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A Comparative Study of Mathematical Interest across Gender among Middle School Students

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ABSTRACT

Mathematics is a critical subject that fosters logical thinking, problem-solving, and analytical reasoning. Among the many factors that shape students' engagement with mathematics, interest plays a pivotal role in determining persistence, achievement, and future career choices, particularly in STEM fields. This study aimed to examine the comparative levels of mathematical interest among middle school boys and girls. A sample of 100 Class 8 students (50 boys and 50 girls) was randomly selected from different schools. A standardized questionnaire developed by Tondon and Pal was used to assess mathematical interest. Data were analyzed using an independent sample t-test through SPSS software. The findings revealed that boys had a higher mean score (M = 96.04, SD = 7.24) compared to girls (M = 92.39, SD = 5.66). The calculated *t*-value (2.26) exceeded the tabulated value (1.98) at the 0.05 level of significance, indicating a statistically significant difference in mathematical interest between boys and girls. These results suggest that gender has a notable impact on students' mathematical interest, with boys demonstrating comparatively greater interest. The study

highlights the influence of societal expectations, classroom practices, and parental attitudes in shaping gender-based differences in mathematics. It further emphasizes that interest is not a fixed trait but can be enhanced through supportive learning environments, innovative teaching strategies, and efforts to counter stereotypes. The implications of this research extend to teachers, parents, curriculum developers, and policymakers who can play a vital role in bridging the gender gap. By promoting inclusive practices, mentorship opportunities, and gender-sensitive pedagogy, it is possible to foster equal mathematical interest and motivation among boys and girls, thereby contributing to greater equity in education and future STEM careers.

PROLOGUE

Mathematics forms the foundation of logical thinking, problem-solving, and analytical reasoning in students' academic journeys. Beyond ability, students' engagement with mathematics is strongly shaped by their interest, which reflects curiosity, motivation, and willingness to persist in solving problems. Mathematical interest plays a crucial role in sustaining learners' efforts and shaping achievement. Among the various factors influencing interest, gender has been widely studied, especially during middle school, when long-term attitudes toward mathematics are formed. Research on gender and mathematical interest has yielded mixed findings. Frenzel, Goetz, and Pekrun (2007) found that girls often reported less enjoyment and interest in mathematics compared to boys, shaped by classroom practices and social expectations. Else-Quest, Hyde, and Linn (2010), in a meta-analysis of international data, concluded that performance differences between genders were negligible, but boys expressed higher confidence and interest. These results stress the importance of distinguishing achievement from interest. Hyde and Mertz (2009) further showed that given equal opportunities, girls demonstrated performance and interest levels equal to or greater than boys, challenging stereotypes of boys' natural superiority in mathematics. In the Indian context, Singh (2018) reported that boys generally showed greater mathematical interest, attributing this to parental expectations and societal perceptions of mathematics as a male domain. Wang (2012) highlighted that mathematical interest in adolescence significantly influenced STEM career aspirations, with boys often receiving stronger encouragement to persist. Together, these studies suggest that gender-based differences in mathematical interest are largely socially and culturally constructed rather than biologically determined. While boys may appear more confident and interested, the evidence

shows that supportive environments can foster equal or greater interest among girls. For educators, the key challenge lies in creating equitable and motivating learning spaces where both boys and girls can engage with mathematics meaningfully.

In the middle school stage, students are particularly sensitive to peer influence, teacher feedback, and societal stereotypes. Girls, for example, may receive subtle messages that mathematics is difficult for them, while boys are often encouraged to excel in it. Such gendered socialization patterns lead to differences in confidence, and ultimately, in interest. A student who feels less capable in mathematics is less likely to find joy in solving problems, even if their actual ability is equal to that of peers. Teachers thus play a critical role in shaping mathematical interest among middle school students. By offering equal opportunities, positive reinforcement, and a supportive classroom climate, educators can help minimize gender differences in interest.

The relationship between gender and mathematical interest is not only academic but also developmental. Interest in mathematics during middle school has long-term implications for students' academic choices and career paths. For instance, students who develop strong interest at this stage are more likely to choose advanced mathematics courses in high school, pursue STEM-related degrees in higher education, and ultimately enter careers in engineering, science, and technology. Since STEM fields are often male-dominated, enhancing girls' interest during middle school can contribute to greater gender equity in professional domains. Research findings, such as those of Wang (2012), support this argument by showing that early mathematical interest strongly predicts later career choices. Although many studies highlight gender differences, there is also a growing body of evidence suggesting that these gaps can be reduced with effective interventions. For example, when teachers use innovative pedagogical strategies like problem-based learning, game-based approaches, or real-life applications of mathematics, both boys and girls show higher levels of interest. Likewise, providing female role models in STEM and showcasing their achievements can inspire middle school girls to see mathematics as relevant and attainable. Thus, mathematical interest should not be viewed as a fixed trait but as a dynamic variable shaped by experiences and support systems.

REVIEW OF LITERATURE

Earlier research studies have also highlighted gender differences in mathematical interest and achievement. **Ahuja (2006)** conducted a study on parental involvement and academic achievement across various socio-economic levels and found that boys often received more encouragement in mathematics-

related tasks, which contributed to higher interest and achievement. Similarly, **Chawla (2010)** examined the relationship between family environment and academic achievement and reported that girls' mathematical performance was often influenced by family support, whereas boys tended to show independent interest in the subject. **Singh & Mishra (2014)** studied middle school students and found that boys demonstrated significantly higher interest in mathematics compared to girls, attributing this to classroom participation and teacher expectations. In another study, **Sharma (2017)** emphasized that societal stereotypes and lack of female role models in STEM fields negatively affected girls' attitudes toward mathematics. More recently, **Verma & Gupta (2020)** investigated mathematical interest among secondary school students and concluded that gender differences persist, with boys scoring higher in mathematical interest, but also highlighted that innovative teaching practices and motivation could significantly reduce this gap. These studies collectively suggest that both social and educational factors play a major role in shaping mathematical interest among boys and girls.

NEED FOR THIS STUDY

The need for this study arises from the crucial role that mathematical interest plays in shaping students' learning outcomes, persistence, and future career aspirations in STEM fields. Middle school years are particularly important, as attitudes toward mathematics formed during this stage often persist into higher education and professional choices. Although previous research has examined gender differences in mathematics achievement, relatively fewer studies have explored the comparative levels of mathematical interest among boys and girls, especially in the Indian context where societal expectations and cultural norms strongly influence learning behavior. Understanding whether and how gender impacts mathematical interest can provide valuable insights for teachers, parents, and policymakers to design interventions that promote equitable learning opportunities. By identifying gaps and addressing stereotypes, this study can contribute to creating supportive classroom environments where both boys and girls can develop sustained interest and confidence in mathematics.

OBJECTIVE OF THE STUDY-

The primary objective of this study is to examine the comparative levels of mathematical interest among middle school boys and girls.

HYPOTHESIS-

H_0: There is no significant difference in the level of mathematical interest between middle school boys and girls.

METHODOLOGY-

The present study adopted a quantitative research approach to investigate the impact of mathematical interest on 100 boys and girls of Class 8. A standardized survey questionnaire developed by Tondon and Pal was used to measure students' interest in mathematics. The sample was randomly selected from multiple schools to ensure adequate representation and minimize bias. For data analysis, t-test technique was employed to examine the difference between mathematical interest and academic achievement. Throughout the research process, ethical considerations such as obtaining informed consent from participants and maintaining confidentiality of data were strictly adhered to.

ANALYSIS AND INTERPRETATION OF HYPOTHESIS-

To examine the null hypothesis stating that- there is no significant difference in the mathematical interest of boys and girls, an independent sample t-test was applied. The test compared the mean scores of mathematical interest between the two groups. SPSS software was utilized for data analysis, which involved computing the mean scores and performing correlation analysis. The results are presented below:

Table-1

Basis of Gender t-test for mathematical interest

	Gender	N	Mean	Standard Deviation	t-Value
Mathematical Interest	Boys	50	96.04	7.24	2.26
	Girls	50	92.39	5.66	

The calculated *t*-value (2.26) was found to be greater than the tabulated *t*-value (1.98) at the 0.05 level of significance, indicating that the difference in mathematical interest between boys and girls is statistically significant. Therefore, it can be concluded that gender has a significant effect on mathematical interest. In

addition, the analysis of mathematical interest among boys and girls shows that there is a slight difference between the two groups. The mean score of boys (M = 96.04, SD = 7.24) is higher than that of girls (M = 92.39, SD = 5.66), indicating that boys reported greater interest in mathematics compared to girls. The independent sample t-test result (t = 2.26) suggests that this difference is statistically significant, meaning that gender plays a role in influencing students' mathematical interest. Thus, boys in this study demonstrated comparatively higher mathematical interest than girls.

SUGGESTIONS

- **For Teachers:**
    - Use activity-based and practical teaching methods to make mathematics more engaging.
    - Encourage equal classroom participation from both boys and girls.
    - Provide additional support and motivation to girls who show less interest in mathematics.
- **For Parents:**
    - Avoid reinforcing gender stereotypes related to mathematics ability.
    - Encourage girls to practice mathematics at home through games, puzzles, and real-life applications.
    - Provide a positive and supportive environment that boosts children's confidence in the subject.
- **For Schools and Curriculum Planners:**
    - Organize workshops, seminars, and motivational talks to inspire students, especially girls, in mathematics.
    - Integrate examples of female mathematicians and role models into the curriculum.
    - Develop gender-inclusive teaching and learning resources.
- **For Policymakers:**
    - Promote policies that reduce the gender gap in STEM education.

- Provide scholarships and special programs to encourage girls to pursue higher studies in mathematics.
- Conduct awareness campaigns to highlight the importance of gender equality in education.

EDUCATIONAL IMPLICATIONS OF THE STUDY

- Boys showed significantly higher mathematical interest than girls, indicating a gender gap.
- Educators should adopt **gender-sensitive teaching strategies** to encourage equal participation.
- Teachers need to use **interactive and engaging methods** to make mathematics appealing for girls.
- Schools should provide **mentorship programs and role models** to motivate girls in mathematics.
- Parents and teachers must work together to **challenge stereotypes** that mathematics is more suited for boys.
- Curriculum planners should design **inclusive activities and assessments** that cater to diverse learning needs.
- Enhancing girls' confidence in mathematics will promote **gender equity in education**.
- Increased interest among girls can lead to **balanced career opportunities in STEM fields** for both genders.

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