Teachers' Emotional Support and its Relationship with Mathematics Anxiety and Mathematics Performance of Secondary School Students

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Abstract

Mathematics is widely recognized as an essential discipline that cultivates logical reasoning, analytical thinking, and problem-solving abilities. Regardless of its importance, numerous students perceive Mathematics as difficult and anxiety-provoking, which can have an adverse impact on their academic performance. This study investigates the role of Teachers' Emotional Support in shaping students' experiences with Mathematics, particularly focusing on its relationship with Mathematics Anxiety and Mathematics Performance among Secondary School Students. The study utilized a correlational design within the quantitative approach. A sample of 210 Class 10th English medium students of Lucknow district in Uttar Pradesh was selected using multistage random sampling and data were analyzed using Pearson's correlation coefficient. The findings revealed a strong negative correlation between Teachers' Emotional Support and Mathematics Anxiety of Secondary School Students (r = –0.753), indicating that greater emotional support is associated with reduced anxiety. A strong positive correlation was also found between Teachers' Emotional Support and Mathematics Performance (r = 0.723), suggesting that emotionally supportive teachers positively influence students' achievement. These results highlight the importance of creating emotionally safe classroom environments. Supportive teacher-student interactions can help reduce anxiety, improve performance, and foster students' confidence, interest, and engagement in Mathematics.

Keywords: Teachers' emotional support, mathematics anxiety, mathematics performance and secondary school students.

Introduction

Mathematics is highly respected and significant within the Indian Knowledge System (IKS), and it is admired and honored as an inspiration of logic, truth, insight, and clarity, with a long history and multiple contributions. Mathematics was never seen as just a subject to be studied in isolation. Instead, it was valued as the foundation of all other fields of knowledge, including astronomy, architecture, economics, science, music, philosophy, and even rituals. Mathematics remains fundamental to human progress in the modern world, serving as the base for fields such computer technology, robotics, data science, finance and economics, artificial intelligence, space science, cyber security, and medical & biological sciences. Mathematics is becoming more important in education in the digital age because it fosters critical thinking, logical reasoning, quantitative analysis, and problem-solving abilities. These abilities are important for developing creativity, making wise judgments, and adapting to a fast changing environment. Recognizing this, both the Kothari Commission (1964-66) and the National Curriculum Framework (NCF, 2005) highlighted Mathematics not just as a basic subject, but also as an important tool for fostering logical thinking, analytical skills, and structured reasoning. Also the Secondary Education Commission (1952) and the National Policy on Education (1986) emphasized the importance of Mathematics in school education and recommended that it should be an integral part of the school curriculum, to be taught to all pupils on a compulsory basis. Similarly, the National Education Policy (NEP, 2020) declared foundational literacy and numeracy especially in mathematics as a national mission, claiming that these abilities are essential for both future education and lifelong learning.

Despite this significance, Mathematics continues to be perceived by many students as the most intimidating subject. ThePrint (2021) reported that every four out of five children in Classes 7-10 across the country are fearful of Mathematics and their fear of the subject grows as they progress to higher classes. The Annual Status of Education Report (ASER, 2018), highlighted by The Times of India (2019), found that 56% of students in class VIII can't divide a three-digit number with a single digit , 72% students in class V can't do division at all and 70% of class III student are not able to do any subtraction. Students in coastal Kerala also struggled with foundational numeracy and basic arithmetic, according to a 2024 survey published by The Hindu in February 2025. This suggests a widespread learning gap.One of the key psychological barriers to Mathematics learning is Mathematics Anxiety (MA): a form of

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emotional tension that arises in response to math-related situations. It is marked by fear, helplessness, and mental disorganization (Zhou et al., 2020; Luttenberger et al., 2018). Students suffering from MA often avoid practicing Mathematics, underperform in assessments, and develop persistent dislike to the subject. Li et al. (2025) defined it as feelings of fear, tension, and unease during math-related learning or problem-solving tasks. Indian studies by Roy and Kumar (2023), Bhan and Kumar (2023), and Rani and Rani (2024) confirm that math anxiety is widespread among Indian secondary students, with female students more severely affected. This anxiety not only hampers performance but also damages students' self-confidence and long-term academic potential.

As both an academic and emotional challenge, Mathematics learning is deeply influenced by the classroom environment, and most importantly, by the teacher-student relationship. According to NCF 2005, the teacher is no longer a transmitter of information but a facilitator, who creates a learning environment that is emotionally safe and intellectually stimulating. Emotional support from teachers expressed through warmth, encouragement, and attentiveness plays a vital role in shaping students' attitude toward the subject. Empirical research confirms this. Salter et al. (2024), in a systematic review of 26 studies across 12 countries, concluded that supportive and warm teacher-student relationships lower students' anxiety, while harsh, indifferent, or dependent interactions increase it. Zhou et al. (2020) demonstrated that positive teacher-student relationships directly enhanced students' problem-solving ability, partially mediated by increased self-efficacy and reduced math anxiety. Roy and Kumar (2023) also noted that emotionally responsive teachers can prevent and reduce math anxiety through early and consistent support. Moreover, Li et al. (2025) confirmed that student-perceived teacher support significantly reduces math anxiety.

In the Indian classroom, especially at the secondary level, students often hesitate to approach teachers with their doubts, particularly in Mathematics. The reason behind this hesitation is emotional distance or fear of negative judgment by the teacher. During adolescence, a period marked by emotional instability and heightened sensitivity, students crave warmth, encouragement, and reassurance from their teachers. When such emotional support is missing, math becomes a source of anxiety rather than empowerment. The researcher's lived experiences, interactions with students, and personal observations in the classroom provided the insight for this research. It has been observed that when students perceive their teacher is emotionally distant or neglects them, they begin to avoid and eventually lose interest in that subject. This lack of interest, especially in areas such as Mathematics, may gradually lead to significant concern and, ultimately, subject-specific anxiety. On the other side, when students experience warmth, caring, affection, and a sense of connection from their teacher, their interest in the subject grows. This improves performance, engagement, and overall well-being.

The alarming levels of math anxiety and poor performance, as documented in ThePrint, The Times of India, The Hindu, and also by several scholarly studies, thereby justify the need for this study. These results highlight the need of investigating how teachers' behavior and attitudes affect students' academic achievement and concerns about particular subjects, especially math anxiety. Research from various studies demonstrates that interactions between educators and learners significantly impact overall student performance, particularly in Mathematics along with the degree of Mathematics Anxiety experienced by students. Therefore it is essential to analyze the relationships between these variables to comprehend the nature of their association, whether positive or negative, enabling the implementation of suitable corrective measures to tackle the significant concern of discomfort with Mathematics and poor performance in the subject. This study also aims to investigate strategies for enhancing achievement and alleviating anxiety through an analysis of the teacher's role, focusing on both verbal and nonverbal behaviors, as well as the critical responsibility they bear in fostering emotionally supportive, positive, and engaging classroom environments.

Mathematics Anxiety

Mathematics Anxiety is an emotional experience characterized by feelings of helplessness, worried thoughts, and physical symptoms such as increased blood pressure, tension, and unease during math-related tasks. It is commonly associated with a lack of interest, low confidence, exam fear, disliking the subject, and feelings of unhappiness, rather than cognitive inability.

Teachers' Emotional Support

Teachers' Emotional Support refers to the verbal and non-verbal behaviors of teachers, including sensitivity, feedback, and responsiveness, that make students feel accepted, connected, encouraged, and supported. It involves warmth, attentiveness, and a helpful attitude toward students and their difficulties, especially during math-related challenges.

Mathematics Performance

Mathematics performance measures the mathematical literacy of a secondary level student to formulate, employ and interpret Mathematics in variety of context to describe, predict and explain phenomena, recognizing the role that Mathematics play in the real life situation.

Secondary School Students

In this study, Secondary School Students are defined as learners studying in Class 10.

Objectives

1. To study the relationship between Teachers' Emotional Support and Mathematics Anxiety of Secondary School Students.
2. To study the relationship between Teachers' Emotional Support and Mathematics Performance of Secondary School Students.

Hypothesis

1. There is no significant relationship between Teachers' Emotional Support and Mathematics Anxiety of Secondary School Students.
2. There is no significant relationship between Teachers' Emotional Support and Mathematics Performance of Secondary School Students.

Research Methodology

Research Design: The present study utilizes a correlational research design within the context of a quantitative research approach to measure the association between Teachers' Emotional Support, Mathematics Anxiety, and Mathematics Performance among Secondary School Students. To analyze the data, the Karl Pearson correlation coefficient was used. Furthermore, a t-test was used to determine the significance of the correlation coefficients obtained.

Population: The population of the study consists of all 10th-grade English medium students from the Trans-Gomati region of Lucknow district in Uttar Pradesh.

Sample: The sample of the study consists of 210 English medium students studying in Class 10.

Sampling Procedure: The data was collected using multistage random sampling. First, strata were created based on the three educational boards: UP Board, ICSE, and CBSE. After that, schools were randomly chosen from each stratum. Finally, 70 students from each board were selected at random from the Class 10 students in the chosen schools.

Tools and Techniques: The data has been collected using a self-developed questionnaire with two components. The first component measured Teachers' Emotional Support across three dimensions: teacher behavior (verbal and nonverbal), teacher sensitivity, and teacher feedback. The second part assessed Mathematics Anxiety using three dimensions: interest, confidence, and exam fear. Expert opinion was used to determine the tool's validity and reliability, and scoring was done using a five-point Likert scale. To assess Mathematics performance, the results of either the half-yearly examination or the most recent Mathematics exam were used.

Data Analysis and Results: Descriptive statistics for the three primary variables: Teacher's Emotional Support, Mathematics Performance, and Mathematics Anxiety were computed to assess their central tendency and dispersion. All variables exhibited acceptable skewness and kurtosis, indicating approximately normal distributions suitable for correlational analysis.

Correlation Matrix of Key Variables: The interrelationships among the three variables are summarized below:
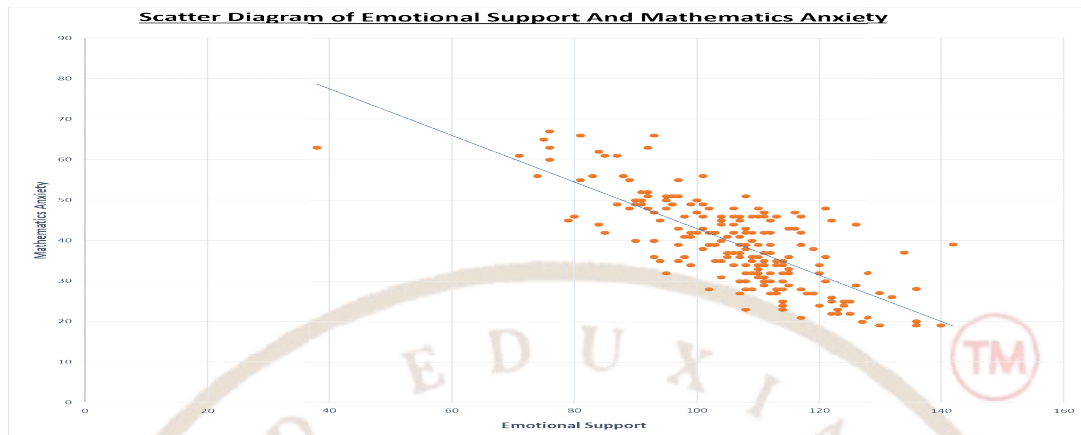
Table 1.1 Correlation Matrix of key variables

| Correlation	Mathematics Performance	Emotional Support	Mathematics Anxiety
Mathematics Performance	1.000	0.723	-0.687
Emotional Support	0.723	1.000	-0.753
Mathematics Anxiety	-0.687	-0.753	1.000

Relationship Analysis

Teacher's Emotional Support and Mathematics Anxiety: A Pearson correlation of **r = -0.753** (n = 210) reflects a strong negative relationship between Teacher's Emotional Support and Mathematics Anxiety. An increase in students' perception of teachers' emotional support is associated with a noticeable decline in their Mathematics Anxiety. This clearly indicates that higher levels of teacher support contribute to lower levels of math anxiety. The scatter diagram given below also illustrates the negative correlation between Teachers' Emotional Support and students' Mathematics Anxiety, as indicated by a downward trend line

.Graph 1.1 Scatter diagram of Teachers' Emotional Support and Mathematics Anxiety

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Teacher's Emotional Support and Mathematics Performance

A Pearson correlation of **r = 0.723** (n = 210) indicates a strong positive association between Teacher's Emotional Support and Mathematics Performance. Students tend to perform better in Mathematics when they perceive their teachers are sympathetic, inspiring, motivating, offering encouragement and positive reinforcement as needed. The scatter diagram demonstrates the relationship between students' Mathematics Performance and Teachers' Emotional Support, with an upward trend line showing that the two variables are positively related.

Graph 1.2 Scatter diagram of Teachers' Emotional Support and Mathematics Performance
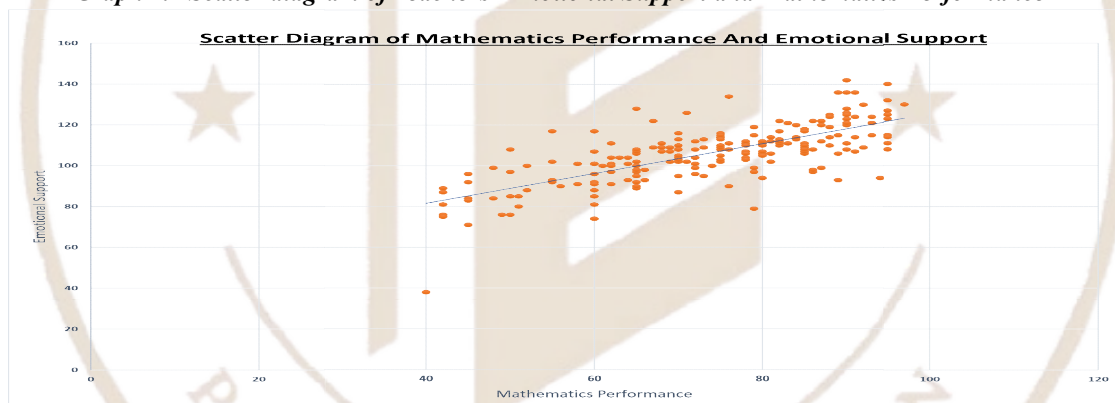
Hypothesis Testing: Two null hypotheses were evaluated at α = .05 using the t-test for Pearson's r.

H_{01}: There is no significant relationship between Teacher's Emotional Support and Mathematics Anxiety of Secondary School Students.

- $r = -0.753$, $n = 210$, $df = 208$
- t(calculated) $= -16.504$; t(critical) ≈ 1.972 (two-tailed)
- $|t$(calculated)$| > t$(critical), $\mathbf{p} < 0.001 \Rightarrow$ **Reject H_{01}**

H_{02}: There is no significant relationship between Teacher's Emotional Support and Mathematics Performance of Secondary School Students.

- $r = 0.723$, $n = 210$, $df = 208$
- t(calculated) $= 15.093$; t(critical) ≈ 1.972 (two-tailed)
- t(calculated) $> t$(critical), $\mathbf{p} < 0.001 \Rightarrow$ **Reject H_{02}**

So, on the basis of hypothesis testing both null hypotheses were rejected, indicating that the observed correlations are statistically significant and not expected to have occurred by chance, thereby confirming a meaningful relationship between the variables.

Result Discussion: The present findings demonstrate that Teacher's Emotional Support has a significant and multifaceted impact on students' mathematical experiences. The strong positive correlation with performance ($r = 0.723$) indicates that when teachers employ

supportive verbal behaviors and nonverbal gestures, show sensitivity, and offer constructive feedback, students achieve higher scores in Mathematics. Emotional support conveyed through warmth, encouragement, and attentive responses fosters a more positive attitude toward the subject, which in turn promotes greater engagement and effort. In contrast, students who experience low levels of emotional support often avoid practicing Mathematics, perform poorly on assessments, and develop a lasting dislike for the subject. Similarly, the observation of a strong negative correlation with Mathematics Anxiety ($r = 0.753$ in the negative direction) suggests that supportive teacher behaviors effectively reduce the fear and tension associated with mathematical tasks. By creating a classroom environment in which students feel accepted and encouraged, teachers help to lower anxiety levels and make Mathematics more approachable. This reduction in anxiety not only improves immediate performance but also contributes to a reinforcing cycle in which lower anxiety leads to better performance ($r = 0.687$ in the negative direction), and further success builds students' confidence and interest. These findings highlight the importance of emotionally supportive teaching and a classroom environment for enhancing student progress and reducing math anxiety.

Conclusion: This study revealed a strong positive correlation between Teachers' Emotional Support and Mathematics Performance ($r = 0.723$), followed by a strong negative correlation with Mathematics Anxiety ($r = –0.753$) among secondary students. These findings are consistent with S. Yadav's (2018) doctoral research and Yadav and Singh's (2018) study, both of which reported significant inverse relationships between anxiety and achievement. Findings of this study also support Syama's (2024) conclusion that positive teacher–student interactions reduce anxiety while enhancing performance, as well as the work of Zhou et al. (2020), Roy and Kumar (2023), and Li et al. (2025), all of whom demonstrated that emotionally supportive teaching increases self-efficacy, alleviates math anxiety, and improves academic outcomes. Considering the importance of Mathematics in fields such as artificial intelligence, space science, finance, economics, and information technology, along with the emphasis placed on it in national policies such as NPE 1986, NCF 2005 and NEP 2020, these findings highlight the importance of encouraging educators show friendly and supportive behavior. Teachers may help students overcome anxiety, nurture genuine interest, and foster critical thinking and problem-solving abilities required for success in today's technological environment by establishing emotionally comfortable and delightful learning environments.

References

- Bhan, R., & Kumar, S. (2023). *Study of academic achievement and mathematical anxiety among secondary school students*. International Journal of Creative Research Thoughts, 11(10), 209–218. https://doi.org/10.6084/m9.figshare.24523423
- **Chettri, S., & Ibrar, M.** (2019, January 16). *56% of Class VIII students can't do basic math's, 27% can't read: Report. The Times of India*. Retrieved from https://timesofindia.indiatimes.com/education/news/56-of-class-viii-students-cant-do-basic-maths-27-cant-read-report/articleshow/67548851.cms
- Government of India. (1953). *Report of the Secondary Education Commission, 1952–53 (Mudaliar Commission Report)*. Ministry of Education. https://www.educationforallinindia.com/1953%20Secondary_Education_Commission_Report.pdf
- Li, X., Fei, W. qun, & Wang, C. (2025). The relationship between student-perceived math teacher support and math anxiety in elementary school: a moderated mediation model. *Educational Psychology*, 1–17. https://doi.org/10.1080/01443410.2025.2512247
- Luttenberger, S., Wimmer, S., & Paechter, M. (2018). Spotlight on math anxiety. *Psychology Research and Behavior Management*, *11*, 311–322. https://doi.org/10.2147/PRBM.S141421
- Ministry of Education. (2020). *National Education Policy 2020*. Government of India. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf
- Ministry of Human Resource Development. (1986). *National Policy on Education, 1986*. Government of India. https://www.education.gov.in/sites/upload_files/mhrd/files/upload_document/npe.pdf
- National Council of Educational Research and Training. (2005). *National Curriculum Framework 2005*. NCERT. https://ncert.nic.in/pdf/nc-framework/nf2005-english.pdf
- Rani, B. & Rani, S. (2024). Examining Dependence of Mathematical Anxiety and Peer Pressure on Mathematical Achievement of Secondary School Students. *International Journal of Indian Psychology, 12(2)*, 2252-2261. DIP: 18.01.193.20241202, DOI:10.25215/1202.193
- Roy, A., & Kumar, A. (2023, December). *Mathematics anxiety among Indian children and its preventive measures*. Bharatiya Vaigyanik evam Audyogik Anusandhan Patrika, 31(2), 142–148. https://doi.org/10.56042/bvaap.v31i2.6390

- Salter, D., Neelakandan, A. & Wuthrich, V.M. Anxiety and Teacher-Student Relationships in Secondary School: A Systematic Literature Review. *Child Psychiatry Hum Dev* (2024). https://doi.org/10.1007/s10578-024-01665-7

- Syama, S. (2024). *Mind set in mathematics learning: Role of teacher-student interaction on student engagement, wellbeing and achievement* (Doctoral dissertation). School of Education, CHRIST University. http://hdl.handle.net/10603/569997

- The Hindu. (2025, February 6). *Maths a tough nut to crack for students in coastal schools: Study. The Hindu.* https://www.thehindu.com/news/national/kerala/students-maths-woes-revealed-in-assessment-in-coastal-schools-in-city/article69184293.ece

- **ThePrint**. (2021, July 14). *Students scared of Maths in Indian middle schools, the fear only grows with time, survey says*. https://theprint.in/india/education/students-scared-of-maths-in-indian-middle-schools-the-fear-only-grows-with-time-survey-says/695916/

- Yadav S. and Singh P.N. (2018). A Study on Mathematics Anxiety and Mathematics Achievement of Secondary School Students. *International Journal of Social Sciences Arts and Humanities*, 5(3), 52-57. Retrieved from www.crdeepjournal.org/ijssah

- Yadav, S. (2018). *Achievement in mathematics in relation to mathematics anxiety and self-efficacy among secondary school students* (Doctoral dissertation). Faculty of Education, Banaras Hindu University. http://hdl.handle.net/10603/222083

- Zhou, D., Du, X., Hau, K. T., Luo, H., Feng, P., & Liu, J. (2019). Teacher-student relationship and mathematical problem-solving ability: mediating roles of self-efficacy and mathematical anxiety. *Educational Psychology*, *40*(4), 473–489. https://doi.org/10.1080/01443410.2019.1696947