

A Study of Curiosity and Reasoning Ability among Secondary School Students of Ranchi City

Sharmin Equbal¹, Roselina Singh²

¹Research Scholar, ²Assistant Professor

University Department of Psychology, Ranchi University, Ranchi

Abstract

This study investigates the impact of gender and type of school on curiosity and reasoning ability among secondary school students in Ranchi city. A sample of 100 students was randomly selected from various government and private schools. The Children's Curiosity Scale (CCS-KR) and the Reasoning Ability Test (RAT) were used to measure curiosity and reasoning abilities, respectively. The results indicate that female students scored significantly higher in both curiosity and reasoning ability compared to male students. Additionally, students from government schools exhibited higher curiosity, while reasoning ability did not significantly differ between school types. A strong positive correlation was found between curiosity and reasoning ability, emphasizing the interconnectedness of these cognitive traits. The findings underscore the need for educational strategies that address gender differences and promote cognitive development across different school environments.

Keywords: Curiosity, Reasoning Ability, Gender Differences, School Type, Secondary School Students

Introduction

Curiosity, a vital aspect of human cognition, is characterized by the desire to acquire new knowledge, explore unfamiliar concepts, and engage with novel experiences. It is a driving force behind learning and intellectual development, encouraging students to delve deeper into subjects and fostering a proactive approach to education. Recent studies have underscored the significance of curiosity in academic settings, linking it to improved memory retention, higher academic performance, and greater engagement in the learning process ^[1,2]. Curiosity not only fuels the acquisition of knowledge but also promotes critical thinking and problem-solving skills, essential for navigating the complexities of modern education.

Reasoning ability, encompassing the capacity to process information, draw logical conclusions, and solve problems, is another crucial cognitive skill that significantly impacts academic achievement. It involves various forms of reasoning, such as verbal, numerical, and abstract reasoning, each contributing to different aspects of learning and intellectual functioning ^[3]. The development of reasoning skills is particularly important during the secondary school years, as students are expected to engage with more complex and abstract academic content. Recent research has highlighted the role of reasoning ability in academic success, emphasizing its importance in critical thinking, decision-making, and the application of knowledge in real-world situations ^[4].

In the educational context, the interplay between curiosity and reasoning ability is pivotal for fostering deep learning and academic success. Curiosity motivates students to seek out new information, while reasoning ability allows them to analyze and apply this information effectively. Understanding how factors such as gender and the type of school influence these cognitive traits is essential for educators and policymakers. Such insights can guide the development of targeted interventions and educational strategies aimed at enhancing curiosity and reasoning skills among secondary school students, ultimately leading to better educational outcomes.

Review of literature

Recent studies have increasingly focused on understanding how curiosity and reasoning ability among secondary school students are influenced by factors such as gender and the type of school they attend. These

studies provide valuable insights into how these cognitive traits develop and vary across different student demographics.

Lauriola et al. (2021) found that female adolescents generally exhibit higher levels of academic curiosity than males, often due to social and cultural influences^[5]. Female students' curiosity is more linked to intrinsic motivation and mastery, while male students often display curiosity driven by external rewards and competition. Sikora and Pokropek (2022) found that students in private or well-funded schools report higher levels of curiosity than those in public or underfunded schools, likely due to the availability of more diverse resources and exploration opportunities^[6].

In reasoning ability, Stoet and Geary (2020) found that boys generally outperform girls in spatial and numerical reasoning tasks, while girls excel in verbal reasoning^[7]. These differences may stem from biological factors and different cognitive activities encouraged in each gender from a young age. García-Cepero and McMahon (2023) synthesized findings, highlighting that both gender and school type significantly impact curiosity and reasoning ability development among secondary school students^[8]. They suggest gender-sensitive teaching and equitable resource access to nurture these traits effectively.

Hartung et al. (2022) found moderate correlations between epistemic curiosity and general knowledge ($r = .24$) and reasoning ability ($r = .30$), with reasoning mediating the curiosity-knowledge relationship^[9]. Fry et al. (2023) observed that curious individuals tend to have higher science and reading abilities, though curiosity was negatively associated with mathematics ability^[10].

Objectives

The objectives of the study are as follows:

1. To study the effect of gender and types of school on curiosity among secondary school students.
2. To study the effect of gender and types of school on reasoning abilities among secondary school students.
3. To study the relationship between curiosity and reasoning abilities among secondary school students.

Hypotheses

The following hypotheses were formulated based on the research objectives

1. There is no significant effect of gender on curiosity among secondary school students.
2. There is no significant effect of types of school on curiosity among secondary school students
3. There is no significant effect of gender on reasoning abilities among secondary school students.
4. There is no significant effect of types of school on reasoning abilities among secondary school students.
5. There is significant relationship between curiosity and reasoning ability among secondary school teachers.

Methodology

Participants

The sample for the study comprised 100 secondary school students from various schools in Ranchi city. The sample included students from both government and private schools. The students were selected using a random sampling technique.

Table 01: Sample Design

Gender	Male	Female
Types of school		
Government	25	25
Private	25	25
Total	50	50
Grand Total	100	

Tools

The Personal Data Questionnaire (PDQ) was prepared by the researcher to elicit personal information from the subjects such as their name, age, gender, religion, class and type of school etc.

The study used Children Curiosity Scale (CCS-KR) to measure the curiosity and the Reasoning Ability Test (RAT) was used to measure the reasoning abilities of students. The Children Curiosity Scale (CCS-KR) developed by Dr. Rajiv Kumar questionnaire is a four-point scale. The scale consists of 44 items. Brown formula for correction, a reliability coefficient of 0.87 was obtained.

To measure the Reasoning Ability Test developed by Dubey (2006) was used. There are 60 questions in the test. There are 100 maximum and 0 minimum marks on the test. This scale is applicable on 12 to 17 years students. the scale has reliability of 0.78.

Data Analysis

The data collected from the questionnaire were analyzed using descriptive statistics and inferential statistics, such as t-tests to examine the differences among gender and types of school. Pearson correlation was used to examine the relationship between these two variables. SPSS 26.0v was used to analyze data.

Result

Effect of gender and type of school on Curiosity

Figure 01: Mean scores on curiosity of gender subgroups of secondary school students

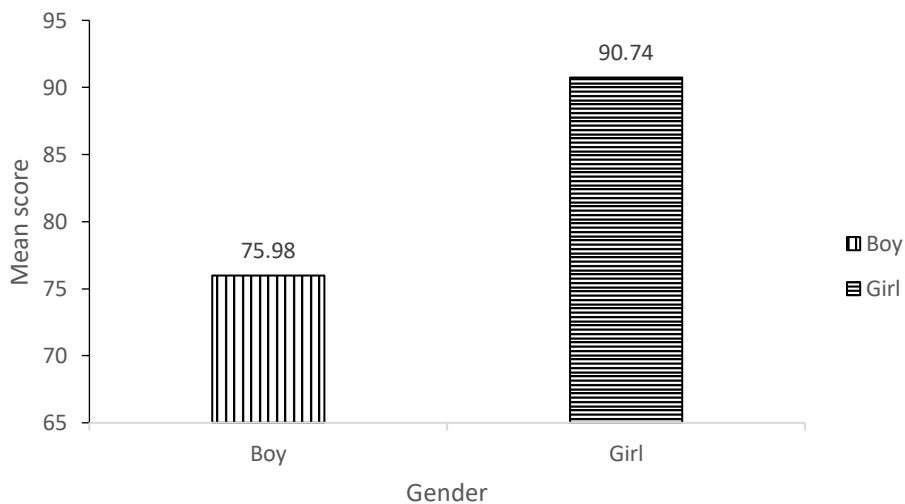
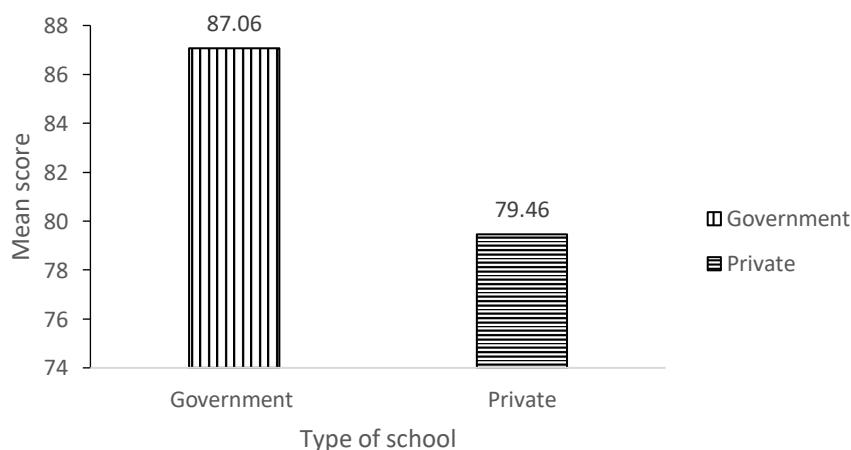


Figure 02: Mean scores on curiosity of type of school of secondary school students



The mean score of curiosity among girl students ($M=90.74$, $SD=13.61$) was significantly higher than boy students ($M=75.98$, $SD=19.12$), $t(98)=4.50$, $p<0.01$. The mean score of curiosity among government students ($M=87.06$, $SD=16.84$) was significantly higher than private students ($M=79.46$, $SD=18.75$), $t(98)=2.13$, $p>0.05$.

Effect of gender and type of school on Reasoning ability

Figure 03: Mean scores on reasoning ability of gender subgroups of secondary school students

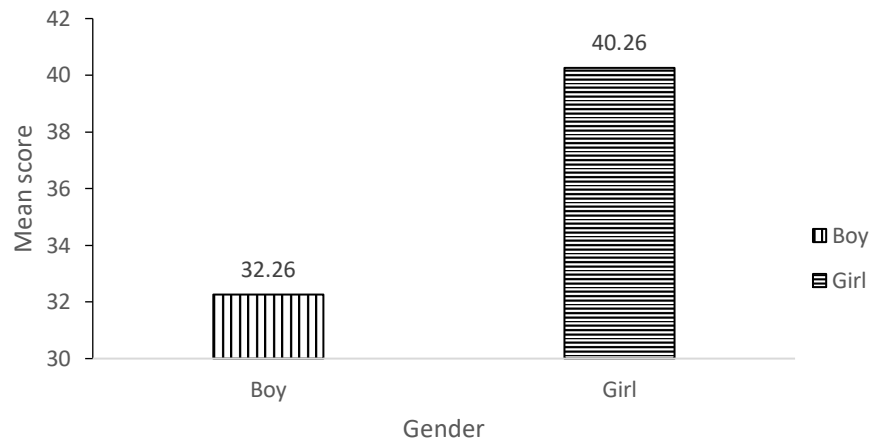
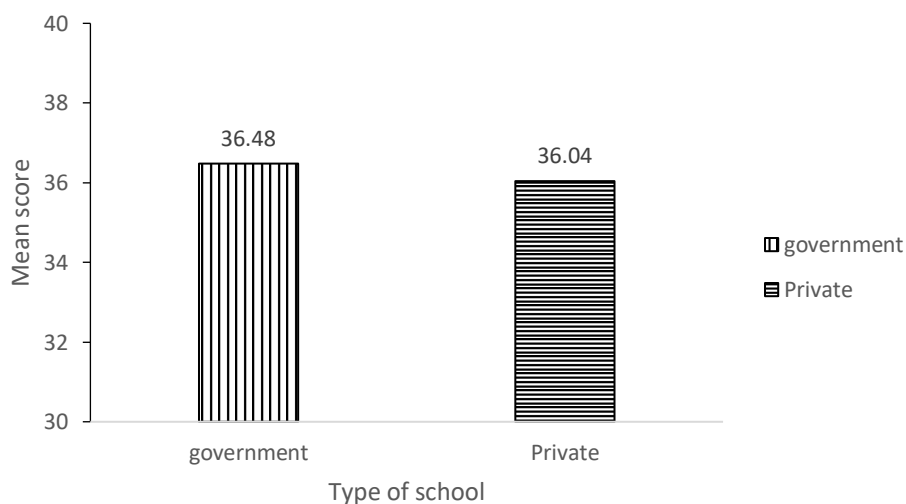


Figure 04: Mean scores on reasoning ability of government and private secondary school students



The mean score of reasoning abilities among girl students ($M=40.26$, $SD=9.92$) was significantly higher than boy students ($M=32.26$, $SD=10.89$), $t(98)=3.83$, $p<0.01$. The mean score of reasoning abilities among government students ($M=36.48$, $SD=9.24$) was not found significantly different than private students ($M=36.04$, $SD=12.81$), $t(98)=0.19$, not significant.

Relationship between curiosity and reasoning ability

A significant positive correlation was found between curiosity and reasoning abilities ($r = 0.85$, $p<0.01$), indicating that students with higher levels of curiosity had better reasoning abilities.

Discussion

This study reveals significant effects of both gender and type of school on curiosity among secondary school students in Ranchi city, while gender alone significantly influences reasoning ability. However, the type of school does not impact reasoning ability.

The gender differences in curiosity align with research suggesting that female students often display higher levels of curiosity than males, possibly due to socialization practices ^[11]. While some studies argue that curiosity is not strongly gender-dependent ^[12], the current findings suggest that gender plays a significant role in this context.

The significant impact of the type of school on curiosity could be attributed to different educational environments; government schools may emphasize holistic development more than private schools. However, contradictory studies suggest that private schools, with their resources, should enhance curiosity, indicating the need for further exploration of this dynamic ^[13].

The significant effect of gender on reasoning ability is consistent with research showing males may excel in tasks requiring logical reasoning ^[14]. However, some studies find minimal gender differences, emphasizing that cognitive abilities may depend more on individual experiences ^[15].

The lack of a significant impact of school type on reasoning ability suggests that reasoning might be more influenced by individual cognitive development and the home environment than by school type ^[16].

Overall, these findings emphasize the influence of gender and school environment on students' curiosity and reasoning abilities and highlight the need for further research to understand these dynamics better.

Limitation

Limitations of the study include a small sample size and the use of self-report measures to assess curiosity and reasoning abilities. Future research should use larger sample sizes and multiple measures to assess cognitive skills.

References

- [1] Wade, S., & Kidd, C. (2019). Curiosity and learning: A neuroscientific perspective. *Nature Reviews Neuroscience*, 20(10), 658-671.
- [2] Schmäzle, R., Häussinger, F. B., Renner, B., & Schupp, H. T. (2021). Curiosity in context: Neural correlates of environmental curiosity and exploration. *NeuroImage*, 224, 117395.
- [3] Heit, E. (2020). Reasoning and thinking. In J. T. Wixted (Ed.), *Stevens' Handbook of Experimental Psychology and Cognitive Neuroscience* (4th ed., Vol. 3). Wiley.
- [4] Toplak, M. E., West, R. F., & Stanovich, K. E. (2021). Assessing cognitive abilities: The critical role of reasoning and rationality. *Annual Review of Psychology*, 72, 399-425.
- [5] Lauriola, M., Foschi, R., & Panno, A. (2021). Gender differences in curiosity and academic motivation during adolescence. *Journal of Adolescence*, 88, 112-123.
- [6] Stoet, G., & Geary, D. C. (2020). Gender differences in the development of reasoning abilities in adolescence. *Developmental Psychology*, 56(9), 1705-1715.
- [7] Sikora, J., & Pokropek, A. (2022). The school environment and student curiosity: Insights from international assessments. *Comparative Education Review*, 66(4), 567-593.
- [8] García-Cepero, M. C., & McMahon, S. D. (2023). The role of gender and school type in the development of curiosity and reasoning abilities: A systematic review. *Educational Research Review*, 38, 100419.
- [9] Hartung, F., Thieme, P., Wild-Wall, N., & Hell, B. (2022). Being snoop and smart. *Journal of Individual Differences*, 43(4), 194–205. <https://doi.org/10.1027/1614-0001/a000372>
- [10] Fry, J., Elkins, M., & Farrell, L. (2023). Cognition and curiosity: Strategies for firms to recruit curious employees. *Applied Economics*, 56(10), 1119–1135. <https://doi.org/10.1080/00036846.2023.2174943>
- [11] Kashdan, T. B., Rose, P., & Fincham, F. D. (2004). Curiosity and exploration: Facilitating positive subjective experiences and personal growth opportunities. *Journal of Personality Assessment*, 82(3), 291-305.

- [12] Ainley, M. (2006). Connecting with learning: Motivation, affect, and cognition in interest processes. *Educational Psychology Review*, 18(4), 391-405.
- [13] Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.
- [14] Halpern, D. F. (2012). *Sex differences in cognitive abilities* (4th ed.). Psychology Press.
- [15] Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist*, 60(6), 581.
- [16] Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In *Handbook of child psychology* (pp. 793-828). Wiley.