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"A Comparative Analysis of Scientific Outlook in Social Engagement Across Castes"

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Abstract:

The present study investigates scientific attitudes toward social activities among higher and lower castes within Hindu and Muslim communities. A population comprising individuals from selected castes was sampled, with 100 participants equally distributed across four caste groups (25 each). Findings reveal significant differences in scientific attitudes between higher and lower castes within both Hinduism and Islam, indicating caste hierarchy strongly influences outlook. However, no significant differences were observed between higher castes of Hindu and Muslim groups, nor between lower castes across religions. These results suggest that caste position, rather than religious affiliation, is the dominant factor shaping scientific attitudes.

INTRODUCTION

The Indian Constitution, through Article 14, provides for equalization in all spheres of education. The Ministry of Human Resource Development and other policymakers have made significant efforts to ensure equal educational opportunities. However, much of this equalization has remained quantitative—focused on the visible availability of opportunities rather than their deeper impact.

For true equalization, qualitative aspects must be addressed. This requires harmonizing the attitudes of students, since traditional caste-based Indian society reflects wide diversity in thought processes. To achieve meaningful educational equality, it is essential first to measure and understand the

current scientific attitudes of students from different castes. Only then can genuine equalization be realized.

Studying the scientific attitudes of various caste groups is important because:

1. Once quantified, individual differences can be identified, enabling remedial teaching for students who need additional support.
2. It will guide subject selection in alignment with students' attitudes.
3. It will facilitate the effective distribution of academic support services, such as:
    - Tutorial teaching
    - Extra or special classes
    - Counselling
    - Group guidance
    - Follow-up services

CONCEPT OF ATTITUDE

An attitude is a predisposition to respond favourably or unfavourably toward ideas, objects, people, events, or situations. It functions as a mental orientation shaped by prior feelings and thoughts, guiding how a person reacts. Like motives, attitudes direct behaviour by preparing an individual to act in certain ways, though they do not themselves supply the energy for action.

Key Characteristics of Attitudes

1. Evaluative basis and motivation — Attitudes rest on judgments about an object's qualities and can prompt motivated behaviour.
2. Learned nature — Attitudes are acquired through experience and socialization rather than being purely innate.
3. Social specificity — Attitudes are tied to particular social contexts or categories.
4. Interrelatedness — Different attitudes can be linked and influence one another to varying degrees.
5. Relative stability — Attitudes are generally enduring and consistent over time.

Allport's Definition

Allport described attitude as a mental and neural readiness, formed through experience, that exerts a directive and dynamic influence on an individual's responses to related objects and situations.

Scientific Attitude

The scientific attitude develops early through influences from family, peers, school, and the wider community. It represents a readiness to engage in particular kinds of inquiry and behaviour.

Individual attitudes may vary in complexity, stability, and depth, ranging from simple or superficial to complex and fundamental.

Traits of a Person with a Scientific Attitude

1. Seeks natural explanations for events.
2. Rejects superstition.
3. Shows curiosity about the environment.
4. Maintains an open mind.
5. Believes in causal relationships.
6. Demands sufficient evidence before accepting claims.
7. Thinks critically.
8. Observes carefully and accurately.
9. Is willing to revise opinions in light of contrary evidence.
10. Enjoys discovery.
11. Avoids drawing conclusions from inadequate evidence.
12. Respects others' viewpoints.
13. Upholds intellectual honesty.
14. Avoids prejudice and bias.
15. Treats conclusions as provisional, not final.
16. Does not accept authority uncritically.

NCERT Viewpoints from the 1971 Chandigarh Workshop

According to NCERT, a person who has developed a scientific attitude typically:

1. Expresses ideas and acts with clarity and precision.
2. Bases judgments on verified facts rather than mere opinion.
3. Is open to new ideas and discoveries, free from prejudice.
4. Responds positively to efforts that apply science for human welfare.
5. Is willing to reconsider personal judgments.
6. Keeps apparatus and materials organized after use.
7. Withholds judgment when data are insufficient.
8. Is free from superstition.
9. Approaches problems objectively.
10. Records and collects scientific data honestly and accurately.

NEED OF THE STUDY: -

A comparative analysis of scientific outlook across caste groups is vital because attitudes toward science influence participation in social initiatives, learning choices, and civic behaviour.

Traditional caste structures and unequal access to resources shape students' worldviews from an early age; measuring these differences reveals where attitudes hinder or help engagement with science-based social activities. Quantifying scientific outlooks enables educators and policymakers to design targeted remedial teaching, counselling, and curricular adjustments that address both cognitive and affective barriers. It also helps match subjects and pedagogies to students' needs and ensures support services—tutorials, special classes, group guidance, and follow-up—are distributed equitably. Ultimately, documenting current attitudes is a prerequisite for meaningful qualitative equalization of education and for fostering a scientifically informed citizenry across caste communities.

OBJECTIVES OF THE STUDY

- To examine the scientific attitude toward social activities among higher and lower castes within the Hindu community.
- To examine the scientific attitude toward social activities among higher and lower castes within the Muslim community.
- To compare the scientific attitudes toward social activities between higher and lower castes in the Hindu community.
- To compare the scientific attitudes toward social activities between higher and lower castes in the Muslim community.

HYPOTHESES OF THE STUDY

- H1: There is no significant difference in scientific attitude toward social activities between higher and lower castes of the Hindu community.
- H2: There is no significant difference in scientific attitude toward social activities between higher and lower castes of the Muslim community.
- H3: There is no significant difference in scientific attitude toward social activities between higher castes of Hindu and Muslim communities.
- H4: There is no significant difference in scientific attitude toward social activities between lower castes of Hindu and Muslim communities.

DELIMITATIONS OF THE STUDY

The study is limited by time and resources and therefore constrained in scope. Boundaries include:

- Geographic and demographic limits: Research was confined to selected castes within Hindu and Muslim communities in a Kalakankar Block, Dist-Pratapgarh (UP).
- Sampling frame: A sample of 25 individuals was drawn from each caste group (total 100)
- Measurement tool: A scientific attitude scale was developed by the for this study.

METHODOLOGY

A normative survey design was employed Participants were selected using random sampling. Data were collected using the scientific attitude scale developed by the investigator, aligned with the study's objectives and hypotheses.

POPULATION AND SAMPLE

- Population: Individuals belonging to the selected Hindu and Muslim castes in the study area.
- Sample: A random sample of (total 100) 25 individuals was drawn from each caste group, yielding equal representation across the four caste groups included.

TOOLS AND SCIENTIFIC ATTITUDE SCALE

- Definition used: Attitude was treated as an enduring system comprising cognitive, affective, and behavioural tendency components centred on an object, person, or event.
- Existing measures: Several standardized instruments exist (e.g., Ravindra Nath & Vandini, 1979), but none covered all relevant dimensions for this context.
- Scale development: The investigator constructed a context-specific scientific attitude scale. Key steps included:
    1. Selecting domains of scientific attitude based on literature.
    2. Drafting 30 items in Hindi for accessibility.
    3. Expert review and item classification into positive and negative statements.
    4. Using a five-point response format: Strongly agree; Agree; Undecided; Disagree; Strongly disagree.
    5. Scoring positive items 5–1 and negative items 1–5; total attitude score equals the sum of item scores.
- Pilot administration: The scale was administered to 50 individuals from each caste group for standardization.

DATA COLLECTION

Random sampling was applied to obtain a representative sample of the selected caste groups. The final dataset comprised 50 respondents from Hindu castes and 50 respondents from Muslim castes, ensuring balanced representation for comparative analysis.

TABLE FOR REPRESENTING STATISTICAL VALUES: -

Showing the means scores (Scientific Attitude) and standard deviation of the groups of different castes:-

TABLE NO. 1

	NUMBER OF PARTICIPANTS	CASTES	MEAN SCORES OF SCIENTIFIC ATTITUDES	STANDARD DEVIATION
Hindu Religion	25	Higher Castes	99.50	7.55
	25	Lower Castes	93.02	7.65
Muslim Religion	25	Higher Castes	98.50	7.20
	25	Lower Castes	91.30	7.60

TABLE NO. -2

Showing the significant of the difference between mean Scientific Attitude Scores of higher and lower castes of Hindu Religion: -

	CASTES	MEAN SCORES	STANDARD DEVIATION	t-value
Hindu Religion	Higher Castes	99.50	7.55	3.01
	Lower Castes	93.02	7.65	

difference is significant at 0.01 level and 0.05 level.

Table 2 shows the difference between mean scientific attitude scores of higher and lower castes of Hindu religion. The value of t-test obtained was 3.01 which is significant at 0.01 level and 0.05 level. So the scientific attitude of higher castes is higher than that of lower castes of Hindu religion.

The first hypothesis was that there is no significant difference between scientific attitude towards social activities of higher and lower castes of Hindu religion and the objective was to study the scientific attitude of higher and lower castes of Hindu religion. So, on the basis of t-test the scientific attitude of higher castes is higher. So the first hypothesis is rejected.

TABLE NO. -3

Showing the significant of the difference between mean Scientific Attitude Scores of higher and lower castes of Muslim Religion: -

	CASTES	MEAN SCORES	STANDARD DEVIATION	t-value
Muslim Religion	Higher Castes	98.50	7.20	3.44
	Lower Castes	91.30	7.60	

difference is significant at 0.01 level and 0.05 level.

Table 3- Shows the difference between mean scientific attitude scores of Higher and Lower castes of Muslim religion. The value of t-test obtained was 3.44 which is significant at 0.01 level and 0.05 level. So, the scientific attitude of higher castes is higher than that of lower castes of Muslim religion.

The second hypothesis was that there is no significant difference between scientific attitude towards social activities of higher and lower castes of Muslim religion and the objectives was to study the scientific attitude of higher and lower castes of Muslim religion. So on the basis of t-test the scientific attitude of higher castes is higher. So the second hypothesis is also rejected.

TABLE NO. 4

Showing the significance of difference between mean scientific attitude scores of higher castes of Hindu & Muslim religion.

	Mean	**SD**	**t-value**
Hindu Religion	99.50	7.55	0.48
Muslim Religion	98.50	7.20	

difference is not significant at 0.05 level.

Table 4 - Shows the difference between mean scientific attitude scores of Higher castes of Hindu and Muslim religion. The value of t-test obtained was 0.48 which is insignificant at 0.01 level and 0.05 level. So, the scientific attitude of higher castes of Hindu and Muslim religion is approximately same.

The fourth hypothesis was that there are no significant Hindu and Muslim religion and objective was to study scientific attitude of lower castes of Hindu and Muslim religion. so, on the basis of t-test the scientific attitude of higher castes of Hindu and Muslim religion is approximately same. So, the third hypothesis is accepted.

TABLE NO. 5

Showing significance of difference between mean scientific attitude scores of lower castes of Hindu & Muslim religion.

	Mean	**SD**	**t-value**
Hindu Religion	93.02	7.65	0.80
Muslim Religion	91.30	7.60	

difference is not significant at 0.01 level and 0.05 level.

Table 5 - Shows the difference between mean scientific attitude scores of lower castes of Hindu and Muslim religion. The value of t-test obtained was 0.80 which is insignificant at 0.01 level and 0.05 level. So, the scientific attitude of lower castes of Hindu and Muslim religion is approximately same.

The fourth hypothesis was that there are no significant Hindu and Muslim religion and objective was to study scientific attitude of lower castes of Hindu and Muslim religion. so, on the basis of t-test the scientific attitude of lower castes of Hindu and Muslim religion is approximately same. So, the fourth hypothesis is accepted.

FINDINGS: -

1. There is a significant difference between scientific attitude towards social activities of higher and lower castes Hindu religion.
2. There is a significant difference between scientific attitude towards social activities of higher castes and lower castes of Muslim religion.
3. There is no significant difference between scientific attitude towards social activities of higher castes of Hindu and Muslim religion.
4. There is no significant difference between scientific attitudes towards social activities of lower castes of Hindu & Muslim religion.

CONCLUSION: -

Within religions (intra-religious comparison):

- Among Hindus, higher and lower castes differ significantly in their scientific attitude towards social activities.
- Among Muslims, higher and lower castes also differ significantly in their scientific attitude towards social activities.

  This shows that caste distinctions *within each religion* influence scientific attitudes.

Between religions (inter-religious comparison):

- Higher castes of Hindus and Muslims show no significant difference in their scientific attitude.
- Lower castes of Hindus and Muslims also show no significant difference in their scientific attitude.

  This indicates that caste position (higher vs. lower) is more decisive than religion in shaping scientific attitudes.

Final Inference

Caste plays a stronger role than religion in determining scientific attitudes towards social activities. While differences exist between higher and lower castes within both Hinduism and Islam, people of the same caste level across religions share similar scientific attitudes.

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