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Original Research Paper

Scientific Temper and Academic Achievement among Tribal and Non-Tribal Students

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ABSTRACT

The present investigation is a comparative study in which a total of 564 tribal and non-tribal adolescent students of Jammu And Kashmir State were selected by stratified random sampling technique. The tribal and non-tribal students were compared for the relationships between academic achievement and scientific temper. Data collected by The Scientific temper scale (2008) by Showkat and Nadeem showed a significant relationship between academic achievement and scientific temper in non-tribal adolescents only. Further gender wise comparisons revealed that male and female students of non-tribal group had significant relationship between the two variables as compared to tribal group.

Keywords: *scientific temper, academic achievement, tribal, non-tribal*

Curiosity, the urge to find logic behind everything that happens, opens the avenues for new inventions and innovations. Behind this curious mind lies the scientific temperament that generates rationality and reasoning ability among people. It is this ability that makes an individual a useful human resource for the nation. Realizing the importance of this, right from the time of India's Independence, scientists, educators, medical professionals, political and social activists alike have been emphasizing the need of developing scientific temper for the progress of the country. Scientific temper is a state of mind that always questions everything, seeks knowledge and settles only for things that can be proved with substantial evidence.

What is scientific temper?

Scientific temper is an attitude of mind which involves the application of logic and creates a particular outlook and develops scientific patterns of behaviour. The fundamental feature of scientific temper is 'the spirit of enquiry and acceptance of the right to question and be

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questioned' (Statement on Scientific Temper, 1992:192-93). It connotes that scientific temper is actually the use of logic and reasoning in accepting any hypothesis, theory, statement or phenomenon and provide an individual the right to question of how, what and why of an object event or phenomenon. Krishnan and Bhuvaneshwari (1990) define scientific temper as one's reactions in his/her life situations as practice of seeing cause and effect relationship appreciation of utility of science in daily life functions, adventurousness, experimental bent, intellectual honesty, objectivity, open mindedness challenging blind faith and receptivity to change. The main avenue for developing scientific temper is science and technology. In the contemporary world scientific knowledge paves the way for developing healthy skepticism, universalism, freedom from prejudice or bias, objectivity, open mindedness and humility, inquisitiveness, rationality, imaginative thinking, perseverance and positivity which are attributes of scientific temper.

Scientific temper leads to eradication of irrational beliefs, ignorance, superstitions, and prejudgement. It is based on observation, insight, reasoning, intuition and creative impulse. As per the statement of scientific temper, 1992; scientific temper involves the acceptance, amongst others, of the following premises:

1. That the method of science provides a viable method of acquiring knowledge;
2. That human problems can be understood and solved in terms of knowledge gained through the application of the method of science;
3. That the fullest use of the method of science in everyday life and in every aspect of human endeavour from ethics to politics and economics- is essential for ensuring human survival and progress; and
4. That one should accept knowledge gained through the application of the method of science as the closest approximation to truth at that time, and question what is incompatible with such knowledge; and that one should from time to time re-examine the basic foundations of contemporary knowledge.

Scientific temper is important in our life because it helps in making decisions rationally which is the demand of present day.

Scientific temper: The Indian perspective

The pioneer for initiating the concept of scientific temper in India was Pandit Jawaharlal Nehru. Realizing the importance of scientific attitude, he proposed that removal of superstitions and dogmas prevalent in Indian society could be possible by permeating scientific temper in the society. He emphasized repeatedly on the necessity of creating a scientifically minded society. Following Nehru's vision, the Indian Parliament adopted the Scientific Policy Resolution (SPR) of 1958, which enunciated the principles on which the growth of science and technology would be based. The SPR-1958 asserted that the Government of India visualised modern science and technology as the chief instrument for social transformation. Subsequently, a clause – (h) was

added in Part IVA in Article 51A of the Constitution of India that lays out the Fundamental Duties, which reads, *"It shall be the duty of every citizen of India to develop scientific temper, humanism and spirit of inquiry and reform"*. In 1981, July 19, The Nehru Centre, Bombay released a document named 'Statement on Scientific Temper' articulating the need to inculcate the values of scientific temper in the Indian society signed by a group of eminent intellectuals, scientists, and academicians. In post Nehruvian period, efforts were made for fostering scientific temper. In this regard, the document "Science and Technology Policy 2003" of the Government of India was proposed which urges 'To ensure that the message of science reaches every citizen of India, man and woman, young and old, so that we advance scientific temper, emerge as a progressive and enlightened society, and make it possible for all our people to participate fully in the development of science and technology and its application for human welfare. Indeed, science and technology will be fully integrated with all spheres of national activity.' (Science and Technology Policy, 2003). In 2011, an attempt was made to revisit the 1981 Statement of Scientific Temper and gave a revised statement known as the 'Scientific Temper Statement Revisited-2011: The Palampur Declaration' which beckons the importance of scientific temper. However, Nehru's dream about the spread of scientific temper in the country has remained largely unrealised, in spite of significant growth in science and technology in India (Mahanti, 2013).

For developing scientific temper among the students, a number of efforts are being made by the Government as well as several Non Government Organizations. Promoting scientific temper is important and the chief agency for accomplishing this task is school education. The National Curriculum Framework (NCF) 2005, which is now considered as the Bible of the school education has also pointed out that sciences, like the systems of mathematics, have their own concepts, often interconnected through theories, and are attempts to describe and explain the natural world. Science education helps in developing scientific temperament which permeates in the individuals the spirit of enquiry which is essential for the development of a rational mind and thinking. Scientific temper thus may affect the learning style of students and as a result would influence the learning outcomes also. This paper is an attempt to explore the relationship between scientific temper and academic achievement among adolescent students.

Objectives

The study was guided by the following objectives:

1. To study the level of scientific temper among tribal and non-tribal adolescent students.
2. To study the academic achievement of tribal and non-tribal adolescent students.
3. To study the relationship of academic achievement and scientific temper among tribal and non-tribal adolescent students.
4. To find out the relationship of academic achievement and scientific temper among male and female adolescent students.

5. To investigate the relationship of academic achievement and scientific temper among tribal and non-tribal adolescent students with respect to gender.

Hypotheses

For obtaining the above stated objectives, following hypotheses were formulated.

1. There is no significant difference in the scientific temper of tribal and non-tribal adolescent students.
2. There is no significant difference in the academic achievement of tribal and non-tribal adolescent students.
3. There is no significant relationship of academic achievement and scientific temper among tribal and non-tribal adolescent students.
4. There is no significant relationship of academic achievement and scientific temper among male and female adolescent students.
5. There is no significant relationship of academic achievement and scientific temper among tribal and non-tribal male adolescent students.
6. There is no significant relationship of academic achievement and scientific temper among tribal and non-tribal female adolescent students.

METHODOLOGY

Sample

The descriptive method of research was adopted for this study. A sample of 564 adolescent students (tribal and non-tribal) was collected from 12 schools of Anantnag and Kupwara district, Kashmir, India by stratified random sampling technique. The sample age ranges from 13-17 years both males and females. The distribution of sample is shown in table 1.

Table 1 Sample distribution.

	Tribal	**Non-tribal**	**Total**
Male	157	141	298
Female	129	137	266
Total	286	278	564

Tools

Annual marks of the students were recorded for assessing the academic achievement of the students and scientific temper was measured by employing The Scientific temper scale (2008) constructed by Showkat and Nadeem which assesses five dimensions of scientific temper i.e., Curiosity, Open Mindedness, Objectivity, Rationality and Aversion to superstitions.

RESULTS

Table 1, Descriptive statistics of academic achievement of different groups

Groups	N	Mean	S.D.	N
Tribal	286	44.48	11.54	286
Non-tribal	278	48.28	13.64	278
Males	298	47.11	13.94	298
Females	266	45.51	11.24	266
Tribal males	157	43.96	11.94	157
Non-tribal males	141	50.61	15.16	141
Tribal females	129	45.11	11.04	129
Non-tribal females	137	45.88	11.46	137

Table 2, Scientific temper and academic achievement of tribal and non-tribal adolescent students

Variable	Category	Mean	S. D	Skewness	Kurtosis	t
Scientific Temper	Non-Tribal	41.03	3.18	-0.86	3.13	4.47***
	Tribal	39.72	3.74	-1.17	1.88	
Academic achievement	Non-tribal	48.28	13.64	0.86	0.91	3.57***
	Tribal	44.48	11.54	0.40	0.68	

****significant at 0.001 level; p < 0.001*

Objective 1: *To study the level of scientific temper among tribal and non-tribal adolescent students.*

Independent samples t-test (table 2) revealed that there is a significant difference in the scientific temper of tribal and non-tribal adolescent students showing non-tribals to be having more scientific temper than tribal ones on account of higher mean value. Thus hypothesis no.1 stating "There is no significant difference in the scientific temper of tribal and non-tribal adolescent students" stands rejected.

Objective 2: *To study the academic achievement among tribal and non-tribal adolescent students.*

Perusal of table 2 showed that there is significant difference in the academic achievement of tribal and non-tribal adolescent students on account of significant t-value. Mean comparisons revealed that non-tribal students have better academic achievement than tribal ones. Therefore hypothesis no.2 "There is no significant difference in the academic achievement of tribal and non-tribal adolescent students" stands rejected.

Table 3 Summary of regression results

	Tribal				Non-tribal				Total			
	R	**R^2**	**B**	**T**	**R**	**R^2**	**B**	**t**	**R**	**R^2**	**B**	**t**
Male	.126	.016	.453	1.584	.304	.092	1.374	3.760**	.251	.063	1.033	4.457**
Female	.001	.000	.004	.017	.248	.062	.949	2.979**	.114	.013	.347	1.859
Total	.060	.004	.184	1.009	.285	.081	1.223	4.941**				

Objective 3*: To study the relationship of academic achievement and scientific temper among tribal and non-tribal adolescent students.*

It was observed from table 3 that scientific temper emerged as a significant predictor of academic achievement of non-tribal adolescent students and there exist a significant positive relationship between the two on the basis of B weight bearing significant t-value. Scientific temper contributes 8.1 % variance in explaining the academic achievement of non-tribal adolescent students. However for tribal adolescent students, scientific temper is not significant enough in predicting their academic achievement and had insignificant relationship with academic achievement. Hence hypothesis number 3 "There is no significant relationship of academic achievement and scientific temper among tribal and non-tribal adolescent students" is partially rejected.

Objective 4: *To find out the relationship of academic achievement and scientific temper among male and female adolescent students.*

On the basis of table 3 it was found that scientific temper is a significant predictor of academic achievement of male adolescent students with a significant and positive relationship (B=1.033; t=4.457) and explains about 6.3% of variance in their academic achievement. On the other hand female adolescent students showed a different result reporting scientific temper as an insignificant predictor of academic achievement with insignificant relationship between the two. Therefore hypothesis number 4 "There is no significant relationship of academic achievement and scientific temper among male and female adolescent students" is partially rejected.

Objective 5: *To investigate the relationship of academic achievement and scientific temper among tribal and non-tribal adolescent students with respect to gender.*

Tribal and non-tribal Males

Non-tribal males have strong and significant relationship between academic achievement and scientific temper (B= 1.374; t=3.760). The percent contribution of scientific temper in explaining

the academic achievement of non-tribal males is 9.2%. However tribal male students showed insignificant relationship between the two with scientific temper contributing very less i.e. only 1.6%. Thus hypothesis number 5 "There is no significant relationship of academic achievement and scientific temper among tribal and non-tribal male adolescent students" is partially rejected.

Tribal and non-tribal females

On comparing females of tribal and non-tribal sample, similar results were obtained as tribal and non-tribal males. Only non-tribal female students showed a significant and positive relationship between scientific temper and academic achievement on account of B weight bearing significant t- value with a contribution of 6.2% variance. Tribal female students showed insignificant results. Hence hypothesis number 6 "There is no significant relationship of academic achievement and scientific temper among tribal and non-tribal female adolescent students" is partially rejected.

CONCLUSION

On the basis of results it can be concluded that scientific temper is a predictor of academic achievement of non-tribal group only. Thus scientific temper may be considered as one of the important factor for enhancing the performance of general adolescent students and efforts should be made to develop scientific temper of adolescents at school level. The tribal students were having lower scientific temper than non-tribal students; so it may be a reason that lower degree of scientific temper is not showing any relationship for tribal adolescent students. Hence the results are recommending an overhaul of education system for tribal students that caters more scientific outlook thereby promoting better educational attainment.

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