

## **Scientific Attitude, A Situational Appraisal among Secondary School Tribal Students of Kerala**

Sandhya Kumar<sup>1</sup>, Dr. H. Indu<sup>2</sup>

### **Abstract**

India, as a land of diversity has the concentration of tribal people mostly in all states except Punjab, Haryana and union territory like Chandigarh, Delhi and Puducherry. From the National Census Reports, it can be seen that there are mainly 36 main tribal communities in the state of Kerala and the population of them numbering to 484,839. The tribal communities all have a unique culture, tradition and practices of their own. The beliefs of each tribal community are different. The livelihood patterns are different, the economical standards are different, the occupation and the social stratification are different. All the communities have their own set of ethics and practices different from others. In Kerala the main communities include Paniya, Kurichchya, Kuruma, Kattunayakans, Uralies etc of Wayanad, Irulas of Attapadi, Muthuvans, Malayarayan and Uralies of Idukki and Kottayam and Kanikkar of Thiruvananthapuram. Though these are the major communities in Kerala, there are sub communities among them. Apart from these major communities Kerala also have 5 particularly vulnerable tribal group communities (PVTG) and they are considered to be primitive considering their stage of transition into modern society. Earlier they were referred to as primitive tribes but later Dhebar commission renamed them as Particularly Vulnerable Tribal Groups (PVTG). They are termed as Kattunaikans of Wayanad, Koragas of Kasargod, Cholanaikans of Nilambur Valley and Malappuram district, Kurumbar of Attapadi and Palakkad districts and Kadars of Cochin based on their tribal descends. The present research study is conducted in the PVTG tribal children studying in residential tribal Asram school which is fully functional under the supervision of Kerala State Government. From the study it was concluded that there are different levels of Scientific Attitude among secondary school tribal students. There is no significant difference in Scientific Attitude among secondary school tribal students for the subsample based on gender of the students.

**Keywords:** Scientific attitude, Secondary school tribal students

### **Introduction**

It must be realised that the most significant outcome of scientific teaching and education is a scientific attitude.

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<sup>1</sup>Research Scholar in Education, Avinashilingam Institute of Home Science and Higher Education for Women University, Coimbatore

<sup>2</sup>Asso. Professor, Department of Education, Avinashilingam Institute of Home Science and Higher Education for Women University, Coimbatore

Therefore, it must be taken in to account that the students must develop their scientific attitudes in their early stages of development itself and that matter must not be considered a thing of lesser significance. A science teacher has the task and obligation of instilling ideals in her students and ethics of science education thus helping them develop a positive attitude towards science and scientific progress. Special efforts must be taken to enhance the same. Open-mindedness, suspicion, judge premised on factual information, willingness to verify and validate findings, faith throughout relationships between variables, eagerness to reevaluate his decision, liberty from superstitious beliefs and delusional information, and sincerity in playback, collecting, and reporting are all characteristics of a man with a good scientific attitude.

### **Some reviews and definitions on scientific attitude**

The advancement of precision in all activities, such as accuracy in calculation, observation, and document; moral integrity; open mindedness; suspended judgement; critical thinking, including self-criticism; and looking for major causes and effects links are all attributes in one's scientific attitude. (Noll, 1935).

A scientific mindset is characterised by a desire or ability to learn about one's surroundings, as well as the conviction that nothing happens without a cause, and that weird and enigmatic events can be understood by natural causes. (Caldwell & Curits, 1943).

Medical attitude can be defined as the possession of the abilities and attitudes required for the use of the scientific process, as well as the information gained via the process, which qualifies a person as a scientist. (Adejuwon, 1981).

Science education may establish in our children certain societal characteristics and values such as honesty, reasoning, objectivity, and making judgments based on factual knowledge. (Abdullahi, 1982).

Scientific attitude is a collection of many different attributes and characteristics that can be seen in an individual's behaviour and actions. People with a clear scientific mindset are open-minded, experiment-oriented, systematic, have a passion for learning, are truly consistent, unbiased, truthful, and have a scientific temper. (Jancirani, Dhevkrishnan, and Devi, 2012).

Raj G.R & Malliga T (2015)<sup>7</sup> In their study of pre-service teachers' scientific attitudes, they discovered that there are substantial disparities inside the level of technical attitude among pre-service teachers depending on gender and subject group, but not strongly impacted by location or age.

Munck, M (2017) Teachers Attitudes and Student Achievement, a research on Science Pedagogy, asserts that teacher-student interactions, teacher practises, and attitudes all influence student success.

Singh, C & Arundhathi B (2017) in a study on scientific attitude and science interest of secondary school students states that scientific activities give the students the ability to think in new dimensions and that there is a need to develop these facilities that promote scientific activities among students. Teachers must be instructing in a manner that can promote scientific attitude and science interest among the students

### Need and Significance

As a science teacher the teacher should find appropriate plug points between the teaching learning processes and provide apt and appropriate experiences to the learners in front of her. The learning that the students get from such experiences can never be supplemented with any other means. The cognition of the learner develops in a broader manner while learning through own experiences and the traditional method of rote learning and memorising will not bring in this broader domain in them. The teacher should be a facilitator and that apt experiences should be provided in appropriate situations during the course of instruction. Also in order to solve the daily life problems of life in an effective manner, a proper development of scientific outlook is an inevitable element in life that helps individual effectively. Hence a problem-solving approach or a cause effect relation approach can be developed which will help the learners in cultivating a positive scientific attitude towards every walk of life. It can be told that the duty and the responsibility of a good science teacher is to instil in positive attitude towards science. The development of such a positive scientific attitude among the children help develop in them the characteristics of open mindedness, curiosity, honesty, tolerance, decision making skills, admit the cause effect relation, eradication of superstitions, controlling of emotions like many other abilities, capacities and skills. Hence the need of the study is to analyse the scientific attitude levels of the secondary school students and find out the difference in attitude levels among the subsample gender.

### Problems faced by tribal students

Amidst all the difficulties faced by the tribal people the honourable government of India as well as the respective State governments have made many provisions for enhancing the status of education among the tribal people. Being the socially disadvantaged and the under privileged people in the society they do face some serious educational disparity on comparison with the majority population. Though there is a lot of disparity, governments are taking many measures to improve the educational status of these people. One of the main initiatives by the Central government is the establishment of Asram schools fully funded and managed by the central and respective state governments. Asram schools have opened an arena for the tribal people to come up in the mainstream education with good excellence in academics, co curricular activities and all other educational and non educational platforms of children. High class facilities are provided in these schools.

In spite of all these facilities still it can be seen that the drop out syndrome and the educational ostracism prevalent among the tribal children especially among the primitive tribes or PVTG group has not yet completely erased out. From the census reports it can be seen the drop out ratio among the scheduled tribes is relatively high.

**Table 1** Community wise dropout rate of school students in Kerala in percentage

YEAR	ALL COMMUNITIES	SC	ST
2007 – 2008	0.83	0.96	4.54
2008 – 2009	0.66	0.72	3.54
2009-2010	0.51	0.58	2.36
2010 -2011	0.53	0.55	2.52
2011 – 2012	1.05	0.61	3.71

Source: DPI Kerala 2014

Thus, it has become the need of the hour to investigate the reasons behind the dropout of the Scheduled tribe students and suggest appropriate measures to minimise this ratio and inculcate interest to acquire education and progress accordingly.

### **Definition of Key Terms**

#### **Scientific Attitude**

Scientific attitudes might be thought of as a collection of ideas “values and norms which is held to be binding on the man of science. The norms are expressed in the forms of prescriptions, proscriptions, preferences and permissions. They are legitimized in terms of institutional values.” (Barnes & Dolby, 1970)

Scientific Attitude is defined in this study as a distinct way of looking at things, a desire to understand why and how things occur with an objective heart and governed by facts.

Some notable features of scientific attitude are:

- Open-mindedness
- Curiosity
- Lack of superstitions
- Judgment based solely on scientific evidence
- Belief in the cause-and-effect relationship
- Willingness to test and verify conclusions
- Critical thinking while engaging in all activities
- Honest reporting

#### **Secondary School Tribal Students**

This refers to the particularly vulnerable tribal students who are studying in 8<sup>th</sup> standard in Asram schools of Kerala. For the present study two Asram schools from Palakkad and Nilambur were selected purposively by the researcher.

#### **Variables**

The study is designed with Scientific Attitude as a criterion variable. The gender of the sample is treated as classificatory variable.

#### **Objectives**

1. To find out the level of Scientific Attitude among secondary school tribal students
2. To find out whether there is any significant difference in the mean score of Scientific Attitude between the subsamples categorized based on gender

#### **Hypotheses**

1. There exist significant different levels of Scientific Attitude among secondary school tribal students
2. There exists significant difference in the mean score of scientific attitudes between subsamples based on gender

### *Methods*

A brief and precise description of the sample selected, tools used, and statistical techniques employed for analyzing the data are as follows:

**Method.** Survey method is used to collect data for study.

**Sample.** The present study was conducted on a sample of 80 students of Government Residential Tribal School in Palakkad and Malappuram districts of Kerala State.

**Tools.** The tool used for the present study is Scientific Attitude scale developed by the researcher.

**Statistical Techniques used.** The following statistical techniques were used for the analysis of the data in the present study

- Preliminary Analysis
- Percentage Analysis
- t-test

### *Preliminary Analysis*

The features of the sample of the population as a whole are described using descriptive statistical metrics. The variables studied in the present investigation are Scientific Attitude. The major statistical constants such as mean, median, mode and standard deviation of the variables were calculated.

Important Statistical constants of the variables Scientific Attitude are given in the Table below given.

Table 2 *Data and Result of Preliminary Analysis of Scientific Attitude among Secondary School Tribal Students*

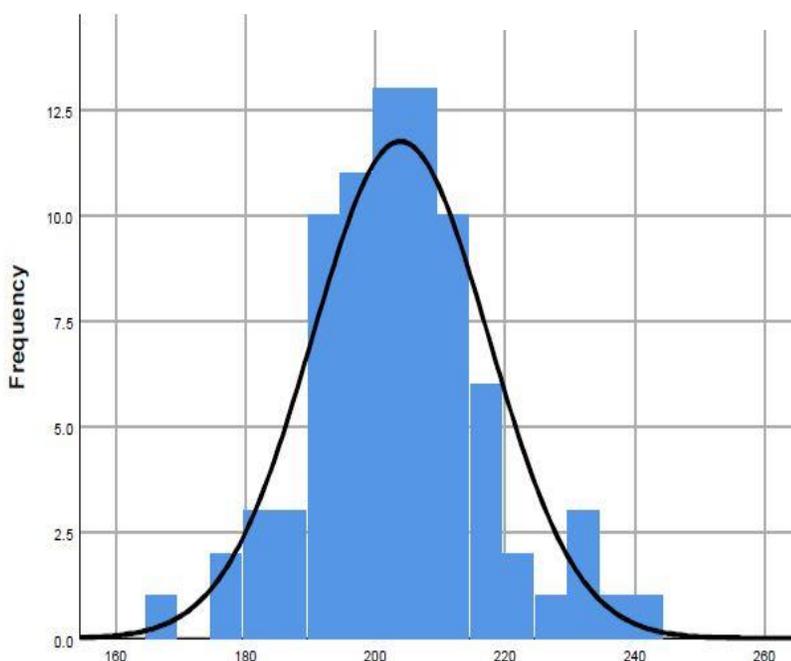
Descriptive Statistics	Scientific Attitude
Mean	203.88
Median	203.0
Mode	199
Std. Deviation	13.572
Skewness	0.241
Kurtosis	0.665

From the Table 2 it is revealed that the three measures of central tendencies, mean, median and mode of the variable Scientific Attitude is 203.88, 203.0 and 199 respectively. The standard

deviation of Scientific Attitude is 13.572. The skewness value of Scientific Attitude is 0.241. The kurtosis value of Scientific Attitude is 0.665.

### Discussion of results

The preliminary analysis shows that there is not so much variation in the three measures of central tendencies such as mean, median and mode of the two variables selected for the study. The values of standard deviation for the variable Scientific Attitude indicate that the scores of these variables were scattered. The index of skewness suggests that the distribution of scores for the variable were positively skewed. The value of kurtosis obtained for Scientific Attitude is 0.665, so the curve is leptokurtic. The graphical representation of distribution of scores of Scientific Attitude among secondary school tribal students is given in the figure 1.



**Figure 1** Graphical representation of distribution of scores of Scientific Attitude of secondary school tribal students

### Major Analysis of Data

Statistical analysis was done and the results are discussed under the following heads

#### Analysis of the level of Scientific Attitude among the secondary school tribal students

Data and results of analysis of the level of Scientific Attitude among the secondary school students are given in the Table 3

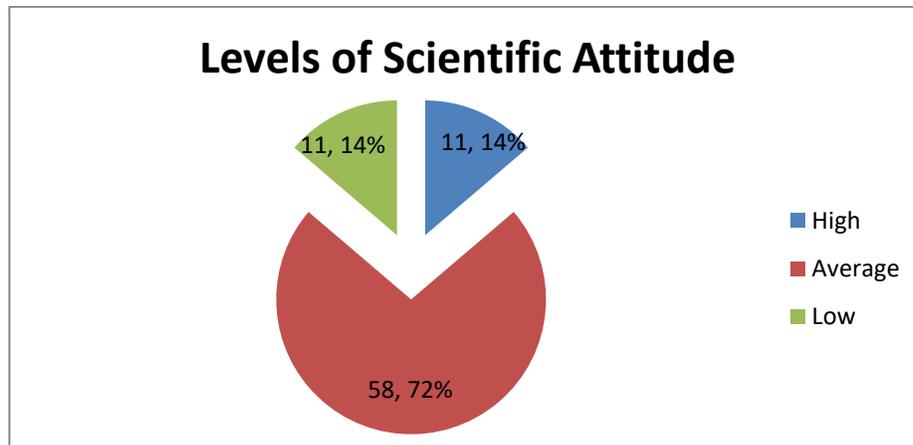
Table 3 Data and Result of Analysis of Level of Scientific Attitude of Secondary School Tribal Students

Group	Scientific Attitude
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	<i>N</i>	%
High	11	14
Average	58	72
Low	11	14

From the Table 3 it is evident that 14% of the secondary school students are having high Scientific Attitude, 72% of students were of average opinion in their Scientific Attitude and 14% of students are low in their Scientific Attitude. The level of Scientific Attitude among the secondary school tribal students is graphically represented in the figure 2



**Figure 2 Graphical representation of levels of Scientific Attitude for secondary school tribal students**

From the figure 2 also it is evident that there exist different levels of Scientific Attitude among secondary school tribal students.

**Discussion of results**

From the result it is found that there exist high, average, and low levels of Scientific Attitude among secondary school tribal students it is also found that 58 students were included in average group. Therefore, the hypothesis stating the existence of difference in nature of Scientific Attitude is accepted.

Rao (1990) also found that the Scientific Attitude in secondary school pupils were average.

**Analysis of difference between mean scores of Scientific Attitude on the subsample based on gender**

Data and results of mean scores of Scientific Attitude among secondary school students in Palakkad district classified based the gender are given in the Table 4

Table 4 *Data and Result of Test of significant Difference between mean scores of Scientific Attitude on the basis of Gender*

Variable	Sample <i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>P</i>
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Scientific Attitude	Female	55	205.71	13.538	1.8463	NS
	Male	25	199.84	13.012		

From the Table 4 it is revealed that score of Scientific Attitude of female (M=205.71) is higher than the score of male (M=199.84). The obtained  $t$  value 1.8463 is lower than the table value (1.96) at 0.05 levels. So the difference between mean scores of Scientific Attitude of males and females is not significant at 0.05 levels.

### Discussion of results

From the result it is also evident that difference in the mean scores of Scientific Attitude among male and female secondary school tribal students is not significant, since the obtained  $t$  value is less than the tabled value 1.96 for 0.05 level. Therefore this part of the hypothesis that states there exist significant difference in the mean scores of Scientific Attitude between the subsamples based on gender is rejected.

Patil (2011) In her research, she discovered that there is a difference in Scientific Attitude ratings between male and female secondary school pupils. It was also discovered that female secondary school students have a higher Scientific Attitude than male secondary school students.

Kumar, (1991) In his research, he discovered that the average group's Scientific Attitude exam results differed significantly from boys and girls.

### Major findings

Major findings of the present investigation are summarized and presented below:

The findings of percentage analysis obtained for Scientific Attitude among secondary school tribal students of Palakkad and Malappuram district.

- When the nature of Scientific Attitude was calculated for secondary school students, it was found that 14% of students have more positive Scientific Attitude, 72% of the students are neutral in their Scientific Attitude and 14% of students have negative Scientific Attitude. The result shows that the most of the secondary school students have average level of Scientific Attitude.
- When the difference between means of Scientific Attitude of secondary school students were tested for significance on the basis of gender it was found that the values obtained were not significant at .05 level of significance. When the Scientific Attitude of male and female secondary school students is compared the  $t$  value obtained is 1.8463. Since the  $t$  value is lower than the tabled value 1.96 at .05 level of significance, mean difference between female and male secondary school students was found to be not significant.

### Tenability of hypothesis

Hypothesis I states that "There exists significant different levels of Scientific Attitude among secondary school tribal students".

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This hypothesis was tested by percentage analysis. Result indicates that secondary school students are differing in their nature of Scientific Attitude and it is classified as students with high, average and low levels of Scientific Attitude.

Therefore the first hypothesis is fully substantiated.

The II hypothesis states “There exists a significant difference in the mean score of scientific attitude between subsamples based on gender.”

This hypothesis was tested using the test of significance of difference between means. Results indicate that there exists no significant difference in mean scores of Scientific Attitude for the subsample based on gender of the students.

Therefore the second hypothesis is rejected.

### Conclusion

The data show that there are various levels of Scientific Attitude among tribal secondary school students. For the subsample depending on gender of the students, there is no substantial difference in Scientific Approach among secondary school tribal students.

### Educational Implications

- The study reveals the need of improving the facilities in the schools
- The study will help in teachers to effectively plan the activities given in the text books

### References

1. Adejuwon, A. (2009), A study of the Relevance of Scientific Skills and Attitudes to Market Women, Munich, GRIN Verlag, <https://www.grin.com/document/179012>
2. Abdullahi, A. (1982). *Science Teaching in Nigeria*. Ilorin: Atoto Press.
3. Barnes, S.B, Dolby, R.B.A. (1970), *The scientific ethos: A deviant viewpoint*. Archives *Euro7péennes de Sociologie*, pp. 3-25
4. Caldwell, Otis, and Curtis, Francis D. (1943) *Everyday Science*. Boston: Ginn and Company, 664 p.
5. Census of India (2001), Registrar General and Census Commissioner, Government of India.
6. Census of India (2011), Registrar General and Census Commissioner, Government of India
7. Dhebar, U. N. (1961) Report of the Scheduled Areas and Scheduled Tribes Commission, 1960-1961
8. Jancirani, R, Dhevakrishnan, R, Devi, S. (2012) *A Study on Scientific Attitude of Adolescence Students in Namakkal District*. International Educational E-Journal, {Quarterly}, ISSN 2277-2456, Volume-I, Issue-IV, July-Aug-Sept 2012
9. Kumar, Udaya (1991), A Study on the Teaching of General Science and the Development of Scientific Attitude in Secondary School Students in relation to Achievement in

General Science, M.S. University Baroda, Department of Education (Doctoral dissertation).

10. Munck, M. (2007), Science Pedagogy, Teacher Attitudes, and Student Success. *Journal of Elementary Science Education, Vol.19, No.2, pp. 13-24*. Department of Curriculum and Instruction, College of Education and Human Rights, Western Illinois University
11. Noll, V. H. (1935). Measuring the scientific attitude. *The Journal of Abnormal and Social Psychology, 30(2)*, 145–154.
12. Patil Vijay GouriDr.(2011). A Comparative Study of Scientific Attitude about secondary and Higher secondary level Students. *International Referred Research Journal, 2(24)*, 24-26.
13. Raj, Gokul. R. & Malliga, T. (2015) A study on Scientific Attitude among Pre Service Teachers. *Research Journal of Recent Sciences. Vol.4(IYSC 2015), 196-198*
14. Rao, Bhaskara & Digumarti (1996). Scientific Attitude vis-a-vis Scientific Aptitude. New Delhi: Discovery Publishing House
15. Singh, Yendluri Chakradhara & Arundhathi Bai. C. A study on Scientific Attitude and Science Interest of Secondary School Students in West Tripura District. *Research gate. <https://www.researchgate.net/publication/338108357>*
16. Bhaskara Rao, Digumarti (1996). Scientific Attitude vis-a-vis Scientific Aptitude. New Delhi : Discovery Publishing House.
17. Bhaskara Rao, Digumarti (1996). Scientific Attitude vis-a-vis Scientific Aptitude. New Delhi : Discovery Publishing House.