.382352941	0.411764706
13	0.088235294	0.058823529	42	0.294117647	0.352941176
14	0.264705882	0.294117647	43	0.294117647	0.235294118
15	0.352941176	0.235294118	44	0.147058824	-0.058823529
16	0.176470588	0	45	0.264705882	0.294117647
17	0.235294118	0.352941176	46	0.264705882	0.529411765
18	0.411764706	0.352941176	47	0.382352941	0.529411765
19	0.235294118	0.352941176	48	0.264705882	0.294117647
20	0.176470588	0	49	0.147058824	0.294117647
21	0.176470588	0.117647059	50	0.264705882	0.294117647
22	0.088235294	0.176470588	51	0.382352941	0.647058824
23	0.264705882	0.294117647	52	0.264705882	0.294117647
24	0.323529412	0.294117647	53	0.323529412	0.529411765
25	0.264705882	0.294117647	54	0.323529412	0.529411765
26	0.382352941	0.411764706	55	0.294117647	0.235294118
27	0.176470588	0.117647059	56	0.382352941	0.294117647
28	0.470588235	0.235294118			
29	0.264705882	0.411764706			

DL= Difficulty level, (According to GARREWT H.E-2008, pp362)

DI= Discrimination Index (According to Agaewal 1986)

FORMULA

DL=	DI=
$\frac{Ru+Rl}{Nu+Nl}$	$\frac{Ru-Rl}{Nu}$

Range

DI	0.40 & Above	Very Good	D L	0.25 to 0.90
	0.30 to 0.39	Good		
	0.20 to 0.29	Fair		
	0.09 to 0.19	Poor		

- Reliability test of scale

For reliability test researcher adopted Cronbach alpha test as well as split half method also.

Cronbach alpha value of total items	0.803676843
Cronbach alpha value of each item	Above 0.40

Validity of the scale

For the content validity of the tool researcher sent to 25 experts throughout the India to central university, state university professors and Associate professors in concern area after suggestion and recommendation of experts from various universities among 52 statements 41 statements or items are retained for main study

CONCLUSION

In present study researcher developed the **social intelligence** scale by using likert method for secondary school students such as girls and boys from rural and urban areas. The reliability of present scale is 0.800 and it is has the sufficient validity also. For item analysis researcher checked the difficulty level of each item and discrimination index of each item. So this **social intelligence** scale can be used to know the **social intelligence** of secondary school students from rural and urban at secondary level.

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Constriction and standardization of scientific attitude scale for secondary school tribal students.

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ABSTRACT

Present paper discusses about development and standardization of scientific attitude scale for students of secondary school tribal students of Adilabad district. Before preparing the scale researcher deeply read the review of related literature of scientific attitude. Based on review of related literature researcher framed the five dimension for scientific attitude scale such as Rationality, Curiosity, Open-mindedness, Objectivity and Aversion to superstition. Based on these dimensions researcher wrote the items for pilot study, before pilot study researcher got checked the items with help of subject experts from various state and central universities. After pilot study researcher did item analysis (difficulty level and discrimination index) and seen reliability with help of cronbach alpha (Reliability of overall items are 0.803676843. And Reliability of each item is above 0.40) test values are satisfactory. Again researcher sent to various experts for content validity. Finally researcher constructed and standardized the tool to measure the scientific attitude of secondary school tribal students Adilabad District.

Key Words: Construction, standardization, scientific attitude, validity and reliability

Introduction

Scientific attitude is the very significant end result of science teaching at school level. ‘‘National Education policy (1986) states that science education will be strengthened so as to develop in the child well defined abilities and values such as the spirit of inquiry, creativity, objectivity, the courage to question and an aesthetic sensibility’’

Above words are coated by our great leader, first prime minister India Jawaharlal Nehru. It clearly says that we cannot survive without science. In human life at every stage science plays a very vital role. Science is the systematic arranged knowledge, it I the knowledge gained by observation and testing of facts

Science allows students to use their imaginations constructively and think creatively. The learner cultivates the habit of seeking the truth. The importance of science is that whatever a student learns may be applied immediately to the world around him. This is an excellent teaching resource. School science education should give opportunity for students to acquire scientific innovation, scientific attitudes, and scientific interest. In today's scientific environment, the production of scientific creativity, scientific attitude, and scientific curiosity develops at a faster rate, which is linked to science learning and, as a result, helps secondary school students obtain higher academic results.

One of the fore most important aim of science teaching is develop scientific attitude among students. Scientific attitude is the complex aspect of various components such as rationality, open-mindedness, curiosity, objectivity, aversion to superstition. The persons those who are

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having high scientific attitude is found to be very curious to know and learn about new things continuously and, he always ready to go with scientific reasons. He puts efforts continuously until and unless he get satisfaction with concerned phenomenon, he believes that there is a cause and effect relation in universe. A man of scientific attitude never belies in superstitions and he always trust collected data and evidence based reports rather than traditional beliefs. A man who is having scientific attitude, he always rejects biased and prejudiced statements which are not having evidence based support.

Objectives of the present study

- To analyze the components of the existing scientific attitude scales
- To develop the Scientific Attitude Scale for the secondary school level Students of Adilabad district
- To standardize the Scientific Attitude Scale for the secondary school tribal Students Adilabad district

Definitions for scientific attitude by various writers

Author	Definition
Moore&sutman	It is a position or opinion, has taken with respect to a psychological aspect in the field of science
Gardener	It is evidence related reasoning and argumentation, search for clarity and internal consistency, open mindedness and skeptism and willingness to change when data contradict their own views
University of Albetra	It is a disposition to all in a certain way or demonstration of thoughts feelings
Victor	Scientific attitude includes the habits like intellectual honesty, accuracy in all operations , open-mindedness, suspended judgment looking for true cause and effect relationship and criticalness and self-criticism
Diedrich	Scientific attitude includes desire of experimental verification as a common labeled skepticism as willingness to accept the statements which are not supported by evidence
Kohli	The person possessing scientific attitude looks for natural causes for the thing that happens, curious concerning the things be observes, open-minded towards work and other's opinion, evaluates techniques and procedures and make the opinions and conclusions based on adequate evidences.

Major components of the scientific attitude

- **Rationality:**

Rationality means 'the quality or condition of being rational'. It is normally explained as showing reasons for actions. Human being is rational animal. Rationality is the showing reason or logic for solution of problem. Usually rationality is the objective, it will exits when valid and practical syllogism is used. There is no more gradation because there is no gradation between invalid and valid arguments. And one more thing is that it applies only for actions. Rational human beings, shall have qualities such as aptness to check traditional

beliefs for reason, commitment towards the value of rationality, tendency to check cause and effect relationships and accept challenging and critical issues.

- Rationality is the state or quality of being reasonable, established on truths not on feelings and emotions
- Rationality is the quality or condition of being rational
- Rationality will accept things which are valid
- Rationality will not accept, if there is absence concrete reason
- Rationality will accept things after careful consideration
- Rationality is the condition which being logical

Curiosity

Curiosity includes thrust for the contemporary and new knowledge and ideas, desire for the additional information It is the innate or internal capability of so many living organisms, but it cannot be subsumed under category of instinct, so because it is lacking in quality of fixed pattern of action. It will be explained by various comfortable ways .But instinct always expressed in fixed way only and it will confers to survival advantage.

- Curiosity is the quality of being curies
- Curiosity is the phenomenon which wants to learn more about something Curiosity is the thrust for complete knowledge
- This is the phenomenon of why, how, regarding particular situation
- It is the concept of understanding very clearly to the new phenomenon
- Curiosity is the thrust towards new phenomenon with respect to that is the reason, how it will and why it will.

Open-Mindedness

Open mindedness is nothing but acceptance to data of subject and opinion foe criticism and evaluation to other persons that means ready for accept and acknowledge the new evidence. According to Philosopher Jonathan Adler, science values another aspect of open-mindedness even more highly: "what truly marks an open-minded person is the ready to acknowledge where evidence leads. The open-minded person is always defer to partial investigation and referee for impartial investigation. It is not same as being neutral.

- Open mindedness s the continues process of investigation of the proof before mind entertain
- Open mindedness is the open platform for hear others ideas
- Open-mindedness never reject ideas which are conflict with own ideas
- It is the process of free from prejudice and accepts of others which will help for solve the problem
- It is the process of accept possible options while investigating a problem
- It is the phenomenon of consider and evaluate the ideas presented by others
- Open-mindedness is the thrust for new ideas and things

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Objectivity (intellectual honesty)

Objectivity include preference for evidence based statement over to unsupported one, it means support for scientific generalization which is gone through critical review. Objectivity is nothing but intellectual honesty which means natural phenomena's speak without additional force and wishes on particular phenomenon. Objectivity is nothing but judgment based on without interference of emotions and bias

- It is a quality of particular person who is going to records data, observation, interpret it and verify its consistency
- Objectivity considers the all available evidences
- Objectivity of particular statement evaluates by others person
- It is nothing but impartiality in thinking or doing work

Aversion to superstition

Aversion to superstition is nothing but demission of superstitious beliefs and search for scientific evidence based explanations. Magical beliefs and superstitions have been found in traditional communities since thousands of years, these beliefs still dominating in modern society. Superstitions derived from Latin words "super'(beyond, over) and "sto, state"(to stand). Superstitions are generally based on cultural variable beliefs in a supernatural reality. Superstitions may relate to things not fully understand and knows by society or people.

- These beliefs works on traditional stories or beliefs
- There is no more evidences for superstition
- Scientist don't believe the superstition
- Superstition creates the fear
- Superstition are followed by un scientific people
- Superstition highly projectable

Constraction and standerdisation

- For construction standardization of scale researcher followed three steps

Such as

1. **Analysis of literature to find components of scientific attitude**

As researcher reviewed the contemporary literature of scientific attitude and gone deeply in concerned area of research. Based on this work researcher decided to take five components for construction of scientific attitude scale such as

- **Rationality**
- **Curiosity**
- **Openmindedness**
- **Objectivity**
- **Aversion to superstition**

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2. Development of scientific attitude scale and

A) Writing of statements or items

In development of scale it is very significant step. Based on the operational deflations of the major components researcher wrote the statements for scale. As this scale is for the secondary school students, there day to day life situations considered while writing statements.

B) Checking the statements

It is the foremost important task to check the statements again and again by researcher after that researcher sent to experts in concerned area to evaluate its appropriateness and usefulness. Therefore 10 expert members selected from various areas. These expert members from various fields such chemistry life sciences, physics, mathematics, psychology, philosophy and education and etc .62 (positive and negative) statements along with major and minor components were sent to expert members. In front of each statement 2 options were given such as 1. Suitable to measure scientific attitude. 2. Not suitable to measure scientific attitude. Among those 62 statements 50 statements retained. These statements were selected more than 60 percent experts, remaining 12 statements were removed as per recommendations of the experts after that researcher checked the grammatical mistakes as well as topological mistakes in the statements.

c) Instructions for respondents

Before actual implementation of the scale, it was important to give some basic instructions to respondents about scale and how to solve it. Some instructions given in front page of scale such as The following statements are concerned with scientific attitude. Read following items carefully and then mark your response on a sheet such as,

1= Strongly Disagree (SD),

2=Disagree (D),

3= Neutral (N),

4= Agree (A),

5=Strongly Agree (SA)

Marking scheme for positive statements

Response	SA	A	N	D	SD
Marks	5	4	3	2	1

Marking scheme for negative statements

Response	SD	D	N	A	SA
Marks	5	4	3	2	1

3. Standardization of scientific attitude scale

A) Pilot study

For pilot study researcher selected tribal welfare ashram schools of Adilabad district of Telangana state. For pilot study sample size is 60. Researcher collected data from 6 secondary (8, 9 and 10 th classes) tribal welfare ashram schools among them 3 schools are girl's schools.

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Schools, which are collected data for pilot study

S/N	Name of the school	Number of students (respondents)
01	A.H.S(S) UTNOOR	10
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03	A.H.S (G) UTNOOR	10
04	A.H.S ADILABAD	10
05	A.H.S (G) MEDIGUDA	10
06	A.H.S (G) INDERVELLY	10
	TOTAL	60

While collecting the data, researcher gave proper instructions to respondents and researcher supervised the every respondents. After collecting the data from respondents researcher divided as 2 parts to the sample such as top 27% scorers among 60 sample and low 27% scorers among 60 sample.(i.e. the top and bottom twenty seven percent of the sixty respondents). After that researcher tabulated the scores of both groups in excel sheet.

Item analysis

Item analysis comprises of item selection, item difficulty and item discrimination.

Difficulty level

Difficulty level of item is defined as proportion of the respondents that marked the item or statement correctly. This is the percentage of the respondents that rightly marked the statement or item. For calculating difficulty index researcher followed the below given formula (Garrett H.E, 2008, pp.362)

$$DL = \frac{Ru + Rl}{Nu + Nl}$$

Here

Ru- Upper group students number, who are responded correctly for each item.

Rl- lower group students number, who are responded correctly for each item.

Nu- Total number of upper group students,

Nl- Total number of lower group students,

With the help of above formula researcher calculated the difficulty level of each item or statements. Value below 0.25 indicates the difficult item and value above the 0.90 indicates that very easy item

Discrimination index

For calculating discrimination index researcher adopted given formula

$$DI = \frac{Ru - Rl}{Nu}$$

Here

Ru- Upper group students number, who are responded correctly for each item.

Rl- lower group students number, who are responded correctly for each item.

Nu- Total number of upper group students

This value can range from -1.00 to +1.00. , all the items are having positive discrimination with values above 0.20. It means discrimination is satisfactory (Agarwal 1986).

- Values of difficulty level and discrimination index

Scientific attitude (Difficulty level & Discrimination Index)					
S.N	**DL**	**DI**	**S.N**	**DL**	**DI**
1	0.264705882	0.294117647	30	0.264705882	0.411764706
2	0.294117647	0.352941176	31	0.029411765	0.058823529
3	0.264705882	0.020761246	32	0.176470588	0
4	0.147058824	-0.058823529	33	0.470588235	0.352941176
5	0.529411765	0.588235294	34	0.264705882	0.020761246
6	0.352941176	0.034602076	35	0.352941176	0.352941176
7	0.294117647	0.235294118	36	0.235294118	0.117647059
8	0.411764706	0.352941176	37	0.470588235	0.006920415
9	0.264705882	0.176470588	38	0.441176471	0.294117647
10	0.352941176	0.352941176	39	0.235294118	-0.235294118
11	0.294117647	0.352941176	40	0.411764706	0.470588235
12	0.323529412	0.411764706	41	0.352941176	0.588235294
13	0.264705882	0.294117647	42	0.382352941	0.529411765
14	0.5	0.411764706	43	0.294117647	0.352941176
15	0.352941176	0.470588235	44	0.323529412	0.294117647
16	0.147058824	-0.058823529	45	0.382352941	0.411764706
17	0.382352941	0.294117647	46	0.294117647	0.352941176
18	0.411764706	0.352941176	47	0.411764706	0.470588235
19	0.411764706	0.117647059	48	0.147058824	0.176470588
20	0.352941176	0.235294118	49	0.294117647	0.470588235
21	0.323529412	0.411764706	50	0.323529412	0.294117647
22	0.382352941	0.294117647	51	0.294117647	0.235294118
23	0.294117647	0.235294118	52	0.264705882	0.294117647
24	0.470588235	0.352941176			
25	0.264705882	0.411764706			
26	0.352941176	0.352941176			
27	0.264705882	0.529411765			
28	0.264705882	0.411764706			
29	0	0			
DL= Difficulty level, (According to GARREWT H.E-2008,(pp362)					

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DI= Discrimination Index (According to Agaewal 1986)				
FORMULA				
DL= Ru+Rl Nu+Nl			DI= Ru-Rl Nu	
Range				
DI	0.40 & Above	Very Good	D L	0.25 to 0.90
	0.30 to 0.39	Good		
	0.20 to 0.29	Fair		
	0.09 to 0.19	Poor		

Reliability test

For reliability test researcher adopted Cronbach alpha test as well as split half method

Cronbach alpha value of total items	0.803676843
Cronbach alpha value of each item	Above 0.40

Validity of the scale

For the content validity of the tool researcher sent to 25 experts throughout India to central university, state university professors and Associate professors in concern area after suggestion and recommendation of experts from various universities among 58 statements 42 statements or items are retained for main study

Conclusion

In present study researcher developed the scientific attitude scale by using likert method for secondary school students such as girls and boys from rural and urban areas. The reliability of present scale is 0.800 and it is has the sufficient validity also. For item analysis researcher checked the difficulty level of each item and discrimination index of each item. So this scientific attitude scale can be used to the know the scientific attitude of secondary school students from rural and urban.

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(SOCIAL INTELLIGENCE & SCIENTIFIC ATTITUDE)

S. No	Name of the secondary school	No. of respondents
01	A.H.S(S) UTNOOR	10
02	A.H.S (B) UTNOOR	10
03	A.H.S (G) UTNOOR	10
04	A.H.S ADILABAD	10
05	A.H.S (G) MEDIGUDA	10
06	A.H.S (G) INDERVELLY	10
	TOTAL	**60**

DISTRIBUTION OF THE SAMPLE.
(SOCIAL INTELLIGENCE & SCIENTIFIC ATTITUDE)

S. No	NAME OF THE SCHOOL	RESPONDENTS
01	GOVT.A.H.S (SC COLONY) UTNOOR	30
02	GOVT.A.H.S (OLD BUSTAND) UTNOOR	30
03	GOVT.A.H.S (S) UTNOOR	30
04	GOVT. A.H.S NARNOOR	30
05	GOVT. A.H.S INDERVELLY	30
06	GOVT. A.H.S (K) ADILABAD	30
07	GOVT. A.H.S ADILABAD	30
08	GOVT. A.H.S WANWAT	30
09	GOVT. A.H.S CHINCHUGHAT	30
10	GOVT. A.H.S MAMIDIGUDA	30
11	GOVT.A.H.S NERADIGINDA	30
12	GOVT. A.H.S RAIGUDA	30
13	GOVT.A.H.S PITTABHONGARAM	30
14	GOVT.A.H.S JAMDA	30
	TOTAL	420

Prof. G. Bhuvaneswara Lakshmi,
&M.Sc., M.Ed.,Ph.D.
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Cell: 9866010233

Department of Education
and Education Technology,
School Of Social Sciences,
University Of Hyderabad
Telangana, 500046

Date: 28/03/2022

To,
The Deputy Director,
Tribal Welfare,
I.T.D.A. Utnoor, Adilabad.

Sub: Permission for data collection— regarding

Respected Sir/Madam,

Mr. G. Srinivas is a Doctoral Research Scholar of the Department of Education and Education Technology, School of Social Sciences, University of Hyderabad and doing research under my supervision. He is working on the topic ''**A study of relationship among social intelligence, scientific attitude and achievement in mathematics of secondary school tribal students of Adilabad District of Telangana state**''.

He may be kindly permitted to collect relevant data/information from your schools under your jurisdiction. The data/information will be used for research purposes only and kept confidential.

Thanking you.

Yours friendly

G Bhuvaneswara Laksh

28/03/22

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