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Scientific Temper Among Arts and Science B.Ed. Teacher Trainees in Mysuru: A Comparative Study

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Abstract:
This study investigates the level of Scientific Temper among Arts and Science B.Ed. teacher trainees, 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 of Arts and Science B.Ed. Teacher trainees in Various B.Ed. Colleges of Mysuru affiliated to University of Mysore. The sample consists of 487 (256 Arts and 231 Science) B.Ed. teacher 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 Arts and Science B.Ed. teacher trainees in Mysuru possessed a high level of Scientific Temper. However, Science B.Ed. teacher trainees showed a slightly higher level of Scientific Temper compared to Arts B.Ed. teacher trainees. It also showed that, there is no significant difference between Arts and Science B.Ed. teacher trainees on various dimensions of Scientific Temper.

Key words: Scientific Temper, B.Ed. Teacher Trainees, Arts and Science Stream, Pre-Service Teachers, Comparative Study.

1. INTRODUCTION:

Scientific Temper is considered a vital attribute for individuals living in a modern, knowledge-based society. It refers to the development of a rational, inquisitive, and evidence-based approach toward understanding natural and social phenomena. In the context of education, Scientific Temper plays a crucial role in shaping critical thinking, problem-solving abilities, and reflective teaching practices among future educators. Teachers with a high level of Scientific Temper are more likely to encourage inquiry, creativity, and logical reasoning among their students, thereby promoting a culture of scientific thinking in classrooms.

Teacher education institutions are responsible for preparing competent and professionally committed teachers who can adapt to the changing educational landscape. B.Ed. teacher trainees, especially from Arts and Science streams, constitute a significant segment of pre-service teachers who will influence the intellectual and scientific development of school students. Previous studies have emphasized that Scientific Temper is influenced by academic background, curriculum exposure, and learning experiences (Kumar & Choudhary, 2018; NCERT, 2012). However, there is a need to examine whether differences exist between Arts and Science teacher trainees in their level of Scientific Temper.

Comparative studies on Scientific Temper among different academic disciplines are limited, particularly in the Indian teacher education context. Understanding such differences can help teacher educators design appropriate interventions and curriculum strategies to enhance Scientific Temper among all teacher trainees. Hence, the present study aims to compare the Scientific Temper of Arts and Science B.Ed. teacher trainees and to provide insights for improving teacher education practices.

II. LITERATURE REVIEW:

Singh, U., & Mishra, P. (2014).
The study found that general B.Ed. pupil teachers possess a significantly higher scientific attitude compared to B.Ed. (Special) pupil teachers. Within the special education group, trainees with a science background demonstrated more advanced scientific temper than those from arts or commerce streams. The findings emphasize the need to integrate inquiry-based activities into special education curricula to bridge these gaps in objectivity and critical thinking.

Kour, S. (2015).
The study revealed a significant positive correlation between academic achievement and scientific temper among adolescent girls, with high achievers demonstrating superior curiosity and open-mindedness. Conversely, low-achieving students exhibited a higher tendency toward superstitions and lacked a systematic approach to problem-solving. These findings suggest that fostering a rational, inquiry-based outlook is essential for improving both cognitive development and academic performance.

Ramesh, P. (2022).
The study highlights that while scientific temper is a constitutional mandate in India, its integration remains inconsistent due to a historical focus on rote learning over critical inquiry. Ramesh argues that systemic shifts in pedagogical methods are necessary to align modern educational practices with the rational, evidence-based outlook intended by policy frameworks. The findings call for a curriculum that prioritizes logical reasoning and objectivity to bridge the gap between policy goals and actual classroom outcomes.

Tiwari, A. & Pathak, K. H. (2022).
This meta-analysis revealed that gender and academic stream are the most significant predictors of scientific attitude, with science-background teachers demonstrating higher objectivity and curiosity. Interestingly, the study found that demographic factors like age, residence, and family type have a negligible impact on a teacher's overall scientific temper. The researchers concluded that a strong scientific attitude is positively correlated with more effective teaching practices and professional personality development.

Rasheed, N. & Bhat, S. A.(2023).
This study investigated scientific temperament among secondary school students, finding no significant difference between male and female students in their overall scientific outlook. The results suggest that gender does not act as a barrier to developing rationality, curiosity, or objectivity when students are provided with similar educational environments. Consequently, the researchers emphasize that school interventions should focus on enhancing inquiry-based learning for all students regardless of gender.

Yadav, K., & Agarwal, A. (2023).
The study concluded that most students possess a moderate level of scientific temper, with significant variations driven by their chosen stream of study and type of school. It found that science students and those in private institutions generally exhibit higher rationality and curiosity than their counterparts. The

researchers advocate for a shift toward student-centered, activity-based learning to further bridge these gaps and nurture a scientific outlook.

Imran, M., Sultan, A., & Ali, F. (2024).
The study identified significant gender-based differences in pedagogical practices, noting that female teachers often utilize more collaborative and student-centered approaches compared to their male counterparts. While both genders maintained positive attitudes toward student learning, female educators demonstrated higher levels of patience and emotional support in the classroom. The findings suggest that professional development should target these variations to ensure a more balanced and effective instructional environment for all students.

Jena, A., & Sangeeta. (2024).
The study found that student teachers in Khordha district generally possess a moderate level of scientific attitude, with no significant differences observed based on gender. However, variations were noted between rural and urban candidates, suggesting that environmental and infrastructural factors influence the development of a scientific temper. The researchers recommend enhancing teacher training programs with practical, inquiry-based activities to boost objective thinking among future educators.

Karmakar, P., & Chattopadhyay, K. N. (2024).
The study highlights that National Education Policy (NEP) 2020 re-emphasizes scientific temper as a core constitutional value, yet identifies a persistent gap between policy goals and classroom practice. The findings suggest that teachers' own scientific attitude—marked by logical thinking and an aversion to superstitions—is the primary catalyst for fostering curiosity and critical inquiry in students. To bridge implementation challenges, the researchers advocate for restructuring teacher training (B.Ed. and D.El.Ed.) to prioritize hands-on, experiential learning over rote-based instruction.

Sharma, P., & Trivedi, L. (2024).
The study found that female teacher trainees in the science stream exhibit significantly higher levels of academic resilience and an internal locus of control compared to those in the arts stream. These results suggest that the rigorous, inquiry-based nature of science education may better equip trainees to handle academic challenges and take personal responsibility for their success. Consequently, the researchers recommend integrating resilience-building strategies into arts curricula to foster a more proactive professional mindset.

Panchal, J. R., & Mahadevaswamy, P. (2025).
The study found a strong positive correlation between high levels of scientific temper and the professional growth of teacher educators, indicating that rationality enhances instructional effectiveness. Findings suggest that educators who possess a scientific outlook are more likely to adopt innovative technologies and evidence-based pedagogical practices in their training. The researchers concluded that institutionalizing a culture of inquiry is essential for the continuous professional development of faculty in higher education.

III. OBJECTIVES OF THE STUDY:

The present study was undertaken to achieve the following objectives:

1. To study the level of Scientific Temper among Arts and Science B.Ed. teacher trainees.
2. To compare the Arts and Science B.Ed. teacher trainees on various dimensions of Scientific Temper.

IV. HYPOTHESES OF THE STUDY:

1. There is no significant difference between Arts and Science B.Ed. teacher trainees 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. teacher trainees in various B.Ed. colleges of Mysuru affiliated to University of Mysore in the academic year 2024-25. Seven B.Ed. colleges of Mysuru were randomly selected. There were total 487 B.Ed. teacher trainees as sample (256 Arts and 231 Science). 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 of Arts and Science B.Ed. teacher trainees.

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 Arts and Science B.Ed. teacher trainees on Scientific Temper.

Table 1.1: Showing the overall Percentage of Scientific Temper among Arts and Science B.Ed. Teacher trainees.

Levels	**N**	**Percentage**
Extremely High Scientific Temper	153	31.4
High Scientific Temper	121	24.8
Above Average Scientific Temper	120	24.7
Average Scientific Temper	74	15.2
Below Average Scientific Temper	15	3.1
Low Scientific Temper	3	0.6
Extremely Low Scientific Temper	1	0.2
Total	**487**	**100.0**
Mean Score	**110.90**	

The above table shows the overall levels of Scientific Temper among Arts and Science B.Ed. teacher trainees. The results of the table depict that 31.4% B.Ed. teacher trainees have Extremely High level of Scientific Temper, 24.8% B.Ed. teacher trainees have High level of Scientific Temper, 24.7% B.Ed. teacher trainees have Above Average level of Scientific Temper, 15.2% B.Ed. teacher trainees have Average level of Scientific Temper, 3.1% B.Ed. teacher trainees have Below Average level of Scientific Temper, 0.6% B.Ed. teacher trainees have Low level of Scientific Temper, 0.2% B.Ed. teacher trainees have Extremely Low level of Scientific Temper.

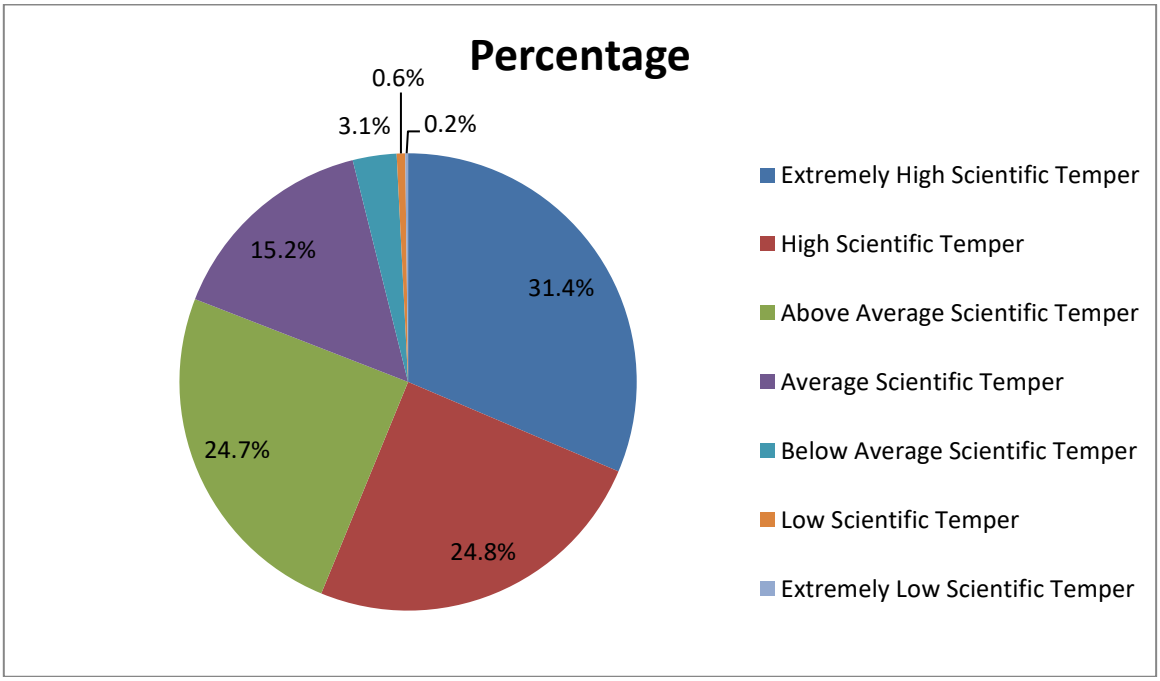

Fig. 1.1: Showing the overall Percentage of Scientific Temper among Arts and Science B.Ed. teacher trainees.

Table 1.2: Showing the percentage comparison between Arts and Science B.Ed. teacher trainees on levels of Scientific Temper

Levels	**Arts B.Ed. teacher trainees**		**Science B.Ed. teacher trainees**	
	N	**Percentage**	**N**	**Percentage**
Extremely High Scientific Temper	69	26.9	84	36.4
High Scientific Temper	69	26.9	52	22.5
Above Average Scientific Temper	60	23.4	60	26.0
Average Scientific Temper	48	18.8	26	11.2
Below Average Scientific Temper	8	3.2	7	3.0
Low Scientific Temper	1	0.4	2	0.9
Extremely Low Scientific Temper	1	0.4	0	0.0
Total	**256**	**100.0**	**231**	**100.0**

The above table shows the comparison between Arts and Science B.Ed. teacher trainees on levels of Scientific Temper. The table reveals that Science B.Ed. teacher trainees show more level of "Extremely High Scientific Temper" 36.4% as compared to Arts B.Ed. teacher trainees 26.9%. Further, 26.9% of Arts B.Ed. teacher trainees shows "High Scientific Temper" while 22.5% of Science B.Ed. teacher trainees fall at this level. Further, 26.0% of Science B.Ed. teacher trainees shows "Above Average Scientific Temper" while 23.4% of Arts B.Ed. teacher trainees fall at this level. Further, 18.8% Arts B.Ed. teacher trainees shows "Average Scientific Temper" while 11.2% of Science B.Ed. teacher trainees fall at this level. Further, 3.2% Arts B.Ed. teacher trainees shows "Below Average Scientific Temper" while 3.0% of Science B.Ed. teacher trainees fall at this level. Further, 0.9% Science B.Ed. teacher trainees shows "Low Scientific Temper" while 0.4% of Arts B.Ed. teacher trainees fall at this level. Further, 0.4% Arts B.Ed. teacher trainees shows "Extremely Low Scientific Temper" while None of Science B.Ed. teacher trainees shows "Extremely Low Scientific Temper".

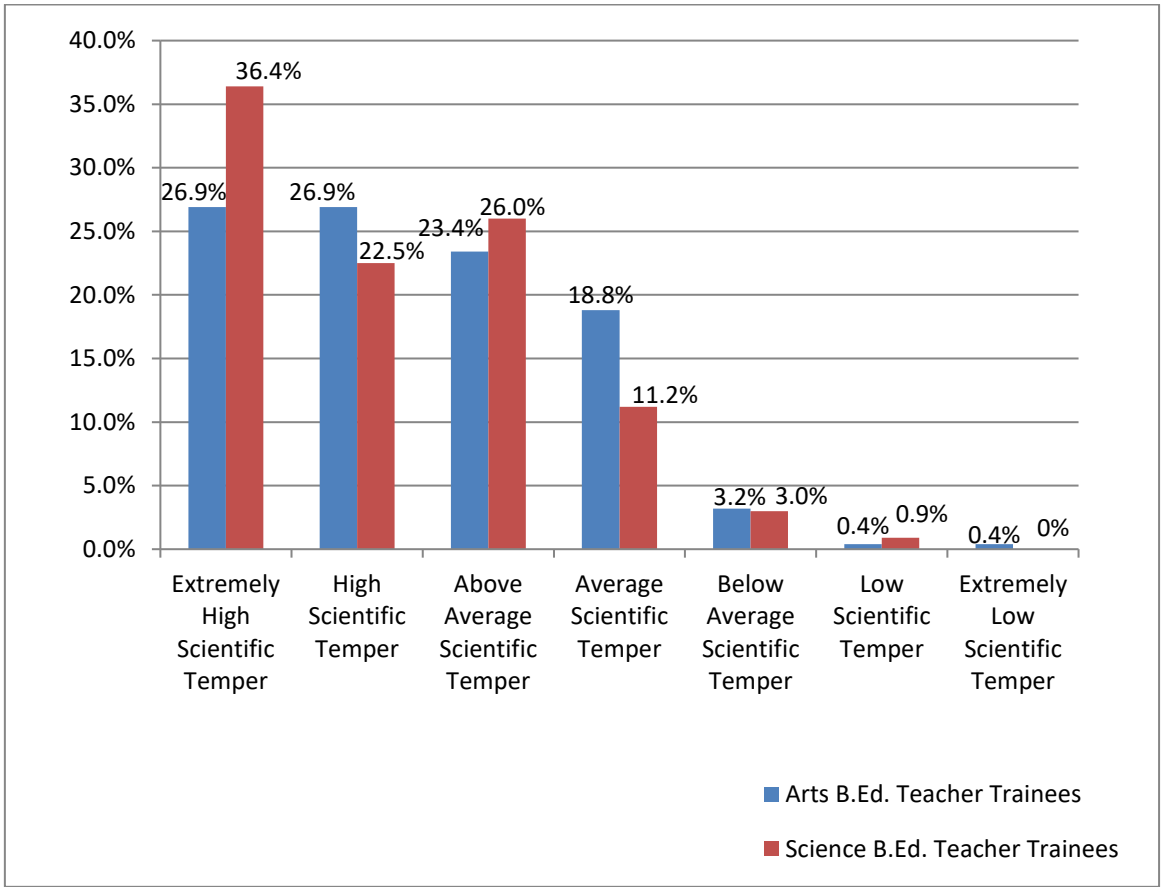

Fig. 1.2: Showing the percentage comparison between Arts and Science B.Ed. teacher trainees on levels of Scientific Temper.

SECTION 'B'-COMPARTIVE ANALYSIS

Comparative analysis of Arts and Science B.Ed. teacher trainees on various dimensions of Scientific Temper.

Table 2.1: Showing the mean difference between Arts and Science B.Ed. teacher trainees on 'Critical Mindedness' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Critical Mindedness	Arts	256	14.48	6.7270	0.1186	**
	Science	231	14.89	6.7251		

**= not significant at 0.05

The mean score of Science B.Ed. teacher trainees (M=14.89) was slightly higher than the Arts B.Ed. teacher trainees (M=14.48). However, the standard deviation values of both groups (Arts = 6.7270, Science = 6.7251) were almost identical, indicating similar variability in Critical Mindedness scores among the two groups. The calculated t-value 0.1186 was less than the critical t value at 0.05 level of significance. Hence null hypothesis was accepted, indicating no significant difference between Arts and Science B.Ed. teacher trainees on "Critical Mindedness" dimension of Scientific Temper.

Table 2.2: Showing the mean difference between Arts and Science B.Ed. teacher trainees on 'Open-Mindedness' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Open-Mindedness	Arts	256	14.45	6.6659	0.5774	**
	Science	231	14.60	6.6639		

**= not significant at 0.05

The mean score of Science B.Ed. teacher trainees (M=14.60) was slightly higher than the Arts B.Ed. teacher trainees (M=14.45). However, the standard deviation values of both groups (Arts = 6.6659, Science = 6.6639) were almost identical, indicating similar variability in Open-Mindedness scores among the two groups. The calculated t-value 0.5774 was less than the critical t value at 0.05 level of significance. Hence null hypothesis was accepted, indicating no significant difference between Arts and Science B.Ed. teacher trainees on "Open-Mindedness" dimension of Scientific Temper.

Table 2.3: Showing the mean difference between Arts and Science B.Ed. teacher trainees on 'Respect for Evidence' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Respect for Evidence	Arts	256	17.05	7.8573	0.0295	**
	Science	231	17.49	7.8553		

**= not significant at 0.05

The mean score of Science B.Ed. teacher trainees (M=17.49) was slightly higher than the Arts B.Ed. teacher trainees (M=17.05). However, the standard deviation values of both groups (Arts = 7.8573, Science = 7.8553) were almost identical, indicating similar variability in Respect for Evidence scores among the two groups. The calculated t-value 0.0295 was less than the critical t value at 0.05 level of significance. Hence null hypothesis was accepted, indicating no significant difference between Arts and Science B.Ed. teacher trainees on "Respect for Evidence" dimension of Scientific Temper.

Table 2.4: Showing the mean difference between Arts and Science B.Ed. teacher trainees on 'Suspended Judgment' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Suspended Judgment	Arts	256	16.01	7.4932	0.0222	**
	Science	231	16.61	7.4913		

**= not significant at 0.05

The mean score of Science B.Ed. teacher trainees (M=16.61) was slightly higher than the Arts B.Ed. teacher trainees (M=16.01). However, the standard deviation values of both groups (Arts = 7.4932, Science = 7.4913) were almost identical, indicating similar variability in Suspended Judgment scores among the two groups. The calculated t-value 0.0222 was less than the critical t value at 0.05 level of significance. Hence null hypothesis was accepted, indicating no significant difference between Arts and Science B.Ed. teacher trainees on "Suspended Judgment" dimension of Scientific Temper.

Table 2.5: Showing the mean difference between Arts and Science B.Ed. teacher trainees on 'Willingness to Change Opinions' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Willingness to Change Opinions	Arts	256	14.91	7.0060	0.0013	**
	Science	231	15.73	7.0040		

**= not significant at 0.05

The mean score of Science B.Ed. teacher trainees (M=15.73) was slightly higher than the Arts B.Ed. teacher trainees (M=14.91). However, the standard deviation values of both groups (Arts = 7.0060, Science = 7.0040) were almost identical, indicating similar variability in Willingness to Change Opinions scores among the two groups. The calculated t-value 0.0013 was less than the critical t value at 0.05 level of significance. Hence null hypothesis was accepted, indicating no significant difference between Arts and Science B.Ed. teacher trainees on "Willingness to Change Opinions" dimension of Scientific Temper.

Table 2.6: Showing the mean difference between Arts and Science B.Ed. teacher trainees on 'Questioning Attitude' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Questioning Attitude	Arts	256	17.36	7.9483	0.4261	**
	Science	231	17.52	7.9463		

**= not significant at 0.05

The mean score of Science B.Ed. teacher trainees (M=17.52) was slightly higher than the Arts B.Ed. teacher trainees (M=17.36). However, the standard deviation values of both groups (Arts = 7.9483, Science = 7.9463) were almost identical, indicating similar variability in Questioning Attitude scores among the two groups. The calculated t-value 0.4261 was less than the critical t value at 0.05 level of significance. Hence null hypothesis was accepted, indicating no significant difference between Arts and Science B.Ed. teacher trainees on "Questioning Attitude" dimension of Scientific Temper.

Table 2.7: Showing the mean difference between Arts and Science B.Ed. teacher trainees on 'Objectivity' dimension of Scientific Temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Objectivity	Arts	256	14.34	6.5447	0.8537	**
	Science	231	14.38	6.5428		

**= not significant at 0.01

The mean score of Science B.Ed. teacher trainees (M=14.38) was slightly higher than the Arts B.Ed. teacher trainees (M=14.34). However, the standard deviation values of both groups (Arts = 6.5447, Science = 6.5428) were almost identical, indicating similar variability in Objectivity scores among the two groups. The calculated t-value 0.8537 was less than the critical t value at 0.05 level of significance. Hence null hypothesis was accepted, indicating no significant difference between Arts and Science B.Ed. teacher trainees on "Objectivity" dimension of Scientific Temper.

Table 2.8: Showing the mean difference between Arts and Science B.Ed. teacher trainees on 'Overall dimensions' of Scientific temper

Dimension	Group	N	Mean	Std. Deviation	t-value	Level of Significance
Scientific Temper	Arts	256	109.55	55.3337	0.0203	**
	Science	231	112.38	55.3317		

**= not significant at 0.05

The mean score of Science B.Ed. teacher trainees (M=112.38) was marginally higher than the Arts B.Ed. teacher trainees (M=109.55). However, the standard deviation values of both groups (Arts = 55.3337, Science = 55.3317) were almost identical, indicating similar variability in Scientific Temper scores among the two groups. The calculated t-value 0.0203 was less than the critical t value at 0.05 level of significance. Hence null hypothesis was accepted, indicating no significant difference between Arts and Science B.Ed. teacher trainees on "Overall" dimensions of Scientific Temper.

VII. DISSCUSSION:

The primary objective of this study was to assess and compare the levels of Scientific Temper among B.Ed. teacher trainees from Arts and Science streams. Scientific Temper is not merely the knowledge of scientific facts but a way of life.

Analysis of Overall Scientific Temper:

The descriptive analysis in Table 1.1 reveals a highly encouraging trend: over 80% of the total B.Ed. teacher trainees possess a scientific temper ranging from "Above Average" to "Extremely High." Specifically, 31.4% fall into the "Extremely High" category. This suggests that the current teacher education cohort is well-equipped with the cognitive prerequisites necessary to foster rational thinking in future classrooms.

When comparing the two streams Table 1.2, Science trainees showed a higher percentage in the "Extremely High" category 36.4% compared to Arts trainees 26.9%. This aligns with the traditional expectation that rigorous engagement with the scientific method in undergraduate studies reinforces empirical thinking. However, it is noteworthy that none of the Science trainees fell into the "Extremely Low" category, whereas a small fraction of Arts trainees did.

Dimensional Analysis and Hypothesis Testing:

Despite the descriptive differences in percentages, the inferential statistics (Tables 2.1 to 2.8) present a different narrative regarding significant differences.

- **Consistency Across Dimensions:** Across all seven dimensions. i.e, Critical Mindedness, Open-Mindedness, Respect for Evidence, Suspended Judgment, Willingness to Change Opinions, Questioning Attitude, and Objectivity. The Science trainees consistently scored marginally higher mean values than their Arts counterparts.
- **Statistical Significance:** In every single case, the calculated t-value was found to be less than the critical value at the 0.05 level of significance. Consequently, the null hypotheses were accepted.

This finding indicates that there is no significant difference between Arts and Science B.Ed. teacher trainees in their overall scientific temper or its individual dimensions. This is a crucial finding as it suggests that "Scientific Temper" is a universal cognitive attribute influenced more by the general educational environment and maturity than by the specific subject of specialization.

VIII. IMPLICATIONS:

The results imply that the B.Ed. curriculum succeeds in maintaining a balanced development of rational thinking across disciplines. Since Arts teachers are responsible for teaching Social Sciences and

Languages subjects deeply intertwined with human behavior and social logic. Their parity with Science trainees in "Respect for Evidence" and "Critical Mindedness" is a positive indicator for a holistic educational system.

IX. CONCLUSION:

The study concludes that B.Ed. teacher trainees in Mysuru possess a high level of Scientific Temper, with over 80% of the sample scoring in the "Above Average" to "Extremely High" categories. This indicates a strong foundation for fostering rational and analytical thinking in future classrooms. While descriptive data showed Science trainees having a higher percentage of "Extremely High" scores (36.4%) compared to Arts trainees (26.9%), inferential statistics revealed a different narrative. The t-test results for all seven dimensions including Critical Mindedness, Objectivity, and Questioning Attitude showed no statistically significant differences between the two groups. Consequently, the null hypothesis was accepted, proving that academic specialization does not dictate one's scientific outlook. This highlights that Scientific Temper is a universal cognitive trait, equally prevalent among Arts and Science educators. These findings suggest that the current teacher education program effectively nurtures a balanced, evidence-based mindset across disciplines, ensuring that all future teachers are equipped to promote logical inquiry and intellectual honesty regardless of their subject expertise.

X. DELIMITATIONS OF THE STUDY:

The study is delimited to B. Ed teacher-trainees undergoing 2 years B.Ed. course from Mysuru affiliated to University of Mysore.

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