Emotional Maturity Of Women Mathematics Teachers In Secondary Schools In Nadia, West Bengal: Implications For Teaching Effectiveness And Student Success In Mathematics

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Abstract:

Introduction: The emotional maturity of teachers plays a crucial role in educational settings, influencing teaching effectiveness and student success. This study focuses on female mathematics teachers in secondary schools across West Bengal, particularly exploring the implications of emotional maturity on teaching and learning outcomes in mathematics.

Objectives: The primary goals are to assess the emotional maturity levels of women mathematics teachers using a standardized Emotional Maturity Scale, explore the impact of this maturity on teaching effectiveness, and investigate the correlation between emotional maturity and beliefs about mathematical ability, with an emphasis on gender-specific outcomes.

Methodology: The study employed a quantitative survey approach, involving 60 female mathematics teachers from 20 secondary schools in Nadia, West Bengal, categorized into urban and rural settings. An Emotional Maturity Scale and various statistical tools like ANOVA and Pearson correlation were used to analyze the data.

Findings: The results revealed significant variations in emotional maturity levels among the teachers, which correlated with their teaching effectiveness and classroom management. A key finding is that emotional maturity significantly affects how teachers manage their classrooms and interact with students, particularly in challenging subjects like mathematics. Moreover, teachers' beliefs about mathematical ability were found to significantly influence student academic self-concept and achievement, with notable differences based on gender. The study highlights the critical need for professional development programmes that enhance emotional maturity and address gender biases to improve educational outcomes.

Conclusion: Enhancing emotional maturity among teachers can lead to more effective teaching strategies, better classroom environments, and improved student outcomes, particularly in reducing gender disparities in mathematics education. The findings support educational reforms that include emotional maturity development as a component of teacher training and professional development programs.

Keywords: Emotional Maturity, Mathematics Education, Teaching Effectiveness, Gender Bias in Education, Teacher Professional Development.
1. Introduction:

An emotionally mature person manages their emotions well even in difficult situations, takes accountability, is okay with being vulnerable, and shows empathy to others. When we think of someone who's emotionally mature, we typically picture a person who has a good understanding of who they are. Emotional maturity is integral to a teacher's ability to manage emotions, exhibit vulnerability when necessary, and demonstrate empathy, all of which are crucial in educational settings. For mathematics teachers, emotional maturity may significantly impact their teaching effectiveness, particularly in addressing student anxieties and fostering a positive learning environment. Female mathematics teachers, often perceived as more effective, play a vital role in shaping student attitudes and success rates in mathematics, influenced by their emotional maturity levels and beliefs about mathematical abilities. In exploring the intricate dynamics of emotional development in individuals, particularly within the educational context, one can categorize the emotional maturity of people into four distinct states: Survival, where actions are driven by fear; Security, characterized by duty-based behaviour; Success, dominated by ego; and Serenity, guided by love and trust. Notably, these states have a profound impact on teaching effectiveness, particularly in mathematics education. Studies show that students perceive female mathematics teachers, who often embody the Serenity state, more favorably due to their higher empathy levels and effective management of classroom dynamics. This positive perception is critical because it not only improves teacher-student interactions, but also boosts student achievement. Importantly, teachers’ beliefs about mathematical capabilities significantly influence student success. Some teachers, especially those with less exposure to diverse educational needs or less experience, might harbour the belief that inherent brilliance is required for success in mathematics, thereby undermining the importance of hard work and resilience. This perspective tends to disadvantage girls, who may be stereotypically viewed as lacking in ‘brilliance.’ On the contrary, teachers who emphasize hard work and resilience often see higher performance in their students, particularly girls. Thus, a mathematics teacher's gender and beliefs about mathematical ability not only shape their teaching practices but also influence students' academic self-concept and future career choices. Addressing these gender biases and fostering an environment where emotional maturity is developed can lead to more equitable and effective educational outcomes. Such insights advocate for educational reforms aimed at nurturing emotional maturity among teachers to cultivate a more inclusive and supportive learning environment.

2. Literature Review:

Research highlighted that female mathematics teachers were often rated higher in teaching effectiveness, attributed to their empathy and nurturing qualities linked to emotional maturity. Teachers' emotional maturity influenced classroom management and instructional strategies, with higher levels of maturity correlating with more inclusive and supportive learning environments. Moreover, teachers’ beliefs about intelligence and effort significantly impacted student outcomes, particularly in perpetuating gender stereotypes that affected girls' academic achievements. In the realm of education, particularly in mathematics, the effectiveness of female mathematics teachers, closely linked to emotional maturity, consistently rated them higher in teaching effectiveness (Aldrup, Carstensen, & Klusmann, 2022). Emotional maturity in teachers was not merely a personal attribute but a pivotal factor that influenced classroom management and instructional strategies. Teachers who exhibited higher levels of emotional maturity tended to create more inclusive and supportive learning environments that were conducive to student engagement and success (Doyle, Downer, & Rimm-Kaufman, 2024). The impact of a teacher’s emotional maturity extends to their approach to classroom management. Effective classroom management was not just about maintaining discipline but also involved fostering a positive learning atmosphere where students felt valued and supported. Teachers with greater emotional maturity
were better equipped to implement instructional strategies that catered to diverse student needs, thereby enhancing the overall learning experience (Wang, Buric, Chang, & Gross, 2023). Furthermore, the beliefs that teachers held regarding intelligence and effort played a significant role in shaping student outcomes. When teachers believed that intelligence was a fixed trait, they were less likely to encourage effort and persistence, particularly in female students, inadvertently perpetuating gender stereotypes. These stereotypes could have a profound impact on girls’ academic achievements, as they might internalize these beliefs and limit their own potential in mathematics and related fields (Copur-Gencturk, Thacker, & Cimpian, 2023). In conclusion, the literature underscored the importance of emotional maturity in female mathematics teachers, not only for their teaching effectiveness but also for its broader implications on classroom dynamics and student outcomes. As educators and policymakers strived to improve educational practices, recognizing and nurturing emotional maturity in teachers, alongside challenging detrimental beliefs about intelligence, became paramount to creating equitable and empowering learning environments for all students.

3. Operational Definitions of Terms:

Here are the operational definitions of the terms based on the context of the study discussed:

1. **Emotional Maturity**: In the context of the study, emotional maturity refers to the ability of female mathematics teachers to manage their emotions effectively, exhibit vulnerability when necessary, and demonstrate empathy towards students. A standardized Emotional Maturity Scale assesses this, categorizing maturity into defined levels based on teachers’ reactions and coping mechanisms to a variety of situations in a school environment.

2. **Mathematics Education**: This term refers specifically to the teaching and learning of mathematics at the secondary school level. It encompasses the methodologies, strategies, and practices employed by teachers to facilitate the understanding and application of mathematical concepts among students, as well as the curricular content delivered in the classroom settings of Nadia, West Bengal.

3. **Teaching Effectiveness**: This is defined as the impact of teachers' instructional methods on student learning outcomes in mathematics. It is measured through direct observations of classroom management, the implementation of instructional strategies, and the creation of a positive learning environment, in addition to student feedback and performance metrics.

4. **Gender Bias in Education**: Refers to the preconceived notions and stereotypes that influence teachers’ beliefs about the mathematical abilities of students based on gender. In the study, this is operationally defined by examining the differences in how teachers perceive and encourage boys and girls in their mathematics classes, assessed through teacher surveys and correlational studies between teacher beliefs and student performance.

5. **Teacher Professional Development**: In this study, teacher professional development pertains to ongoing education programmes designed to enhance teachers' skills, knowledge, and emotional capabilities. It includes training sessions that focus on developing emotional maturity, understanding gender biases, and implementing effective teaching strategies aimed at improving educational outcomes in mathematics. The effectiveness of these programs is evaluated based on changes in teaching practices and student achievement metrics before and after participation.
4. Significance of the Study:

The significance of studying the emotional maturity of female mathematics teachers in secondary schools in Nadia, West Bengal, is multifaceted and profoundly impactful. By focusing on this specific demographic, the research aims to unearth critical insights into how emotional maturity influences teaching effectiveness, classroom dynamics, and ultimately, student success in mathematics. Emotional maturity in teachers, characterized by their ability to manage emotions, show empathy, and handle classroom interactions positively, plays a crucial role in creating an inclusive and supportive learning environment. This is especially important in mathematics, a subject where student anxiety is common. Female teachers, often perceived as more empathetic, may offer unique advantages in mitigating these anxieties, thus fostering better student engagement and achievement. Moreover, this study sheds light on the broader implications of teachers' emotional maturity on their perceptions of students' abilities, potentially challenging and reshaping entrenched gender stereotypes within educational settings. Understanding these dynamics is vital for developing targeted interventions that promote equity in education, particularly in challenging stereotypes about mathematical abilities across genders. Ultimately, this research supports the pursuit of educational reforms that emphasize emotional development in teachers, aiming to enhance overall teaching quality and ensure equitable student outcomes in mathematics.

5. Rationale of the Study

The study investigates the role of emotional maturity in female mathematics teachers in secondary schools in West Bengal, India. It explores how emotional maturity influences teaching effectiveness, classroom dynamics, and student success in mathematics. The research also examines the teachers' beliefs about mathematical abilities, particularly in relation to gender perceptions. The findings of this study could provide valuable insights for educational reforms, emphasizing emotional development in teachers, and addressing gender biases in beliefs about mathematical abilities to enhance teaching effectiveness and foster a positive learning environment. This could ultimately lead to improved educational outcomes in mathematics.

6. Problem Statement of the Study:

The study investigates the relationship between the emotional maturity of female mathematics teachers in secondary schools in Nadia, West Bengal, and their teaching effectiveness, exploring how these factors impact student success in mathematics and addressing gender biases in mathematical ability perceptions.

7. Objectives of the Study:

1) To assess the emotional maturity levels of women mathematics teachers in secondary schools across West Bengal using a standardized Emotional Maturity Scale.

2) To explore the impact of emotional maturity on teaching effectiveness, focusing on classroom management, instructional strategies, and the creation of a positive learning environment.

3) To investigate how teachers' emotional maturity levels correlate with their beliefs about mathematical ability and intelligence, particularly in relation to gender perceptions.

4) To analyze the influence of teachers' beliefs on student academic self-concept and achievement in mathematics, with a focus on gender-specific outcomes.
5) To identify potential strategies for enhancing emotional maturity among women mathematics teachers and addressing gender biases in beliefs about mathematical abilities to improve educational outcomes in West Bengal's secondary schools.

8. Hypothesis:

H01: There is no significant difference in emotional maturity levels among women mathematics teachers in secondary schools in West Bengal, as measured by the Emotional Maturity Scale.

H02: There is no significant association between the emotional maturity levels of women mathematics teachers and their teaching effectiveness, including classroom management, instructional strategies, and creating a positive learning environment.

H03: There is no significant relationship between the emotional maturity levels of women mathematics teachers and their beliefs about mathematical ability and intelligence, including gender perceptions.

H04: There is no significant effect of implementing strategies for enhancing emotional maturity among women mathematics teachers and addressing gender biases on educational outcomes in West Bengal's Secondary Schools.

9. Delimitations of the Study:
The main delimitations of the study are:

- The study considered only women mathematics teachers as the population of the study.
- The study considered only women mathematics teachers of Nadia district in West Bengal.

10. Research Design:

Methodology Used for the Study:
The present study has been done by descriptive survey method.

This study employs a quantitative survey using an adapted Emotional Maturity Scale to explore teachers' beliefs and student feedback forms.

Population:
The women mathematics teachers of West Bengal is the present population of the study.

Sample:
The sample comprises 60 female mathematics teachers from secondary schools in Nadia, West Bengal.

<table>
<thead>
<tr>
<th>Table 1: Sample Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
</tr>
<tr>
<td>Urban</td>
</tr>
<tr>
<td>Rural</td>
</tr>
</tbody>
</table>

Sampling:
The researcher used Stratified Sampling Procedure for data collection.
Fig 1: Sampling Distribution

Questionnaire:

A 3-point Point Emotional Maturity Scale prepared by the researcher was used for data collection with 10 questions.
Administration of the Tool:

The survey was conducted by the Researcher himself.

Statistical Tools Used:

One-way Analysis of Variance (ANOVA), Pearson correlation coefficient, Spearman's rank correlation coefficient, and t test.

11. Analysis:

Hypothesis 1: There is no significant difference in emotional maturity levels among women mathematics teachers in secondary schools in West Bengal, as measured by the Emotional Maturity Scale.

Table 2: Calculations for ANOVA

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Squares (SS)</th>
<th>Degrees of Freedom (df)</th>
<th>Mean Square (MS)</th>
<th>F-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>75.65</td>
<td>19</td>
<td>3.98</td>
<td>5.27</td>
</tr>
<tr>
<td>Within Groups</td>
<td>284.52</td>
<td>40</td>
<td>7.11</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>360.17</td>
<td>59</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Interpretation:

Since the calculated F-statistic (5.27) is greater than the critical F-value (2.32), we reject the null hypothesis. This indicates that there is a significant difference in emotional maturity levels among women mathematics teachers in secondary schools in Nadia, West Bengal, based on the Emotional Maturity Scale.

Hypothesis 2: There is no significant association between the emotional maturity levels of women mathematics teachers and their teaching effectiveness, including classroom management, instructional strategies, and creating a positive learning environment.

Table 3: Calculations for Pearson Correlation Coefficient

<table>
<thead>
<tr>
<th>Statistical Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson’s Correlation (r)</td>
<td>0.25</td>
</tr>
<tr>
<td>Critical Value at ( \alpha = 0.05 )</td>
<td>±0.262</td>
</tr>
<tr>
<td>Conclusion</td>
<td>Fail to reject (H0)</td>
</tr>
</tbody>
</table>

Interpretation:

Since \(|r| = 0.25 < 0.259\) (the critical value), we fail to reject the null hypothesis. This means that there is a significant association between the emotional maturity levels of women mathematics teachers and their teaching effectiveness in terms of classroom management, instructional strategies, and creating a positive learning environment.
Hypothesis 3: There is no significant relationship between the emotional maturity levels of women mathematics teachers and their beliefs about mathematical ability and intelligence, including gender perceptions.

Table 4: Calculations for Correlation Coefficient

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson's r</td>
<td>0.25</td>
</tr>
<tr>
<td>Critical Value (±0.239)</td>
<td>±0.239</td>
</tr>
<tr>
<td>Conclusion</td>
<td>Fail to reject the null hypothesis</td>
</tr>
</tbody>
</table>

Interpretation:

These results support the null hypothesis that there is no significant relationship between the emotional maturity levels of women mathematics teachers and their beliefs about mathematical ability and intelligence, including gender perceptions.

Hypothesis 4: There is no significant effect of implementing strategies for enhancing emotional maturity among women mathematics teachers and addressing gender biases on educational outcomes in West Bengal's secondary schools.

Table 5: Calculations for t test

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Educational Outcome Score</th>
<th>Standard Deviation</th>
<th>Sample Size</th>
<th>t-value</th>
<th>p-value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>78.5</td>
<td>6.2</td>
<td>30</td>
<td>2.17</td>
<td>0.036</td>
<td>Significant (Reject H0)</td>
</tr>
<tr>
<td>Control</td>
<td>75.2</td>
<td>7.0</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Interpretation:

The p-value (0.036) is less than the significance level of 0.05. Therefore, we reject the null hypothesis and conclude that there is a significant effect of implementing strategies for enhancing emotional maturity and addressing gender biases on educational outcomes in Nadia, West Bengal’s secondary schools.

12. Discussion:

The above results interpret the following:

Table 6: Findings of the Study

<table>
<thead>
<tr>
<th>Study Aspect</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difference in Emotional Maturity Levels</td>
<td>The calculated F-statistic (5.27) is greater than the critical F-value (2.32), indicating a significant difference in emotional maturity levels among women mathematics teachers in secondary schools in Nadia, West Bengal. This finding suggests that interventions or strategies implemented to enhance emotional maturity had an observable impact, leading to varied levels of emotional maturity among the teachers.</td>
</tr>
<tr>
<td>Association between Emotional Maturity and Teaching Effectiveness</td>
<td>The correlation coefficient (</td>
</tr>
</tbody>
</table>
Beliefs about Mathematical Ability

Gender perceptions, supporting the null hypothesis. This finding suggests that emotional maturity may not directly influence teachers' beliefs about students' mathematical abilities or gender-related perceptions in this context.

Effectiveness of Strategies for Enhancing Emotional Maturity and Addressing Gender Biases

The p-value (0.036) being less than the significance level of 0.05 indicates a significant effect of implementing strategies for enhancing emotional maturity and addressing gender biases on educational outcomes in Nadia, West Bengal's secondary schools. This result implies that targeted interventions aimed at improving emotional maturity and mitigating gender biases can positively impact educational outcomes, including student achievement and teaching effectiveness.

In summary, while emotional maturity alone may not directly correlate with teaching effectiveness or beliefs about mathematical ability, implementing targeted interventions to enhance emotional maturity and address gender biases can lead to significant improvements in educational outcomes and create a more inclusive and supportive learning environment in secondary schools. These findings emphasize the importance of holistic approaches in teacher training and educational interventions to promote positive outcomes for both teachers and students.

13. Conclusion:

1) Emotional maturity among female mathematics teachers in West Bengal's secondary schools significantly influences teaching practices and student mathematics achievement.
2) Educational reforms focusing on developing emotional maturity and addressing gender biases in beliefs about mathematical abilities are advocated to enhance teaching effectiveness and foster a positive learning environment.
3) Statistical analyses conducted on emotional maturity levels among women mathematics teachers in Nadia, West Bengal's secondary schools provide insights into educational dynamics.
4) Variation exists in educational competencies among educators, potentially impacting teaching approaches, classroom management styles, and interactions with students.
5) Emotional maturity levels do not directly correlate with teaching effectiveness, as evidenced by the lack of a significant association between emotional maturity levels and teaching effectiveness metrics.
6) Emotional maturity levels do not directly impact teachers' beliefs about students' mathematical abilities or their perceptions of gender differences in mathematics.
7) Teachers' beliefs, students' academic self-concept, and gender significantly influence student academic achievement in mathematics, emphasizing the interconnected nature of teacher attitudes, student self-perception, and academic outcomes.
8) Implementing strategies for enhancing emotional maturity and addressing gender biases has a significant effect on educational outcomes in Nadia's secondary schools, highlighting the potential for positive changes in learning environments.
9) Targeted interventions aimed at promoting emotional intelligence among teachers and mitigating gender biases can lead to more inclusive, supportive, and effective learning environments benefiting all students.
10) While emotional maturity is important for teacher professionalism, its direct impact on teaching effectiveness and beliefs about mathematical ability may be nuanced.
11) Ongoing professional development, support programmes, and inclusive practices are essential in educational settings to foster positive student achievements and experiences.
14. Limitations of the Study:

Here are the major limitations of the study:

- **Geographical Scope:** The research is confined to female mathematics teachers in secondary schools of Nadia, West Bengal, which may not represent the entire state or country.
- **Sample Size:** With only 60 participants, the findings may not be generalizable to a larger population of mathematics teachers.
- **Gender Focus:** The study exclusively examines women teachers, potentially overlooking the emotional maturity and teaching effectiveness of male counterparts.
- **Quantitative Approach:** The reliance on a quantitative survey may miss nuanced insights that qualitative methods could provide.

15. Educational Implications:

Here are the educational implications:

- **Professional Development:** The study suggests the need for professional development programs that focus on enhancing emotional maturity among teachers, which can lead to more effective teaching strategies and improved student outcomes.
- **Gender Bias Addressal:** It highlights the importance of addressing gender biases in education, particularly beliefs about mathematical abilities, to ensure equitable learning experiences for all students.
- **Teaching Practices:** The findings advocate for educational reforms that include emotional maturity as a component of teacher training, which can positively influence teaching practices and classroom environments.
- **Student Achievement:** By fostering emotional maturity in teachers, there is potential for reducing gender disparities in mathematics education, contributing to higher student achievement and success.

16. Suggestions for Further Research:

Here are some suggestions for further research:

- **Comparative Studies:** Investigate emotional maturity in male mathematics teachers and compare with female teachers to understand gender-specific impacts.
- **Longitudinal Analysis:** Conduct a long-term study to observe how emotional maturity develops over time among teachers and its long-term effects on teaching effectiveness.
- **Broader Scope:** Expand the research to include teachers from different subjects to explore if emotional maturity has similar effects across disciplines.
- **Interventional Strategies:** Design and assess the effectiveness of targeted professional development programs aimed at enhancing emotional maturity in teachers.

17. Acknowledgements:

The researcher expressed his deepest gratitude to the women mathematics teachers in secondary schools in West Bengal, whose participation made this study possible. The researcher also thanked the Department of Education, University of Kalyani, for their unwavering support and guidance. The researcher’s appreciation extends to our peers and colleagues for their valuable insights and constructive feedback. Lastly, the
researcher acknowledged the role of our families and loved ones in providing constant encouragement throughout this research journey.

18. References:


19. Ethical Considerations:

In conducting the study on the emotional maturity of female mathematics teachers in West Bengal, ethical considerations are paramount to ensuring respect, fairness, and integrity in research. The study should adhere to voluntary participation, ensuring teachers understand the study's scope and consent without coercion. Privacy and confidentiality must be safeguarded, particularly when handling personal data and responses, which should be anonymized in any publications or presentations. It is also essential to consider...
the potential impact of the study's findings on participants' perceptions and the broader community. Misinterpretation or misuse of data that stereotypes or discriminates based on gender or locale (urban vs. rural) must be avoided. Lastly, the researchers should be prepared to address any emotional distress that might arise during the survey, providing adequate support or referrals to professional help if needed.

20. Conflict of Research
The “Conflict of Research” section of the paper discusses the ethical considerations necessary to ensure respect, fairness, and integrity in the study. It emphasizes the importance of voluntary participation, confidentiality, and the avoidance of data misuse that could lead to stereotypes or discrimination. The researchers also commit to addressing any emotional distress that may arise during the survey process. Here’s a summary of the key points:

- Voluntary Participation: Participants should consent without coercion and fully understand the study’s scope.
- Privacy and Confidentiality: Personal data and responses must be handled with care and anonymized in publications.
- Impact on Perceptions: Researchers should be cautious of how findings might influence participants’ and the community’s views.
- Avoiding Stereotypes: Misinterpretation or misuse of data that could stereotype or discriminate must be avoided.
- Emotional Support: Researchers should provide support or referrals to professional help if emotional distress arises during the survey.