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Scientific Temper Among B.Ed. Trainees: A Comparative Study of Grant-in-Aid and Unaided Colleges in Mysuru

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Abstract:

This study investigates the level of Scientific Temper among B.Ed. trainees of Grant-in-Aid and Unaided colleges, a critical attribute for educators in a rapidly evolving, science-driven world. Employing a descriptive survey methodology, the research assesses the trainees' disposition towards Critical Mindedness, Open-Mindedness, Respect for Evidence, Suspended Judgment, Willingness to Change Opinions, Questioning Attitude and Objectivity and explores the factors influencing these attitudes, including academic background and exposure to pedagogical methods .This research paper attempts to study the Scientific Temper among B.Ed. trainees of Various Grant-in-Aid and Unaided B.Ed. colleges of Mysuru affiliated to University of Mysore. The sample consists of 457 (219 Grant-in-Aid and 238 Unaided) B.Ed. trainees selected randomly. The data were collected by using Prof. K.S.Misra's scale of Scientific Temper Inventory (S.T.I.). The findings revealed that both Grant-in-Aid and Unaided B.Ed. trainees in Mysuru possessed a High level of Scientific Temper. However, B.Ed. trainees of Grant-in-Aid colleges showed a slightly higher level of Scientific Temper compared to B.Ed. trainees of Unaided colleges. It also showed that, there is no significant difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on various dimensions of Scientific Temper.

Key words: Scientific Temper, B.Ed. Trainees, Grant-in-Aid, Unaided Colleges, Teacher Education.

1. INTRODUCTION:

The progress of a modern society is deeply rooted in the scientific temper of its citizens, a term popularized by Jawaharlal Nehru to describe a way of life that involves the search for truth, the power of questioning, and the rejection of preconceived notions without proof. It is not merely a knowledge of science, but a rational and analytical state of mind characterized by logical thinking and objectivity.

In the landscape of modern India, the teacher acts as the primary catalyst for fostering this mindset. Since B.Ed. trainees are the future architects of the classroom, their own level of scientific temper significantly influences how they will eventually nurture critical thinking in their students.

However, the quality of teacher education can be influenced by various institutional factors, including infrastructure, faculty expertise, and socioeconomic backgrounds of the students. In the city of Mysuru, a prominent educational hub, B.Ed. colleges generally fall into two categories: Grant-in-Aid institutions, which receive government funding, and Unaided institutions, which operate independently.

This study seeks to explore whether the difference in institutional framework and environment between these two types of colleges impacts the development of scientific temper among prospective teachers. By conducting a comparative analysis, this research aims to identify gaps and provide insights into how teacher education programs in Mysuru can better equip trainees with the rational spirit essential for 21st-century education.

II. LITERATURE REVIEW:

Anand and Kumar (2015) investigated the level of scientific temper among B.Ed. trainees in Ramanathapuram district. The study revealed variations in scientific temper based on selected background variables and emphasized the role of teacher education institutions in fostering rational thinking and scientific outlook. The findings highlight the need to strengthen pedagogical practices that promote inquiry, critical thinking, and scientific attitude among prospective teachers.

Kori (2018) examined differences in attitudes toward basic science between rural and urban PUC students, finding that locality significantly influenced students' science perceptions. The study indicated that urban students generally held more positive attitudes compared to their rural counterparts, suggesting disparities in exposure and resources. These findings underscore the need for targeted interventions to enhance science interest and learning environments in rural settings.

Meenakshi (2019) explored secondary school students' attitudes toward science, comparing differences by gender and type of school. The study found that both sex and school type significantly influenced students' science attitudes, with notable variations in enthusiasm and interest levels. These results highlight the importance of gender-responsive and context-sensitive strategies in science education to foster positive attitudes.

Acharya (2021) compared scientific temper among undergraduate students across selected demographic variables, revealing significant differences linked to factors such as gender, discipline, and academic background. The study highlights that demographic influences shape students' inclination toward scientific reasoning and critical thinking. These findings underscore the need for educational strategies that nurture scientific temper inclusively across diverse student groups.

Bhatnagar (2021) examined the scientific temper of senior secondary science students and found that most students demonstrated moderate levels of scientific thinking and inquiry skills. The study identified significant differences in scientific temper related to variables such as gender and academic performance. These findings suggest the need for enriched science curricula and instructional strategies to strengthen students' scientific attitudes and reasoning abilities.

Karmakar and Chattopadhyay (2024) investigated teachers' scientific temper within the framework of *NEP 2020*, highlighting the importance of scientific mindset for effective implementation of contemporary educational reforms. The study found that teachers generally exhibited a positive scientific outlook but identified gaps in applying scientific reasoning in classroom practices. These insights underscore the need for professional development programs that strengthen teachers' scientific temper in alignment with policy goals.

Tetseo (2025) examined the scientific temper of B.Ed. students in Kohima, Nagaland, revealing that most teacher-trainees demonstrated moderate levels of scientific thinking and inquiry skills. The study found significant associations between scientific temper and selected demographic variables, such as gender and academic background. These results highlight the need for teacher education programs to emphasize scientific reasoning and reflective practices to enhance future educators' scientific outlook.

Khan (2018) analyzed national curricular documents to explore how science, scientific literacy, and scientific temper are framed within educational policies. The study found that while curricula emphasize scientific knowledge, they insufficiently integrate scientific temper and literacy as explicit educational

goals. These findings highlight the need for curriculum reforms that more strongly support the development of scientific reasoning and critical thinking in learners.

III. OBJECTIVES OF THE STUDY:

The present study was undertaken to achieve the following objectives:

1. To study the level of Scientific Temper among B.Ed. trainees of Grant-in-Aid and Unaided colleges.

2. To compare the B.Ed. trainees of Grant-in-Aid and Unaided colleges on various dimensions of Scientific Temper.

IV. HYPOTHESES OF THE STUDY:

There is no significant difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on various dimensions of Scientific Temper.

V. METHODOLOGY:

The proposed study was carried on by quantitative research method. The population of the present study confined to as the B.Ed. trainees in various B.Ed. colleges of Mysuru affiliated to University of Mysore in the academic year 2024-25. Six B.Ed. colleges of Mysuru were randomly selected. There were total 457 B.Ed. teacher trainees as sample (219 Grant-in-Aid and 238 Unaided). A Scientific Temper Inventory (S.T.I.) which was constructed and standardized by Prof. K.S. Misra, has been used to collect data. It consists of 28 items according to their area of Scientific Temper. The scale measures seven dimensions of Scientific Temper- (i) Critical Mindedness, (ii) Open-Mindedness, (iii) Respect for Evidence (iv) Suspended Judgment (v) Willingness to Change Opinions (vi) Questioning Attitude (vii) Objectivity

The reliability coefficient is 0.7214 and validity is 0.633. In this study, The raw data was subjected to percentage, mean, S.D. and t-test for statistical treatment. The following table shows the statistical analysis of the data. t-test was used to compare the various dimensions of Scientific Temper among B.Ed. trainees of Grant-in-Aid and Unaided colleges.

VI. STATISTICAL ANALYSIS AND INTERPRETATION:

The raw data was subjected to percentage, mean, S.D. and t-test for statistical treatment. The following table shows the statistical analysis of the data.

SECTION 'A'-DESCRIPTIVE ANALYSIS:

Percentage computation of B.Ed. trainees of Grant-in-Aid and Unaided colleges on Scientific Temper.

Table 1.1: Showing the overall Percentage of Scientific Temper among B.Ed. trainees of Grant-in-Aid and Unaided colleges.

Levels	**N**	**Percentage**
Extremely High Scientific Temper	138	30.20
High Scientific Temper	118	25.82
Above Average Scientific Temper	114	24.94
Average Scientific Temper	69	15.10
Below Average Scientific Temper	14	3.06
Low Scientific Temper	3	0.66
Extremely Low Scientific Temper	1	0.22
Total	**457**	**100.00**
Mean Score	**110.64**	

Table 1.1 illustrates the overall percentage distribution of Scientific Temper levels among a total of 457 B.Ed. trainees from both Grant-in-Aid and Unaided colleges. The largest proportion of trainees falls into the "Extremely High Scientific Temper" category at 30.20% (N=138), followed closely by the "High" and "Above Average" categories at 25.82% and 24.94% respectively. In contrast, a very small minority of the trainees exhibit lower levels, with only 0.66% categorized as "Low" and 0.22% as "Extremely Low". Collectively, the data indicates a strong overall scientific temper within the group, supported by a calculated mean score of 110.64.

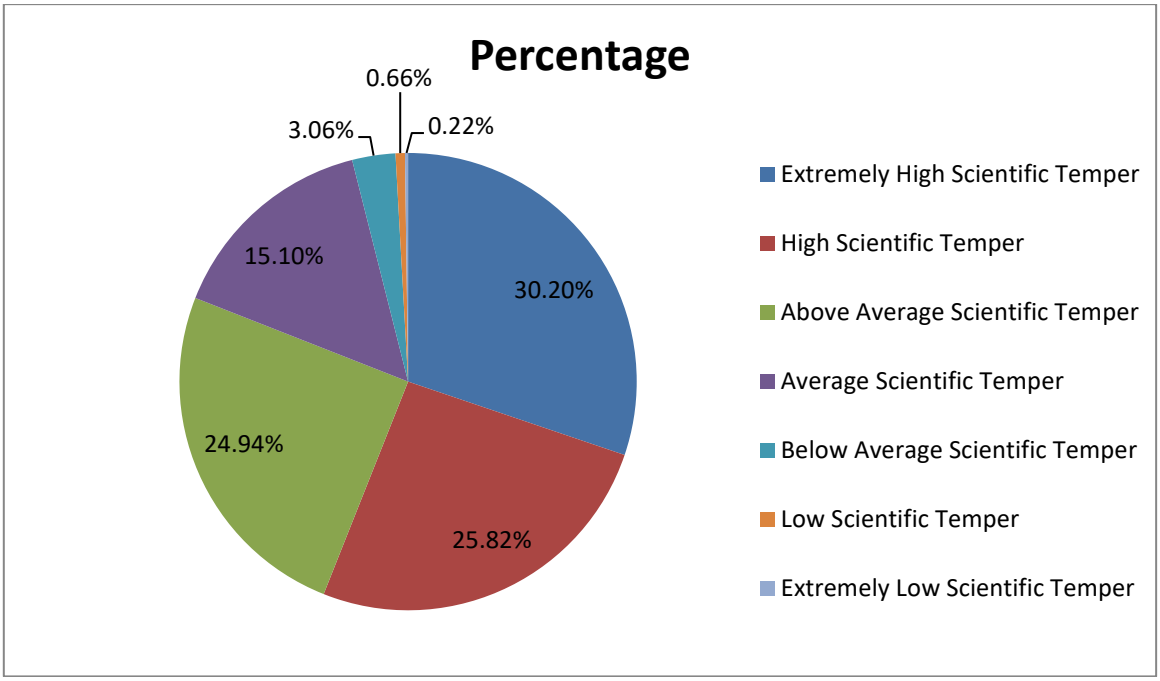

Fig. 1.1: Showing the overall Percentage of Scientific Temper among B.Ed. trainees of Grant-in-Aid and Unaided colleges.

Table 1.2: Showing the percentage comparison between B.Ed. trainees of Grant-in-Aid and Unaided colleges on levels of Scientific Temper

Levels	**Grant-in-Aid**		**Unaided**	
	N	**Percentage**	**N**	**Percentage**
Extremely High Scientific Temper	77	35.16	61	25.63
High Scientific Temper	61	27.85	57	23.95
Above Average Scientific Temper	50	22.83	64	26.89
Average Scientific Temper	24	10.96	45	18.91
Below Average Scientific Temper	7	3.20	7	2.94
Low Scientific Temper	0	0	3	1.26
Extremely Low Scientific Temper	0	0	1	0.42
Total	**219**	**100.0**	**238**	**100.0**

Table 1.2 presents a percentage comparison of Scientific Temper levels among B.Ed. trainees from Grant-in-Aid (N=219) and Unaided (N=238) colleges. The data reveals that a higher percentage of Grant-in-Aid trainees possess an "Extremely High" scientific temper (35.16%) compared to their Unaided counterparts (25.63%). Conversely, the Unaided group shows a broader distribution across

lower levels, including small representations in the "Low" (1.26%) and "Extremely Low" (0.42%) categories, which are entirely absent in the Grant-in-Aid group. Overall, while both groups predominantly fall within the "Above Average" to "Extremely High" brackets, the Grant-in-Aid trainees demonstrate a more concentrated trend toward higher levels of Scientific Temper.

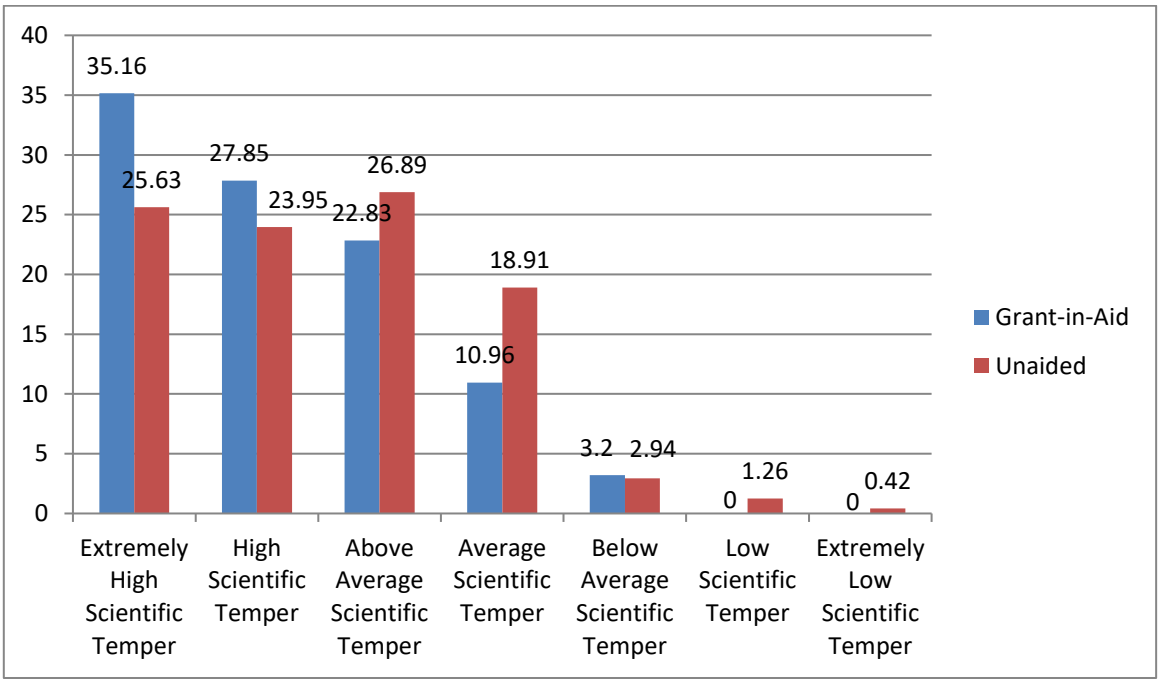

Fig. 1.2: Showing the percentage comparison between B.Ed. trainees of Grant-in-Aid and Unaided colleges on levels of Scientific Temper.

SECTION 'B'-COMPARTIVE ANALYSIS

Comparative analysis of B.Ed. trainees of Grant-in-Aid and Unaided colleges on various dimensions of Scientific Temper.

Table 2.1: Showing the mean difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on 'Critical Mindedness' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Critical Mindedness	Grant-in-Aid	219	14.83	2.89	0.03894	**
	Unaided	238	14.26	2.98		

**= not significant at 0.05

Table 2.1 displays a comparison of the Critical Mindedness dimension of Scientific Temper between B.Ed. trainees from Grant-in-Aid (N=219) and Unaided (N=238) colleges. The Grant-in-Aid group achieved a mean score of 14.83 with a standard deviation of 2.89, while the Unaided group had a mean of 14.26 and a standard deviation of 2.98. The analysis yielded a t-value of 0.03894, which is marked as not significant at the 0.05 level. This indicates that there is no statistically significant difference in the critical mindedness of trainees based on whether they attend a Grant-in-Aid or Unaided college.

Table 2.2: Showing the mean difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on 'Open-Mindedness' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Open-Mindedness	Grant-in-Aid	219	15.01	2.83	0.00007	**
	Unaided	238	13.93	2.94		

**= not significant at 0.05

Table 2.2 presents a comparison of the "Open-Mindedness" dimension of scientific temper between B.Ed. trainees from Grant-in-Aid and Unaided colleges. The data indicates that trainees from Grant-in-Aid institutions (N=219) achieved a mean score of 15.01 with a standard deviation of 2.83, while those from Unaided colleges (N=238) recorded a slightly lower mean of 13.93 with a standard deviation of 2.94. Despite the numerical difference in means, the calculated t-value of 0.00007 is found to be not significant at the 0.05 level. This statistical result suggests that there is no meaningful disparity in the level of open-mindedness between trainees from the two types of educational institutions.

Table 2.3: Showing the mean difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on 'Respect for Evidence' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Respect for Evidence	Grant-in-Aid	219	17.42	2.06	0.07546	**
	Unaided	238	17.05	2.35		

**= not significant at 0.05

Table 2.3 provides a comparison of the "Respect for Evidence" dimension of scientific temper between B.Ed. trainees from Grant-in-Aid and Unaided colleges. The data reveals that Grant-in-Aid trainees (N=219) achieved a mean score of 17.42 with a standard deviation of 2.06, while their counterparts from Unaided institutions (N=238) recorded a mean of 17.05 with a standard deviation of 2.35. While the Grant-in-Aid group displays a slightly higher average score, the calculated t-value of 0.07546 is found to be not significant at the 0.05 level. This statistical result indicates that there is no meaningful difference between the two groups regarding their respect for evidence, suggesting a consistent development of this scientific trait regardless of institutional type.

Table 2.4: Showing the mean difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on 'Suspended Judgment' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Suspended Judgment	Grant-in-Aid	219	16.58	2.58	0.09666	**
	Unaided	238	16.14	2.99		

**= not significant at 0.05

Table 2.4 illustrates the mean difference between B.Ed. trainees from Grant-in-Aid and Unaided colleges specifically regarding the "Suspended Judgment" dimension of scientific temper. The Grant-in-Aid group (N=219) achieved a mean score of 16.58 with a standard deviation of 2.58, whereas the

Unaided group (N=238) recorded a mean score of 16.14 with a standard deviation of 2.99. The resulting t-value of 0.09666 is marked as not significant at the 0.05 level, indicating that there is no statistically significant difference between these two categories of trainees in their capacity for suspended judgment.

Table 2.5: Showing the mean difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on 'Willingness to Change Opinions' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Willingness to Change Opinions	Grant-in-Aid	219	15.67	2.62	0.00083	**
	Unaided	238	14.80	2.87		

**= not significant at 0.05

Table 2.5 details the mean differences between B.Ed. trainees from Grant-in-Aid and Unaided colleges regarding the "Willingness to Change Opinions" dimension of scientific temper. The Grant-in-Aid group (N=219) achieved a mean score of 15.67 with a standard deviation of 2.62, while the Unaided group (N=238) recorded a slightly lower mean of 14.80 with a standard deviation of 2.87. Despite this numerical variation, the calculated t-value of 0.00083 is not significant at the 0.05 level. This result suggests that there is no statistically significant disparity between the two groups of trainees in their openness to revising their opinions based on new information.

Table 2.6: Showing the mean difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on 'Questioning Attitude' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Questioning Attitude	Grant-in-Aid	219	17.54	2.16	0.19903	**
	Unaided	238	17.27	2.38		

**= not significant at 0.05

Table 2.6 presents the comparison of the "Questioning Attitude" dimension of scientific temper between B.Ed. trainees from Grant-in-Aid and Unaided colleges. The data shows that trainees from Grant-in-Aid colleges (N=219) achieved a mean score of 17.54 with a standard deviation of 2.16, while those from Unaided colleges (N=238) recorded a mean of 17.27 with a standard deviation of 2.38. The calculated t-value of 0.19903 is determined to be not significant at the 0.05 level, indicating that there is no statistically significant difference between the two groups in their questioning attitude.

Table 2.7: Showing the mean difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on 'Objectivity' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Objectivity	Grant-in-Aid	219	14.95	2.75	0.00003	**
	Unaided	238	13.92	2.51		

**= not significant at 0.05

Table 2.7 compares the "Objectivity" dimension of scientific temper between B.Ed. trainees from Grant-in-Aid and Unaided colleges. The Grant-in-Aid group (N=219) recorded a mean score of 14.95 with a standard deviation of 2.75, while the Unaided group (N=238) achieved a mean of 13.92 with a standard deviation of 2.51. Despite the numerical difference in means, the calculated t-value of 0.00003 is not significant at the 0.05 level. This statistical result indicates that there is no significant difference between the two types of institutions regarding the objectivity levels of their trainees.

Table 2.8: Showing the mean difference between B.Ed. trainees of Grant-in-Aid and Unaided colleges on 'Overall dimensions' of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Scientific Temper	Grant-in-Aid	219	112.94	12.87	0.00036	**
	Unaided	238	108.54	13.27		

**= not significant at 0.05

Table 2.8 illustrates the mean differences in the "Overall dimensions" of scientific temper between B.Ed. trainees from Grant-in-Aid and Unaided institutions. The data shows that the Grant-in-Aid cohort (N=219) achieved a higher mean score of 112.94 (SD = 12.87) compared to the Unaided cohort (N=238), which recorded a mean of 108.54 (SD = 13.27). Despite this numerical variance, the calculated t-value of 0.00036 is determined to be not significant at the 0.05 level. Consequently, the results indicate that there is no statistically significant disparity in the overall scientific temper between trainees from these two types of colleges.

VII. DISSCUSSION:

The findings of this study reveal that a significant majority of B.Ed. trainees in Mysuru possess a high level of scientific temper, with over 80% falling into the "Above Average" to "Extremely High" categories and a collective mean score of 110.64. While descriptive data suggests that Grant-in-Aid trainees have a higher concentration of "Extremely High" scientific temper (35.16%) compared to Unaided trainees (25.63%), the inferential statistical analysis tells a more nuanced story. The t-test results for all seven dimensions such as Critical Mindedness, Open-Mindedness, Respect for Evidence, Suspended Judgment, Willingness to Change Opinions, Questioning Attitude, and Objectivity yielded t-values that were consistently not significant at the 0.05 level. For instance, the overall mean difference (112.94 for Grant-in-Aid vs. 108.54 for Unaided) resulted in a non-significant t-value of 0.00036. This indicates that while institutional management types may differ in resources or admission criteria, they are equally effective in fostering the core cognitive and behavioral traits associated with scientific inquiry among teacher trainees.

VIII. IMPLICATIONS:

The results of this study carry significant implications for teacher education policy and curriculum design. Since the study confirms a robust level of Scientific Temper across both Grant-in-Aid and Unaided colleges, it suggests that the current B.Ed. curriculum under the University of Mysore is successfully internalizing scientific values regardless of the college's financial structure. However, the presence of "Low" and "Extremely Low" levels in the Unaided sector (though minimal at 1.68% combined) suggests a need for targeted remedial workshops or "science-in-society" seminars specifically in those institutions to ensure no trainee enters the profession with a closed or uncritical mindset. Furthermore, since Scientific Temper is a prerequisite for effective National Education Policy (NEP) 2020 implementation, these findings provide a positive baseline for education departments to integrate

more inquiry-based pedagogy, knowing that the trainee workforce already possesses a strong foundation in objectivity and critical thinking.

IX. CONCLUSION:

This comparative study concludes that there is no statistically significant difference in the scientific temper of B.Ed. trainees from Grant-in-Aid and Unaided colleges in Mysuru. Consequently, the null hypothesis stating that no significant difference exists between the two groups across various dimensions is accepted. While Grant-in-Aid institutions showed a slight numerical advantage in mean scores across dimensions like Open-Mindedness (15.01 > 13.93) and Objectivity (14.95 > 13.92), the lack of statistical significance proves that both types of institutions are producing teachers who are equally equipped with a questioning attitude and respect for evidence. Ultimately, the study highlights a healthy intellectual environment in Mysuru's teacher training sector, where the spirit of rationalism and scientific inquiry remains consistent across different institutional frameworks.

X. DELIMITATIONS OF THE STUDY:

The scope of this study was delimited in several ways to maintain focus and depth. Geographically, the research was confined solely to B.Ed. colleges located within Mysuru and affiliated with the University of Mysore, meaning the findings may not be generalizable to trainees in other districts or states. Temporally, the data collection was restricted to the academic year 2024-25. The study focused exclusively on the comparison between Grant-in-Aid and Unaided colleges, excluding Government B.Ed. college from its purview. Additionally, the assessment of Scientific Temper was limited to the seven dimensions defined by Prof. K.S. Misra's Scientific Temper Inventory (S.T.I.), and the study did not account for external variables such as the trainees' previous academic backgrounds (Arts vs. Science streams) or their socio-economic status.

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