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Analaysis On Scientific Temper And Academic Achievements Among Research Scholars In Management Studies Discipline

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ABSTRACT

Scientific temper integrates the way we live, process our mind, ability to think and interact with the society. It is the ability of an individual to associate with things.The person endowed with scientific temper is transparent, and question-seeking.Such mind will always expect and believe truth. The individual will accept it only when it is proved. A society with a scientific temper is always on the path of development. This research paper's main objective is to investigate doctoral research scholars' scientific temper and academic achievements in the management studies discipline. With the help of the inventory developed by Nadeem andWani the primary data is captured.One hundred research scholars were selected, covering four universities in Tamilnadu, India. Descriptive statistics and inferential statistics helps to measure the problem researched. The sample comprises of 69 male and 31 femaleand urban population 60, whereas rural population 41. Comparative analysis helps carry out the constructs to measurescientific temper which includes a total of five constructs. The researcher tests the relationship between academic achievements and scientific temper among urban and rural students among gender. The results show that curiosity and rationality dimensions are significant with respect to academic achievement of research scholars. There is a significant relationship between scientific temper dimensions like open-mindedness, objectivity, rationality, and superstition among rural and urban students. The study's outcome is that the implementation of New Education Policy -2020 (NEP-2020) will undoubtedly improve the scientific temperament among students at school levels by including critical thinking, design thinking, and the introduction of an interdisciplinary curriculum.

Keywords: Academic achievements, gender, management studies, rural, scientific temper, urban.

I.INTRODUCTION

The scientific temper is a vital role of human life which involves logical, rational and critical thinking. It is an attitude of an individual. Scientific method involves observation, understanding, analysing, questioning, framing hypothesis, testing, proving and communicating. It precisely focuses on questioning and inventing new things in society. An individual considers having a scientific temper if they employ a scientific decision-making method in everyday life. The book contributed by Pandit Jawaharlal Nehru, The Discovery of India coins the term Scientific temper first time.

In this, he suggested that scientific temper is the attitude to:

i. Search for new bodies of knowledge
ii. Not to accept anything without proof or a test
iii. One must have the ability to transform in the light of new evidence

iv. Not to rely on preconceived notions instead of observational evidence

Scientific temper is the fundamental duty of every citizen as mentioned in the Article 51A of our constitution.As per clause (h) one has to develop scientific temper. It induces secularism, and humanism, the government of India announced 28th Februaryas National Science Day of 2014 in order tofosterScientific Temper.

The society with a scientific temper is always on the path of development (Narendra Modi, 2020). Religion is the socio-cultural system and scientific consciousness is being aware of happenings in the society. These two are parallel streams, which really don't coincide. We cannot test or challenge the religious belief through experiments. It cannot be explored with the sacred text using the method of reason. Due to these arguments in India the scientific temperament is shrinking which does not show good sign for our economic development.

The countries dominated by theoretic ideals are struggling to make scientific and technological leaps.We cannot unitereligions moreover science provide and gives choice of best offers and opportunity for a well-structured fellowship (C.V.Raman, 1936). He said that all could become men of science.

In the 21st century, the country is more dependent on science and technology. Advancement in innovation and invention will uplift society and be competitive. It is imperative to what extent these traits are imbibed within the citizens, especially the student's community. Concerning this, the study attempts to measure the scientific temper of research scholars in Tamilnadu.

Society has its cultural values and the idea of scientific temper and scientists are not against it. Scientist encourages the ways and means to test and validate long-held strong beliefs and how they areindulging in our country and culture (APJ Kalam, 2012).

Understanding Scientific Temper

Scientific temper is the individual ability to think and act scientifically. It refers to the score's students gain from the scientific temper scale of Showket Rashid and Nadeem's. The inventory has five constructs. They are curiosity, open-mindedness, objectivity, rationality, and aversion to superstitions. All the constructs have ten items which measure the respective dimension, using a structured questionnaire of three points Liker scale.

Academic Achievement

It refers to the mean aggregate marks scored by the student in his /her UG/PG level.

Location

Urban means that the respondents are from municipal corporations and district headquarters. Rural means that the respondents are from villages, Gramin panchayats, talukas, etc.

2. LITERATURE REVIEW

Nadeem and Showkat Rashid Wani (2008) have developed a scale to measure the construct scientific temper which has five constructs to measure the scientific temper of the respondents. Researchers widely use this scientific temper scale (STS) to measure scientific temper and academic achievements in high school, higher secondary, undergraduate & postgraduate level students.

Dhar (2009)., in his research observed that scientific temperament encompasses traits such as open mindedness, humility, suspend judgement without evidence, universalism, healthy scepticism, objectivity and humility and positive approach of perseverance. A study by Abhisheek Saxena throws light on the relevance between understanding scientific temper and its social relevance. The study also explain that teachers, mentors and elderly people have to encourage students to have a healthy argument which mobilize the thinking process.One of the best approach to implement is Do-it-yourself, wherein they learn and do which helps them to analyse situations and solve problems on their own.

A study by Bhat and Netragaonkar (2014)., in Kashmir observes that the scientific temper first generation learners is comparatively good than of non-first-generation learners.Following this another study by Maqbool (2014)., results that the

academic achievement and scientific temper of science and social science differ significantly with respect to curiosity and objectivity, but no significance with respect to the other three constructs. It is a notable fact that the scientific temper in our country is shrinking slowly, worrying fact as mentioned by Rajendran (2015).

Andrabi and Jabeen (2017) depict the research outcomes among tribal group students. It was observed that the non-tribal group students (male and female) had a positive significant relationship between their academic achievements and ST.Kour. (2015), in his study, explains that one has to believe facts if it has relevant evidence to be justified. Questioning why and what leads to new inventions is the spirit of scientific temper.

Mehraj (2018), has studied the scientific temper among secondary school learners. There is a significant associationbetween rural and urban school student on the various ST constructs. Bakulsrimany (2018) results that social media such as Facebook, Twitter, Instagram and Youtube etc., act as an effective communication tool in endorsing the scientific temper.

III.OBJECTIVES

- **i.** To study the demographic profile of the research scholars.
- **ii.** To compare the scientific temper and academic achievements among research scholars in the management discipline.
- **iii.** To examine the association between gender, location, and scientific temper among the respondents.
- **iv.** To conduct a comparative analysis on each dimension of scientific temper among urban and rural students.

IV.RESEARCH METHODOLOGY

The researcher visited four universities in TamilNadu, viz Alagappa University, Bharathidasan University, Mother Teresa University, and Madurai Kamaraj University in order to collect the response. The researcher collects the Primary data using the census method. A total of one hundred research scholars from the four universities were chosen based on the convenient sampling technique. The scientific temper scale (STS) of Showkat Rashid and Nadeem is used for the study. The five constructs used for the study is curiosity, open-mindedness, objectivity, rationality, and aversion to superstition.

This study also tries to measure the academic achievement of research scholars in the management studies discipline, which operationally explains the marks secured by their under graduation and post-graduation programs. For this, the investigators have designed a questionnaire covering demographic profiles and academic achievements.

Sample size

The investigators collected primary data from 100 research scholars (respondents) in TamilNādu, covering four universities. The researcher uses the Census method to collect the data through a structured questionnaire of Showkat Rashid and Nadeem inventory of scientific temper scale.

V. STATISTICAL TOOLS

i. Descriptive statistics- Gender & Location Cross tabulation (Bi-variate analysis)
ii. Descriptive statistics – UG and PG education have undergone.
iii. Descriptive statistics of academic achievement of different groups- t-test
iv. Means differences between and within groups - Anova test
v. Significance of location and scientific scale dimensions – Independent samples t-test
vi. Significance relationship between scientific temper and academic achievement among urban & rural students- Regression test
vii. Comparative analysis of the significance of scientific temper five dimensions

VI. DATA ANALYSIS AND DISCUSSION

i. Demographic profile of the respondents

Table 1 Respondents shows Gender and Location details

Table 1 : Gender * Location Crosstabulation

Gender		Location		Total
		Urban	**Rural**	
Male	Count	40	29	**69**
	% within Gender	58.00%	42.00%	100.00%
Female	Count	20	11	**31**
	% within Gender	64.50%	35.50%	100.00%
Total	**Count**	**60**	**40**	**100**
	% within Gender	60.00%	40.00%	100.00%

Table 1 results that 69 respondents are male and 31 are female respondents. According to location, 60 are from urban and 40 are from rural.

Table 2 shows the institution details where the respondents have undergone theirs under graduation and post-graduation.

Descriptive statistics of under graduation and post-graduation undergone

Table 2: Descriptive Statistics of UG and PG undergone

Institution	N	Minimum	Maximum	Mean	Std. Deviation
Government Owned Institution	25	54.00	77.50	62.500	7.159
Private Institution	29	56.00	72.50	69.121	5.005
Govt. funded Institution	29	51.50	72.50	66.793	5.042
Public School/ College	16	57.00	67.00	62.000	5.164
Boarding School	1	62.00	62.00	62.000	

Table 2 shows that about 25 percent of the respondents studied in government colleges, 58 percent are from private and government-funded colleges, and 27 percent are from other institutions.

ii. Descriptive statistics of academic achievement of different groups

Table 3 shows the descriptive statistics of academic achievements of different male, female, rural, and urban groups.

Table 3: Descriptive statistics of academic achievement of different groups

Groups	Number of Students (N)	Mean	Std. Deviation (S.D)	t value	p

Urban	60	66.433	5.735	1.595	0.114
Rural	40	64.300	6.896		
Males	69	66.246	6.957	1.919	0.058
Females	31	64.097	4.140		
Urban - Males	40	67.025	6.569	1.093	0.278
Rural - Males	29	65.172	7.442		
Urban - Females	20	65.250	3.366	2.225	0.034
Rural - Females	11	62.000	4.733		

The results from the above table show that gender, location, and academic achievement do not have a significant relationship.

iii. ANOVA test

ANOVA test ascertains the means difference within and between groups.

Null hypothesis: No means of difference within and between groups.Table 4 shows the ANOVA test results.

Table 4: Result of ANOVA

		Sum of Squares	d.f	Mean Square	F	Sig. value
Curiosity	Between Groups	2.078	2	1.039	11.260	**0.000**
	Within Groups	8.952	97	0.092		
	Total	11.030	99			
Open-mindedness	Between Groups	0.547	2	0.274	1.578	0.212
	Within Groups	16.822	97	0.173		
	Total	17.370	99			
Objectivity	Between Groups	0.045	2	0.023	1.183	0.311
	Within Groups	1.853	97	0.019		
	Total	1.898	99			
Rationality	Between Groups	0.714	2	0.357	7.537	**0.001**
	Within Groups	4.597	97	0.047		
	Total	5.312	99			
Superstition	Between Groups	0.006	2	0.003	0.024	0.976
	Within Groups	11.185	97	0.115		

	Total	11.190	99			

Table 4 shows that curiosity and rationality dimensions are significant at a 5% level. Other dimensions like open-mindedness, objectivity, and superstition are insignificant at a 5% significant level.

iv. Independent sample t-test

Independent samples t-test helps ascertain the significance of location and scientific temper scale dimensions.

Null hypothesis: Students have no relationship between location and scientific temper scale dimensions. Table 5 shows the Independent samples t-test results.

Table 5: Independent samples t-test resultsGroup Statistics

Group Statistics							
Scientific temper	**Location**	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**	**t value**	**Significance**
Curiosity	Urban	60	1.597	0.314	0.041	1.651	0.103
	Rural	40	1.483	0.354	0.056		
Open Mindedness	Urban	60	1.625	0.454	0.059	-1.980	0.051
	Rural	40	1.783	0.344	0.054		
Objectivity	Urban	60	1.717	0.135	0.017	0.331	0.741
	Rural	40	1.707	0.144	0.023		
Rationality	Urban	60	1.642	0.197	0.025	0.700	0.487
	Rural	40	1.606	0.277	0.044		
Superstition	Urban	60	0.930	0.375	0.048	-0.232	0.817
	Rural	40	0.945	0.272	0.043		

Table 5 shows that the location (urban and rural) and the five dimensions of scientific temper have no relationship at a 5% significance level. i.e., insignificant.

v. Summary of Regression Results

The researcher adopts a regression test to ascertain the relationship between scientific temper and academic achievement among rural and urban students.

Null hypothesis: No significant relationship between scientific temper and academic achievement among rural and urban students. Table 6 shows the summary of regression results.

Table 6: Descriptive Statistics

	Mean	Std. Deviation

Academic achievement	65.580	6.280
Curiosity	1.551	0.334
Open-mindedness	1.688	0.419
Objectivity	1.713	0.138
Rationality	1.628	0.232
Superstition	0.936	0.336

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.40	0.230	0.189	5.655

Change Statistics				
R Square Change	**F Change**	**d.f1**	**d.f2**	**Sig. F Change**
0.230	5.617	5	94	0.000

a. Predictors: (Constant), Superstition, Curiosity, Open-mindedness, Objectivity, Rationality

Coefficients[a]

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	45.277	12.663		3.575	0.001
Curiosity	7.016	1.867	0.373	3.758	**0.000**
Open-mindedness	-3.584	1.379	-0.239	-2.598	0.011
Objectivity	0.783	4.821	0.017	0.162	0.871
Rationality	8.009	2.984	0.295	2.684	0.009
Superstition	1.172	1.818	0.063	0.644	0.521

Table 6 shows no relationship between curiosity (scientific temper) and academic achievement among urban and rural students. There is a significant relationship between scientific temper dimensions like open-mindedness, objectivity, rationality, and superstition among rural and urban students.

vi. Comparative analysis

Comparative analysis helps identify the significance of scientific temper five dimensions individually among urban and rural students. The results are as shown below:

Null hypothesis: There is no significance between scientific temper dimensions individually among urban and rural students.

Table 6: Comparative analysis

Curiosity

Dimension	Group	Mean	S.D	t-value	Level of Significance
Curiosity	Urban	1.5967	0.3141	1.651	0.103
	Rural	1.4825	0.3544		

Open mindedness

Dimension	Group	Mean	S.D	t-value	Level of Significance
Open Mindedness	Urban	1.625	0.4537	-1.98	0.051
	Rural	1.7833	0.3443		

Objectivity

Dimension	Group	Mean	S.D	t-value	Level of Significance
Objectivity	Urban	1.717	0.135	0.331	0.741
	Rural	1.707	0.145		

Rationality

Dimension	Group	Mean	S.D	t-value	Level of Significance
Rationality	Urban	1.6417	0.1973	0.700	0.487
	Rural	1.6063	0.2767		

Superstition

Dimension	Group	Mean	S.D	t-value	Level of Significance
Superstition	Urban	0.93	0.3752	-0.23	0.817
	Rural	0.945	0.2717		

Open-mindedness among urban and rural students is significant at a 5 percent significance level. The remaining four dimensions of curiosity, objectivity, rationality, and superstition are insignificant among rural and urban students.

VII. LIMITATIONS AND FURTURE IMPLICATIONS

This study also has certain limitations. One hundred respondents were selected, covering only four universities in Tamilnadu. The scientific temper has been measured based on only five dimensions: curiosity, open-mindedness, rationality, objectivity, and superstition. Adding more dimensions like innovation, design thinking, etc. helps enhance the study's visibility.

The questionnaire follows a three-point scale, whereas a five-point scale will add more value. The scientific temper scale (STS) needs modification by including more statements like questioning abilities, seeking answers to the questions, and spending more time on science-related programs rather than other entertainment programs.Further research can be explored to measure the scientific temper and the motive behind it among students of high school and higher secondary school. Upcoming researchers may focus on developing a framework on scientific temper traits required considering the various dimensions.

VIII. CONCLUSION

The study measures the scientific temper and academic achievement among Ph.D. research scholars in the management studies discipline. The researchers adopt the scientific temper scale (STS) inventory and the respondents' demographic details for primary data collection. Statistical tools like descriptive statistics and inferential statistics are used for data analysis for hypothesis testing. The study outcome shows that open-mindedness among urban and rural students is significant. The remaining four dimensions of curiosity, objectivity, rationality, and superstition are insignificant among rural and urban students. The results prove a significant relationship between scientific temper dimensions like open-mindedness, objectivity, rationality, and superstition among rural and urban students. Further, it shows no relationship between gender, location, and academic achievement. The study mentions its limitations.

The researchers commemorate different ways to improve scientific temper. The important methods are: developing to ask questions & seek answers among students, incorporating design thinking, critical thinking, etc., in pedagogy and curriculum design, and adopting innovative teaching and learning approaches. Students should be encouraged to view more science films rather than entertainment programs. Both at educational institutions and home level, it has to practice. Implementing New Educational Policy (NEP-2020) guidelines in letter and spirit helps enhance the scientific temper among students.

New Educational Policy (NEP-2020) expects to record a tremendous change in the education system. Incoherent with a scientific temper, students have the flexibility to choose the area of interest, which paves the way for them to gain knowledge and deliberately induce a scientific temper attitude. It also stresses that skills such as coding, logic, and scientific temper are essential to be a successful, adaptable, productive, and innovative human. Integrating NEP with the Indian education system will transform our country into a new India, and it has immense scope for enriching scientific temperament.

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