A Study of Scientific Aptitude among Higher Secondary Students Based on School Environment

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Abstract:
This study examined the relationship between school environment and scientific aptitude among 600 higher secondary students from Janjgir-Champa, equally drawn from government and private schools, using stratified sampling. Students' perceptions of the school environment were measured with Mishra's (1983) inventory, and scientific aptitude with a test constructed by Agrawal and Arora (1986). Findings showed a significant positive correlation: students who perceived their school environment more positively demonstrated higher scientific aptitude, consistent across both school types, i.e. government and private. The study concludes that a supportive, inclusive school environment fosters scientific aptitude in higher secondary students.
Keywords: *School environment, scientific aptitude, higher secondary students*

INTRODUCTION

Scientific aptitude refers to an individual's natural ability and readiness to understand, apply, and appreciate scientific concepts, methods, and reasoning. It is not limited to subject knowledge; rather, it reflects a way of thinking characterized by curiosity, observation, logical analysis, and problem-solving. A person with high scientific aptitude tends to ask questions about how and why things happen, seeks evidence before accepting claims, and shows interest in experimentation and discovery.

Key components of scientific aptitude include keen observation, critical thinking, analytical reasoning, numerical ability, and the capacity to interpret data. It also involves understanding cause–and–effect relationships, forming hypotheses, testing ideas through experimentation, and drawing logical conclusions. Students with scientific aptitude often demonstrate patience in investigation, accuracy in measurement, and openness to new ideas based on evidence.

Scientific aptitude plays a vital role in academic achievement, especially in science and mathematics, as well as in everyday decision-making. It helps individuals approach problems systematically and develop rational solutions. In educational settings, nurturing scientific aptitude encourages inquiry-based learning, creativity, and innovation. Teachers can enhance this aptitude by promoting hands-on activities, experiments, discussions, and real-life applications of scientific principles. Developing scientific aptitude from an early age prepares students to think scientifically, adapt to technological advancements, and contribute meaningfully to society.

India's National Education Policy (NEP) 2020 highlights the importance of holistic student development, focusing not only on academic achievement but also on essential life skills. Research consistently shows that the school environment significantly influences students' overall growth. The school environment encompasses the physical, social, psychological, and cultural conditions in which learning occurs. Often viewed as a miniature society, a school reflects broader social values and norms that shape students' behaviour and attitudes. A positive and supportive school environment promotes not only academic success but also social, emotional, and physical well-being. Such an environment helps students develop socially responsible behaviour and emotional balance, contributing to their overall development.

Hence, the present study examines the possible linkage of school environment with scientific aptitude among secondary students.

OBJECTIVES

The objective of the present study is to correlate the perceived school environment by higher secondary school students with their scientific aptitude.

HYPOTHESIS

H_{01} No significant correlation will be observed between the perceived school environment and scientific aptitude among higher secondary school students.

REVIEW OF LITERATURE:

Mohsahid (2016) conducted a study to compare the scientific aptitude of secondary-level students from Urdu and English medium schools. The results showed that English medium students had better scientific aptitude than Urdu medium students. No significant difference was found between English and Urdu medium girls; however, Urdu medium girls showed significantly higher scientific aptitude than boys. **Narang Sushila (2018)** assessed the scientific aptitude of higher secondary students and found that gender and type of school had no significant effect on scientific aptitude. **Channavar (2018)** studied the scientific aptitude of 50 boys and 50 girls from government high schools in Raipur district, Chhattisgarh. The findings revealed that boys had higher scientific aptitude, as well as greater logical and numerical ability, than girls. However, no significant difference was found between boys and girls in scientific knowledge and science vocabulary. **Sainrema and Symb (2018)** investigated the correlation between scientific aptitude and achievement in science among Class IX students. The results showed a significant positive correlation between students' scientific aptitude and their academic achievement in science. **Mishra (2020)** found that boys had higher scientific aptitude than girls, and urban students demonstrated significantly higher scientific aptitude than rural students. **Savita (2022)** found that boys from senior secondary schools perceive the school environment as more conducive than girls. **Balasundaram and Muthuchami (2022)** concluded that there was a significant correlation between students' scientific aptitude and their study habits, but no significant difference between boys and girls in scientific aptitude or study habits. **Ibrahim and Mohammed (2023)** in their study reported a significant relationship between academic stress and self-concept in students with their school environment. It was concluded that a better school environment is needed to reduce academic stress and enhance self-concept in students. **Kapil Kalita and Pranav Saikia (2024)** conducted a comparative study of numerical ability and scientific aptitude among 50 boys and 50 girls from government secondary schools in Goalpara, Assam. The study found that boys had significantly higher numerical ability than girls, but no significant difference was observed in scientific aptitude between them.

METHODOLOGY

Sample

For the study, a total of 600 higher secondary students were selected from various schools in the Janjgir-Champa district of Chhattisgarh. The sample was carefully divided to include equal representation from both types of institutions, comprising 300 students from government schools and 300 students from private schools. This balanced selection helped ensure diversity in institutional backgrounds and learning environments. The stratified sampling technique was employed to select the participants so that different sections of students were proportionately represented in the study.

Tools:

School Environment Inventory:

The perception of students towards the school environment was assessed by an inventory prepared by Mishra (1983). It consists of 70 items. Higher scores indicate a better perception of the school environment. This inventory is highly reliable and valid.

Scientific Aptitude Test

The scientific aptitude of the selected students was measured using the Scientific Aptitude Test Battery developed by Agrawal and Arora (1986). The battery includes four components: a reasoning test, a numerical ability test, a science information test, and a science vocabulary test. The battery consists of a total of 210 questions, including 52 questions for the reasoning test, 52 for the numerical ability test, 50 for the science information test, and 56 for the science vocabulary test. Each correct answer is awarded 1 mark, while an incorrect answer receives 0 marks. The minimum possible score on the test is 0 and the maximum is 210. The reliability of the test has been established through test–retest and split-half methods. All items in the test show appropriate discrimination between high and low scorers, and the correlation of all dimensions with the total test score was found to be statistically significant, thereby confirming the validity of the test.

Procedure:

600 higher secondary school students were chosen from various government and private schools of Janjgir-Champa district of Chhattisgarh. The school environment inventory and scientific aptitude test were administered. The responses were tabulated and put to further statistical analysis. Results are given in Tables 1, 2 and 3, respectively.

RESULT AND DISCUSSION

Table 1 Correlation between School Environment and Scientific Aptitude (N=600)

	'r'	Scientific Aptitude
School Environment		0.428

r(df=598) .08 (p<.05)

Table 1 shows the correlation between school environment and scientific aptitude among 600 students. The obtained correlation coefficient (r = 0.428) indicates a moderate positive relationship between the two variables. This suggests that students who perceive their school environment more favourably tend to demonstrate higher scientific aptitude. The correlation is statistically significant at the 0.05 level (rdf=598 = 0.08, p < .05), confirming that the association between school environment and scientific aptitude is meaningful and not due to chance.

Table 2 Pearson Correlation Coefficient between School Environment and Scientific Aptitude in Students of Govt Higher Secondary School (N=300)

	'r'	Scientific Aptitude
School Environment		0.364

r(df=298) at .05 level 0.113

Table 2 presents the Pearson correlation between school environment and scientific aptitude among 300 students enrolled in government higher secondary schools. The obtained correlation coefficient (r = 0.364) indicates a positive relationship between the two variables. This means that students who perceive their school environment more positively tend to exhibit higher levels of scientific aptitude. The correlation exceeds the critical value at the 0.05 level of significance, confirming that the relationship is statistically significant.

Table 3 Pearson Correlation Coefficient between School Environment and Scientific Aptitude in Students of Private Higher Secondary School (N=300)

	'r'	Scientific Aptitude
School Environment		0.518

r(df=298) at .05 level 0.113

Table 3 presents the Pearson correlation between school environment and scientific aptitude among 300 students enrolled in private higher secondary schools. The obtained correlation coefficient (r = 0.518) indicates a moderate positive relationship between the two variables. This means that students who perceive their school environment more positively tend to exhibit higher levels of scientific aptitude. The correlation exceeds the critical value at the 0.05 level of significance, confirming that the relationship is statistically significant.

According to the findings of the study, the school environment plays an important role in shaping students' scientific aptitude. A better school environment encourages curiosity, critical thinking, and problem-solving among students. A supportive and resource-rich school setting fosters inquisitiveness and promotes inquiry-based learning, where students actively participate in analyzing scientific facts. Moreover, a positive school and teaching environment nurtures creativity and problem-solving skills, which in turn enhance students' scientific aptitude.

CONCLUSION

In conclusion, a positive and resourceful school environment significantly enhances students' scientific aptitude by fostering curiosity, critical thinking, creativity, and problem-solving. Supportive teaching

practices and inquiry-based learning further strengthen students' ability to understand and apply scientific concepts effectively.

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