



## SCIENTIFIC TEMPER AND ACADEMIC ACHIEVEMENT OF FIRST AND NON-FIRST GENERATION LEARNERS IN KASHMIR

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### *Abstract*

*The focus of the study was to compare the first and non-first generation learners on scientific temper and academic achievement. The sample for the present study consisted of 800 students in which 400 were first generation learners and 400 were non-first generation learners. The investigators used Nadeem's and Showkat Rashid's Scientific temper scale to assess the scientific temper of sample subjects. The previous two years academic achievement served as academic indicator of the sample subjects. The investigator used various statistical techniques viz, mean, S.D., t-test to analyze the data. The statistical data revealed that there is significant difference between first and non-first generation learners on scientific temper and academic achievement. Non-first generation learners were found to have better scientific temper and academic achievement as compared to their counterparts.*

**Keywords:** *scientific temper, academic achievement, first and non-first generation learners.*



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## INTRODUCTION

Scientific temper is not really the knowledge of a particular subject or theorems and laws that define such a temper. Not all people with knowledge of physics, chemistry, biology or any other subject can be called scientific. A scientific temper refers to an open, questioning seeking mind. A mind seeks truth and accepts it when proved. A mind that is curious to understand 'whys' and 'hows' of life while accepting that all questions may not be fully answerable.

Scientific temper describes an attitude which involves the application of logic and the avoidance of bias and preconceived notions.

The concept of Scientific Temper was articulated first by Pandit Jawaharlal Nehru in 1946 in his book *Discovery of India*, referring to it as "a way of life, a process of thinking, a method of acting and associating with our fellowmen". The tradition of skepticism and humanism is not new to Indian intellectual tradition.

Such notions go back to antiquity – Jain, Sankya, and Buddhist traditions have repeatedly emphasized the spirit of enquiry. During the Indian renaissance many leaders popularized the notion of scientific enquiry and gradually it became part of Indian ethos.

Nehru was instrumental in laying the foundations for building the infrastructure for science and technology in India – the Universities, the IITs, the CSIR labs, etc. These became the 'hardware' of science and technology in India, while Scientific Temper among the people of India was to be the 'software'. In 1976, India became the first country to include in its Constitution 'Scientific Temper with humanism' as a fundamental duty of all citizens of the country [Article 51-A(h)].

Four years later, in October 1980, a group of academicians and intellectuals deliberated for four days at Coonoor, near Ooty, on the state of Scientific Temper in the country. Out of those deliberations was born 'A Statement on Scientific Temper', which was released on 19 July 1981. This document articulated the need to inculcate the values of Scientific Temper in the Indian Society to rid the country of its socio-economic ills at that time. The Statement was expected to usher in a movement—a second Indian Renaissance—in India to 'provide the necessary fillip for restructuring our country embodying the aspirations of our people'. Broadly, the statement extolled the virtues of the scientific method as an antidote to the traditional religious and/or superstitious dogmas that prevail in our country. In recent times, the hold of such antiquarian beliefs has become greatly widespread in the country through television channels, and lately, through the Internet.

The preamble to the Statement noted the continuous accumulation of knowledge by which allowed mankind exercise control over the environment. However, the spread and adoption of mankind's knowledge has been uneven due to prevalent schisms across the world and control over such knowledge by the elites. In such a bleak situation, fatalism prevails, reinforcing obscurantism, irrationalism and a retreat from reason. To advance in the scientific age, we must

understand the meanings and imperatives of scientific temper – which in essence is ‘humanity’s assertion of being in charge of its destiny and not a passive victim of malevolence of stars’. Scientific Temper thus becomes an imperative for a brighter future for our country.

In teaching science, it is more important to help students to understand the scientific approach to life and develop a scientific temper than it is impart scientific knowledge or train them in specific scientific techniques. While scientific knowledge and techniques may be useful to them in their career, the scientific approach to life has much wider ramifications as it is applicable to all aspects of life-social, economic, political and even religious. Krishnamurti’s approach to religious questions has many parallels with the scientific approach to truth. Technology and the applications of science, however useful they may be, are not the real purpose of the scientific quest. Its real purpose is to discover the laws of nature and unravel the great mystery of the origin and operation of the universe in which we live (an article by Prof. P. Krishna).

Prof. M. G. K. Menon, in his lecture on the Role of Science and the Responsibility of Scientists in National Development (Jawaharlal Nehru Memorial Lectures, 1973-79), has urged the scientific community to take up the task of building up scientific temper among the citizens of the country. Recalling an instance where Sir C. V. Raman was speaking to school children under the auspices of the Community Science Centre in Ahmadabad on “Why is the sky blue”, Prof. Menon has mentioned that Sir C. V. Raman did not use any blackboard or slides but lecturing under the open blue sky made a magnificent impact. Fortunately today several tools for the propagation of knowledge are available and scientists can make full use of them and spread the scientific knowledge which will inevitably lead to the development of scientific temper among the people. The Statement of Scientific Temper prepared by Nehru Centre of Bombay to which I have made a reference earlier has briefly mentioned the role of scientific temper in India today.

Robert E Franken, creativity is defined as the tendency to generate or recognize ideas, alternatives or possibilities that may be useful in solving problems, communicating with other and entertaining ourselves and others.

Academic achievement is a capacity to excel others which is important component for every person especially for a student to be successful, as he/she is always facing competitive situation in his educational career. Achievement after all is the end product of all educational

endeavors. The main concern of all educational efforts is to see that the learners achieves. A teacher is supported to arrange the educational situation in a way so as to encourage pupils to put their heart and soul in the school activities. Hence the problem of achievement has drawn sufficient attention of researchers in the field of educational psychology.

Tiwari and Bansal (1994) mentioned that a child with high academic achievement is likely to be well-treated as well behaved and independent and low achievers as incapable and deprived of employment, which may lead this to maladjustment to life. Balasubramaniyam (1992) while reviewing studies on correlates of achievement has observed, "Achievement is the end product of all educational endeavors. The main concern of all educational efforts is to see that the learner achieves. Quality control, quality assurance and of late total quantity quality management of the achievement have increasingly gained the attention of researchers in education.

### **OBJECTIVES OF THE STUDY**

Following objectives were formulated for the purpose of present study:

1. To study the scientific temper of first and non-first generation learner.
2. To study the academic achievement of first and non-first generation learners.
3. To compare first and non-first generation learners on scientific temper.
4. To compare first and non-first generation learners on academic achievement.

### **HYPOTHESES**

1. First and non-first generation learners differ significantly on scientific temper.
2. First and non-first generation learners differ significantly on academic achievement.

### **OPERATIONAL DEFINITION OF TERMS AND VARIABLES**

**1. Scientific Temper:** For the purpose of present study, scientific temper has been operationally defined as the score which the investigator got by administering Nadeem's and Showkat's Scientific Temper Scale.

**2. Academic Achievement:** Academic achievement of first and non-first generation learners refers to the knowledge attained and skills developed in the school subjects. So, academic achievement means the achievement of students in academic subjects. For this purpose, the aggregate Marks obtained by the subjects in previous two exams served as measures of academic achievement.

**SAMPLE :** The sample for the study consisted 800 students (400 first generation learners and 400 non-first generation learners). The sample were selected randomly from different schools of Kashmir division.

The breakup of the sample shall be as under:

<b>Group</b>	<b>N</b>	<b>Total</b>
First generation	400	800
Non-first generation	400	

**Tools Used :** The data for the present study was collected with the help of scale constructed by Prof. Nadeem and Showkat Rashid Wani which assesses five dimensions of scientific temper i.e. curiosity, open mindedness, objectivity, Rationality and Aversion to Superstitions.

### **ANALYSIS AND INTERPRETATION**

**Table 1: Significance of the mean difference between first and non-first generation learners on “Curiosity” dimension of Scientific Temper.**

<b>Group</b>	<b>Mean</b>	<b>S.D</b>	<b>t-value</b>	<b>Significance</b>
First generation learners	6.96	1.71	0.54	NS*
Non-first generation learners	7.14	1.57		

\* = Not Significant

The above table shows the mean difference between first and non-first generation learners on Curiosity dimension of Scientific Temper Scale. The above table reveals that there is no significance difference between first and non-first generation learners, which indicate that the both groups displayed somewhat similar curiosity, though the mean difference favoured non-first generation learners but the difference failed to arrive at any level of confidence.

**Table 2: Significance of the Mean difference between first and non-first generation learners on “Open Mindedness” dimension of Scientific Temper.**

<b>Group</b>	<b>Mean</b>	<b>S.D</b>	<b>t-value</b>	<b>Significance</b>
First generation learners	5.89	1.96	1.69	NS*
Non-first generation learners	6.21	1.52		

\* = Not Significant

The above table reveals that there are no significant mean differences between first and non-first generation learners on open mindedness, dimension of Scientific Temper, the table shows that

non-first generation learners have high mean score as compared to the mean score of first generation learners but the difference failed to arrive at any level of confidence.

**Table 3: Significance of the mean difference between first and non-first generation learners on “objectivity” dimension of Scientific Temper**

Group	Mean	S.D	t-value	Significance
First generation learners	5.25	1.28	2.17	Significant at 0.05 level
Non-first generation learners	6.41	1.26		

The above table shows the mean difference between first and non-first generation learners on objectivity dimension of scientific temper scale. The table shows reveals that there is significance between first and non-first generation learners on scientific temper scale. The calculated t-value of 2.17 exceeds the t-value at 0.05 level of significance. This justifies that the difference between two groups is statistically significant at 0.05. The mean of non-first generation learners (6.41) is decidedly better than the mean of first generation learners. (5.25).

**Table 4: Significance of the mean difference between first and non-first generation learners on “Rationality” dimension of Scientific Temper.**

Group	Mean	S.D	t-value	Significance
First generation learners	5.47	1.36	2.87	Significant at 0.01 level
Non-first generation learners	6.22	1.30		

The above table shows that the mean difference between the first and non-first generation learners on Rationality dimension of Scientific Temper Scale. The calculated t-value of 2.87 exceeds the t-value at 0.01 level of significance. This justifies that the difference between two groups is statistically significant at 0.01 level. The mean score of non-first generation learners (6.22) is decidedly better than the mean of first generation learners (5.47). This indicated that the non-first generation learners displayed rationality dimension more than their counterpart.

**Table 5: Significance of the mean difference between first and non-first generation learners on “Aversion to Superstition” dimension of Scientific Temper**

Group	Mean	S.D	t-value	Significance
First generation learners	4.21	1.80	3.96	Significant at 0.01 level

Non-first generation learners	4.87	1.92
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The above table shows that the mean difference between the first and non-first generation learners on Aversion dimension of Scientific Temper Scale. The calculated t-value of 3.96 exceeds the t-value at 0.01 level of significance. This justifies that the difference between two groups is statistically significant at 0.01 level. The mean score of non-first generation learners (4.87) is decidedly better than the mean of first generation learners (4.21). This indicated that the non-first generation learners displayed aversion dimension more than their counterpart.

**Table 6: Showing mean significance difference (Overall dimensions) of scientific temper between first and non-first generation learners (composite score).**

Group	Mean	S.D	t-value	Significance
First generation learners	30.26	4.69	4.32	Significant at 0.01 level
Non-first generation learners	34.45	5.21		

The above table shows that the mean difference between the first and non-first generation learners on composite score of Scientific Temper Scale. The calculated t-value of 4.32 exceeds the t-value at 0.01 level of significance. This justifies that the difference between two groups is statistically significant at 0.01 level. The mean score of non-first generation learners (34.45) is decidedly better than the mean of first generation learners (30.26). This indicated that the non-first generation learners displayed better scientific temper than their counterparts.

*In the light of the above discussion the hypotheses no.1 (chapter -1) which states as, "First and non-first generation learners differ significantly on scientific temper" is accepted.*

**Table 7: Significance of mean difference between first and non-first generation learners on academic achievement**

Group	Mean	Standard Deviation	t-value	Level of significance
First generation learners	47.32	14.36	2.72	Significant at 0.01 level
Non-first generation learners	50.51	17.02		

The perusal of above table, makes it clear that there is significant mean difference between first and non-first generation learners on academic achievement. The calculated t-value of 2.72 exceeds the t-value at 0.01 level of significance. However mean score favours non-first

generation learners (50.51) which shows non-first generation learners have better academic performance than their counterparts.

*In the light of the above discussion the hypotheses No. 2 which reads, "First and non-first generation learners differ significantly on academic achievement" is accepted.*

## **CONCLUSION**

On the basis of the data analysis the following conclusions have been drawn out from the present study:

1. It has found that both the groups displayed somewhat similar type of curiosity while measuring on scientific temper scale. Both the groups of first generation learners and non-first generation learners showed desire for understanding new situation.
2. It was further found that both first generation learners and non-first generation learners showed same type of open mindedness while measuring on scientific temper scale. Both first generation learners and non-first generation learners showed willingness to revise opinions and conclusions in the light of new evidences and facts.
3. It has also been found that non-first generation learners showed better objectivity than first generation learners. Both the groups have ability to observing and recording facts without any influence.
4. It has been found that non-first generation learners showed more rationality than their counterparts while measuring on scientific temper scale. Both first generation learners and non-first generation learners have taste for the identification of cause and effect relationship.
5. It was further found that while comparing first generation learners and non-first generation learners on scientific temper, non-first generation learners showed better aversion to superstition dimension of scientific temper. Both the groups have ability to rejection of false beliefs.
6. It has been found that non-first generation learners displayed better scientific temper than their counterparts.
7. It has been found through the study that first generation learners and non-first generation learners differ significantly on academic achievement. Non-first generation learners are found to higher academic achievements than first generation learners.



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