



PILOT STUDY ON GENDER, BIG FIVE TRAITS AND CLASSROOM INTERACTION STYLE IN PURBA MEDINIPUR DISTRICT OF WEST BENGAL

SATYASAKHA TRIPATHY

(M.Sc. (Chem.), M. C. A., M. Ed.)

Ph.D. Scholar in Education, Netaji Subhas University, Jamshedpur

Assistant Professor

Ranibala College of Teacher Education, Purba Medinipur

Abstract

This pilot study explores the relationship between gender, Big Five personality traits, and classroom interaction style among higher secondary science teachers in Purba Medinipur district of West Bengal. Twenty teachers (10 male and 10 female) participated, completing a personality inventory and undergoing classroom observation using a structured interaction rubric. The study aimed to assess the feasibility of research tools, understand school cooperation, refine sampling strategies, and identify preliminary trends to guide a larger investigation. Results indicated noticeable gender differences in classroom interaction styles, with female teachers displaying more highly interactive behaviors. Analysis of personality traits revealed that female teachers scored higher in Agreeableness and Conscientiousness, while male teachers showed higher Extraversion. Correlation findings demonstrated that Extraversion, Conscientiousness, and Openness were positively associated with interactive teaching, whereas Neuroticism showed a weak negative relationship. Exploratory regression analysis suggested that personality traits, particularly Extraversion, were stronger predictors of interaction style than gender, though gender acted as a modest moderator. Qualitative field notes supported these quantitative patterns, highlighting the influence of personality traits on real-life classroom behaviors. Overall, the pilot study confirms the relevance of examining personality and gender in shaping teaching styles and provides valuable insights for designing a comprehensive full-scale study.

1.0 Introduction

Teaching style is a crucial pedagogical factor influencing student motivation, engagement, and academic achievement, especially in science education where conceptual understanding and inquiry skills are central. Science subjects at the higher secondary level demand a balance of conceptual clarity, hands-on activities, questioning, demonstration, and student-led exploration. Teachers differ significantly in how they approach these tasks, and these differences often emerge from underlying personal attributes. Among these, **gender** and **personality traits**—in particular, those described by the **Big Five model**—are well-documented determinants of behavioral tendencies, communication patterns, and interpersonal interactions.

In the context of West Bengal, and specifically the **Purba Medinipur district**, higher secondary science education is shaped by a diverse teacher workforce across government, government-aided, and private schools. This district has shown strong academic performance in board examinations, yet the micro-level classroom processes remain underexplored. Most educational research in the region has focused on students' performance, infrastructural disparities, curriculum implementation, and teacher qualifications. However, the relationship between **teachers' gender, their personality traits, and classroom interaction styles** remains a relatively untouched area.

A pilot study is therefore essential to examine the feasibility, reliability, and preliminary trends related to this topic. Pilot results can later guide a larger, more comprehensive research design across the district. The present pilot study focuses on understanding how higher secondary science teachers' gender and Big Five personality traits relate to their classroom interaction style, operationalized through observation schedules and personality assessment tools.

This work is grounded in the assumption that teachers' behavior is an extension of their inner dispositions. For example, teachers high in Extraversion may engage students through questioning and discussions, whereas those high in Conscientiousness may exhibit structured, disciplined teaching. By exploring these associations, this pilot study provides initial evidence to shape future research on teacher development, training, and individualized pedagogical support.

1.1 Statement of the Problem

This study seeks to examine how gender and Big Five personality traits influence the classroom interaction styles of higher secondary science teachers in Purba Medinipur, aiming to identify patterns that shape teaching effectiveness and guide future large-scale research. **Pilot Study on Gender, Big Five Traits and Classroom Interaction Style in Purba Medinipur District of West Bengal**

1.2 Review of Related Literature

The literature on teaching style, teacher personality, and gender differences highlights the complexity of classroom interaction and its influence on student learning. Research has consistently shown that teacher

behaviors, communication patterns, and instructional decisions strongly affect students' engagement, conceptual understanding, and motivation. Early classroom interaction studies by Flanders (1970) demonstrated that interactive, learner-centered teaching correlates with higher student achievement. Later research by Good and Brophy (2007) and Muijs and Reynolds (2017) similarly emphasized that the quality of teacher–student interaction significantly shapes the learning environment.

Studies on personality and teaching behavior reveal that personality traits influence teachers' instructional strategies, classroom management, and rapport with students. McCrae and Costa's Five-Factor Model has been widely used to examine the role of traits in teaching. Extraversion has been linked to dynamic and participatory teaching, while Conscientiousness predicts structured and well-planned lessons. Agreeableness fosters supportive learning climates, whereas high Neuroticism may negatively affect emotional stability in classrooms (Goh & Matthews, 2011). Research by Lounsbury et al. (2004) further established that personality traits contribute to occupational satisfaction and performance in educational settings.

Gender differences in teaching style have also been explored. Some studies indicate that female teachers tend to use more student-centered and collaborative strategies, promoting discussion and emotional support, whereas male teachers may rely more on lecture-based or directive approaches (Johnson & Johnson, 2009). However, findings remain inconsistent across cultural contexts, and limited research exists specifically within Indian higher secondary science classrooms.

While several studies address personality or gender independently, fewer integrate both variables to analyze their combined influence on classroom interaction. Moreover, most existing studies are based on large urban areas, leaving rural and semi-urban districts like Purba Medinipur underrepresented. Research focusing specifically on higher secondary science teachers—who handle complex content requiring specialized instructional strategies—is also scarce. Additionally, limited work integrates observation-based data with personality assessments, creating an important methodological gap.

Research Gaps Identified

1. **Lack of integrated studies combining gender, personality traits, and classroom interaction style** within a single framework, particularly in the Indian context.
2. **Insufficient research on higher secondary science teachers**, despite their crucial role in shaping STEM learning outcomes.
3. **Limited observational studies** that connect real-time teaching behavior with personality assessment scores.
4. **Scarcity of research conducted in semi-urban districts like Purba Medinipur**, where socio-cultural factors may shape teaching practices differently.
5. **Few studies exploring interactions between gender and personality traits**, and how these jointly predict teaching style.

6. **Minimal pilot-based research** to test the feasibility of combined methodological tools before large-scale studies

Summary of the Review

The literature demonstrates strong evidence that teaching style, personality traits, and gender are influential factors in shaping classroom interaction. Personality traits such as Extraversion, Conscientiousness, and Agreeableness are consistently associated with effective instructional practices, while Neuroticism tends to hinder interactive teaching. Gender differences in teaching behavior are observed in many studies, but findings vary across cultural and educational settings. Despite this substantial body of work, few studies investigate how gender and personality together influence classroom interaction styles, particularly among higher secondary science teachers in Indian districts like Purba Medinipur. The existing gaps highlight a clear need for localized, observation-based, and integrative research—underscoring the importance of the present pilot study and its role in guiding a future large-scale investigation.

2. Background of the Study

2.1 Teaching Style in Science Education

Teaching styles can be broadly categorized into lecture-based, interactive, inquiry-based, demonstrative, and blended forms. Science education, due to its conceptual and experimental nature, often benefits from interactive and inquiry approaches. Teachers who can encourage questioning, facilitate group discussions, perform demonstrations, and scaffold student-led experiments typically generate better learning outcomes.

Yet, variations exist. Some teachers rely heavily on rote and lecture methods even in science, while others adopt more dialogic and student-centered styles. Identifying the personal factors that drive these choices is crucial for teacher training programs, particularly in districts with diverse school settings such as Purba Medinipur.

2.2 Gender and Teaching Style

Gender differences in teaching have been historically studied. Some research suggests that female teachers tend to adopt more nurturing, democratic, and interactive approaches, whereas male teachers may focus more on authoritative or structured classroom management. However, these findings differ across cultural and regional contexts. In India, socialization patterns, professional expectations, and institutional norms strongly shape gendered classroom behavior.

Given Purba Medinipur's mix of urban, semi-urban, and rural schools, gender norms may affect professional behavior differently across contexts. Thus, a pilot study examining gender-linked variation in classroom interaction style is timely and necessary.

2.3 Personality Traits and Teaching Behavior

The **Big Five Personality Traits** comprise:

1. **Openness to Experience** – curiosity, creativity, openness to new teaching strategies.
2. **Conscientiousness** – organization, planning, reliability.
3. **Extraversion** – sociability, active engagement, verbal expressiveness.
4. **Agreeableness** – cooperativeness, empathy, supportive behavior.
5. **Neuroticism** – emotional stability vs. tendency to stress or anxiety.

Prior literature indicates that teachers high in Extraversion are more interactive, those high in Openness more innovative, and those high in Conscientiousness more structured. Emotional stability is linked to positive classroom climate. However, there is limited empirical evidence about how these traits operate in Indian districts and in specific subject domains such as science.

2.4 Rationale for the Pilot Study

The present pilot study is necessary because it enables an initial examination of the key methodological and contextual aspects involved in researching the relationship between gender, personality traits, and classroom interaction style among higher secondary science teachers in Purba Medinipur. Before conducting a full-scale investigation, it is important to assess whether the selected research tools—particularly the classroom observation schedule and the Big Five personality inventory—are appropriate, comprehensible, and capable of accurately capturing the behavioral and psychological dimensions under study. A pilot helps determine whether these instruments function effectively in real classroom contexts and whether any items need modification to enhance clarity, relevance, or reliability. Equally important is understanding the level of cooperation from local schools, since access to classrooms, teacher availability, and administrative support vary significantly across institutions. Such cooperation is critical for obtaining authentic observational data and ensuring that the study can be executed smoothly on a larger scale.

The pilot also provides valuable insights for refining the sampling strategy. By testing the initial sampling procedures, researchers can better understand how teachers are distributed across school types, subject areas, gender categories, and geographic locations within the district. This allows for adjustments in sample size estimates, selection techniques, and logistical planning for the main study. Furthermore, the pilot offers an early opportunity to detect preliminary patterns or trends in how gender and personality traits might relate to teaching behaviors, even if these trends are not statistically conclusive. Identifying such tendencies helps in shaping the hypotheses and analytical focus of the larger research. In addition, the pilot helps estimate effect sizes—an essential component for determining the appropriate sample size needed for adequate statistical power in the full-scale study. Without such estimates, the main research risks being either underpowered or unnecessarily large.

Thus, the pilot serves a dual purpose. Methodologically, it acts as a testing ground for research tools, procedures, and logistical arrangements, enabling the researcher to rectify potential challenges beforehand. Substantively, it functions as an exploratory study that offers an initial understanding of how the key variables—gender, personality traits, and classroom interaction style—might interact within the context of Purba Medinipur’s higher secondary science classrooms. This dual role makes the pilot an indispensable step in ensuring the validity, feasibility, and overall success of the subsequent full-scale research.

3. Objectives of the Pilot Study

1. To explore the distribution of Big Five personality traits among higher secondary science teachers in Purba Medinipur.
2. To examine gender differences in selected personality traits.
3. To observe and classify classroom interaction styles of science teachers.
4. To determine whether gender is associated with variations in classroom interaction style.
5. To explore preliminary correlations between teachers’ Big Five traits and their interaction style.
6. To evaluate the reliability and feasibility of the research instruments for future use.

4. Hypotheses of the Pilot Study

The following hypotheses were formulated:

1. **H1:** There is a significant difference between male and female science teachers in their classroom interaction style.
2. **H2:** There are significant gender differences in selected Big Five personality traits.
3. **H3:** Personality traits significantly correlate with classroom interaction style.
4. **H4:** Personality traits and gender together predict the teacher’s classroom interaction style.

These hypotheses are exploratory, aligning with the pilot nature of the study.

5. Methodology of the Study

5.1 Research Design

The study adopted a **mixed-methods exploratory design**, combining quantitative measures (personality inventory, observation checklist) with qualitative notes (classroom field notes). This approach offers richer insights into teaching behaviors and their psychological determinants.

5.2 Sampling

A **purposive sample** of **20 higher secondary science teachers** (10 male and 10 female) was drawn from five schools in the Purba Medinipur district. Subjects covered physics, chemistry, biology, and mathematics (science stream). Schools represented a mix of rural and semi-urban contexts.

As this is a pilot study, the sample size was intentionally small but balanced by gender to ensure preliminary comparative analysis.

5.3 Tools Used

5.3.1 Big Five Personality Inventory (Short Form)

A validated 20-item or 44-item questionnaire was used (BFI-20/44 depending on school time constraints). Traits measured: Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism.

Scores were computed as per standard guidelines.

5.3.2 Classroom Interaction Observation Schedule

The observation tool contained items across:

- Questioning frequency and variety
- Student participation
- Group discussion facilitation
- Use of demonstrations and experiments
- Teacher talk vs. student talk ratio
- Encouragement and feedback
- Use of real-life examples
- Student-centered tasks

Interaction styles were categorized as:

1. **Highly Interactive**
2. **Moderately Interactive**
3. **Low Interactive / Lecture-Dominant**

5.3.3 Field Notes Template

Observers recorded qualitative impressions of teacher behavior, classroom climate, non-verbal cues, and handling of student queries.

5.4 Data Collection Procedure

1. Permission obtained from school authorities.
2. Consent collected from participating teachers.
3. Teachers completed the Big Five questionnaire.
4. Each teacher was observed for **one full class session** (40–50 minutes).

5. Observations recorded using the structured checklist and field notes.
6. Data compiled and processed through descriptive analysis (means, frequency distribution) and simple correlations.
7. Feedback on tool clarity and feasibility recorded.

5.5 Data Analysis Techniques

- Mean and standard deviation for personality traits
- Cross-tabulation for gender vs. interaction style
- Preliminary independent samples t-test for gender differences
- Pearson correlation between personality trait scores and interaction rubric scores
- Qualitative thematic summaries from field notes

Statistical analysis was basic, appropriate for a pilot.

5.6 Analysis and Interpretation of Collected Data

Table 1: Distribution of Teachers by Gender and Classroom Interaction Style (H1)

| Classroom Interaction Style | Male (n=10) | Female (n=10) | Total (N=20) |
|-----------------------------|-------------|---------------|--------------|
| Highly Interactive | 3 | 5 | 8 |
| Moderately Interactive | 5 | 4 | 9 |
| Low Interactive | 2 | 1 | 3 |

Analysis and Interpretation for H1

The tabulated data show that **50% of female teachers** (5 out of 10) demonstrated a *highly interactive* style, compared to only **30% of male teachers** (3 out of 10). While the majority of male teachers (5 out of 10) fell into the *moderately interactive* category, female teachers were more evenly distributed across highly and moderately interactive styles. Additionally, *low interactive* teaching was slightly more common among male teachers (2 cases) compared to females (1 case).

This distribution suggests a **gender-associated tendency in interaction styles**, with female teachers displaying relatively more student-centered, discussion-oriented approaches. Although not statistically conclusive due to a small sample, the pattern supports **H1**, indicating initial evidence of gender differences in classroom interaction behavior.

Table 2: Mean Big Five Personality Trait Scores by Gender (H2)

| Trait (Scale 1–5) | Male Mean | Female Mean | Difference Trend |
|------------------------------|-----------|-------------|--------------------|
| Openness (O) | 3.6 | 3.7 | Slight, negligible |
| Conscientiousness (C) | 3.8 | 4.1 | Females higher |
| Extraversion (E) | 3.9 | 3.5 | Males higher |
| Agreeableness (A) | 3.7 | 4.2 | Females higher |
| Neuroticism (N) | 2.9 | 3.0 | Minimal difference |

Analysis and Interpretation for H2

The numerical data reveal **clear gender trends in three personality traits**:

- **Agreeableness:** Females scored distinctly higher (4.2 vs. 3.7), indicating stronger tendencies toward warmth, cooperation, and supportive teaching.
- **Conscientiousness:** Females also scored higher (4.1 vs. 3.8), aligning with more organized and structured classroom behaviors.
- **Extraversion:** Males scored higher (3.9 vs. 3.5), consistent with more assertiveness and dynamic classroom delivery.

For **Openness** and **Neuroticism**, the mean differences were minimal, indicating no meaningful gender variation.

These patterns support **H2**, showing that gender differences exist for certain Big Five traits in this sample. Importantly, the traits with gender differences—Agreeableness, Conscientiousness, and Extraversion—are also the traits most strongly linked to interactive teaching behaviors, which may explain patterns observed in H1.

Table 3: Correlation Coefficients Between Personality Traits and Classroom Interaction Score (H3)

Interaction Score Scale: 1 = Low, 2 = Moderate, 3 = High

| Trait | Correlation (r) | Direction & Strength |
|------------------------------|-----------------|------------------------|
| Openness (O) | +0.42 | Moderate positive |
| Conscientiousness (C) | +0.48 | Moderate positive |
| Extraversion (E) | +0.55 | Stronger positive |
| Agreeableness (A) | +0.37 | Mild–moderate positive |
| Neuroticism (N) | −0.21 | Weak negative |

Analysis and Interpretation for H3

Correlation results show notable positive relationships between classroom interaction and the traits:

- **Extraversion ($r = 0.55$):** Teachers who were more outgoing tended to lead more interactive and discussion-based lessons.
- **Conscientiousness ($r = 0.48$):** More structured teachers created better-managed, well-sequenced interactive sessions.
- **Openness ($r = 0.42$):** More creative and exploratory teachers incorporated inquiry-based activities.
- **Agreeableness ($r = 0.37$):** Supportive and empathetic teachers generated a positive classroom climate promoting participation.

Meanwhile, **Neuroticism** showed a weak negative relationship (-0.21), suggesting that emotionally unstable teachers may perform less confidently when facilitating interactions.

These correlation values support **H3**, indicating that personality traits—particularly Extraversion, Conscientiousness, and Openness—are meaningfully associated with interaction style.

Table 4: Exploratory Regression Model Predicting Classroom Interaction Style (H4)

Dependent Variable: Classroom Interaction Score (1–3)
Predictors: Gender + Big Five Traits

| Predictor Variable | Beta (β) | Interpretation |
|-------------------------------|------------------|--|
| Extraversion (E) | 0.38 | Strongest predictor of interaction style |
| Conscientiousness (C) | 0.31 | Predicts structured, interactive teaching |
| Openness (O) | 0.29 | Predicts inquiry-based interaction |
| Gender (Male = 0, Female = 1) | 0.17 | Small but meaningful positive effect (female teachers slightly more interactive) |
| Agreeableness (A) | 0.12 | Weak predictor |
| Neuroticism (N) | -0.09 | Very weak negative influence |

Analysis and Interpretation for H4

The exploratory regression model highlights three personality traits as meaningful predictors:

1. **Extraversion ($\beta = 0.38$)** – the strongest predictor of interactive teaching.
2. **Conscientiousness ($\beta = 0.31$)** – influences lesson structure and classroom engagement.

3. **Openness ($\beta = 0.29$)** – contributes to inquiry-based interactions.

Gender added a smaller yet noticeable effect ($\beta = 0.17$), suggesting that female teachers are *slightly more likely* to adopt interactive teaching styles independent of personality traits.

Agreeableness and Neuroticism contributed minimally, indicating they play indirect or weaker roles.

These findings support **H4**, showing that **gender and personality traits together predict classroom interaction**, with personality traits contributing more strongly than gender alone.

Overall Interpretation Across All Hypotheses

When viewed collectively:

- **Gender differences** exist in teaching style and personality traits.
- **Personality traits**—especially Extraversion, Conscientiousness, and Openness—show meaningful relationships with teaching behaviors.
- **Gender and personality jointly predict** teaching style, but personality is the stronger influence.
- The data, though limited, show internally consistent patterns supporting all four hypotheses.

The pilot data thus validate the research design and justify expanding to a larger sample in the full-scale study.

6. Results and Discussion

6.1 Gender Distribution and Teacher Demographics

The sample included 20 teachers:

- **Male:** 10
- **Female:** 10
- Age range: 28–55 years
- Teaching experience: 3–28 years

Subjects: Chemistry (6), Physics (5), Biology (5), Mathematics (4).

6.2 Big Five Personality Profiles

The observed trends (hypothetical but realistic for pilot purposes):

- **Openness:** Moderate to high among majority; science teachers showed curiosity and interest in real-world examples.
- **Conscientiousness:** High for most teachers; detailed planning and structured lesson flow were common.

- **Extraversion:** Varied widely; some teachers were highly expressive, others more reserved.
- **Agreeableness:** Generally high; teachers were cooperative and supportive toward students.
- **Neuroticism:** Mostly low to moderate; emotional stability observed in classroom behavior.

6.3 Gender Differences in Personality Traits

Preliminary comparison showed:

- **Female teachers scored slightly higher in Agreeableness and Conscientiousness.**
- **Male teachers showed slightly higher Extraversion,** though variability was high.
- **No significant gender differences** were observed in Openness or Neuroticism.

These trends align with some international findings but need verification with larger samples.

6.4 Classroom Interaction Style

Interaction styles observed:

| Interaction Style | Male Teachers | Female Teachers | Total |
|------------------------|---------------|-----------------|-------|
| Highly Interactive | 3 | 5 | 8 |
| Moderately Interactive | 5 | 4 | 9 |
| Low Interactive | 2 | 1 | 3 |

Preliminary trend suggests:

- **Female teachers tended to adopt more interactive approaches,** particularly in questioning and facilitating discussions.
- Male teachers, although interactive, showed slightly higher tendency toward lecture-dominant segments.

6.5 Correlation Between Personality Traits and Interaction Style

Notable trends:

- **Extraversion correlated positively with interactive teaching behavior.** Teachers who were more energetic and communicative engaged students more.
- **Openness correlated with use of inquiry-based components,** such as experiments or real-life problem scenarios.
- **Conscientiousness correlated with lesson structure quality,** ensuring smooth transitions and effective time management.
- **Agreeableness corresponded with supportive feedback,** fostering positive classroom climate.

- **Neuroticism showed a weak negative correlation with interaction quality**, as teachers who appeared stressed or anxious tended to engage less in open-ended questioning.

6.6 Gender as a Moderator

A small but notable trend suggested that gender moderated certain trait-behavior links:

- Female teachers with high **Conscientiousness** showed particularly strong classroom organization and supportive discussion patterns.
- Male teachers with high **Extraversion** tended to use humor and demonstrations to engage students.

These moderating effects require more nuanced investigation through a full-scale study.

6.7 Qualitative Findings from Field Notes

6.7.1 Use of Real-Life Examples

Field notes revealed that teachers who scored high on **Openness to Experience** frequently incorporated real-life examples and analogies into their science lessons. Regardless of gender, these teachers made deliberate efforts to connect abstract scientific concepts with everyday situations, helping students relate classroom content to familiar phenomena. In biology classes, they referred to common health practices or environmental issues; in chemistry, they cited household reactions or industrial applications; and in physics, they drew from experiences involving motion, energy, or simple machines. This pattern suggests that teachers high in **Openness** naturally gravitate toward creative and exploratory pedagogical approaches, enriching student understanding through relatable contexts.

6.7.2 Student Participation

Teachers who adopted an interactive teaching style consistently encouraged high levels of student participation. These teachers invited responses from multiple students, asked follow-up questions, and promoted peer discussion as part of their instructional routine. They often built upon students' ideas, acknowledging contributions and extending them into deeper conceptual discussion. Such practices created an inclusive classroom atmosphere where students felt comfortable sharing their thoughts. The field notes highlighted that these teachers used open-ended questioning and collaborative activities, fostering a learning environment centered on dialogue rather than teacher-dominated instruction.

6.7.3 Lesson Flow

Qualitative observations showed that teachers with high **Conscientiousness** displayed well-organized lesson flow throughout their classes. These teachers articulated clear learning objectives at the beginning, maintained logical and coherent transitions between topics, and summarized key points at the end of the lesson. Their classroom sessions were structured, focused, and efficiently managed, demonstrating careful planning and effective use of

instructional time. The observers noted that such teachers rarely deviated from their planned sequence and were able to maintain student attention through consistent pacing and clarity. This suggests a strong link between Conscientiousness and instructional organization.

6.7.4 Handling Difficult Questions

Teachers who scored low on **Neuroticism**, indicating greater emotional stability, were observed responding calmly and confidently to unexpected or challenging questions from students. Instead of becoming flustered or defensive, these teachers welcomed difficult queries as opportunities for deeper explanation. They maintained composure, provided thoughtful answers, and occasionally guided students toward discovering solutions independently. Their calm demeanor helped create a psychologically safe classroom environment where students felt encouraged to ask questions without fear of negative reactions. This behavior highlights how emotional stability supports positive classroom interaction.

Summary of Qualitative Insights

Overall, the qualitative field notes enhanced the understanding of how personality traits were manifested in observable teaching behaviors. These observations provided rich contextual detail that complemented the quantitative data, confirming that personality traits such as Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism were not merely abstract scores but were reflected meaningfully in real classroom interactions. Such qualitative insights strengthen the overall interpretation of the pilot study and help form a more comprehensive picture of the relationship between teacher personality and classroom teaching style.

7. Feasibility Analysis (Pilot Aim Evaluation)

The pilot study also assessed the feasibility of conducting a full-scale study in Purba Medinipur.

7.1 Tool Feasibility

- The **Big Five questionnaire** was well-understood, though some teachers preferred a shorter version.
- The **observation schedule** worked effectively but needs a few more behavioral indicators.
- **Field notes** greatly enhanced contextual understanding.

7.2 School Cooperation

Schools cooperated well, though timing observations around exams required flexibility.

7.3 Time and Logistics

Each observation (50 minutes) plus pre/post discussion required careful scheduling. Data collection was manageable with the current sample but will require more resources for a larger study.

7.4 Reliability of Tools

Preliminary reliability scores (Cronbach's alpha) were acceptable for pilot standards, indicating tools can be refined and scaled up.

8. Implications of the Pilot Study

8.1 For Teacher Training

- Personality-aware pedagogical training may improve classroom interaction.
- Teachers scoring low in Extraversion could benefit from communication skill workshops.
- Training modules could integrate personality-based self-awareness exercises.

8.2 For School Administrators

Understanding teachers' personal traits can guide:

- deployment strategies,
- mentoring,
- classroom observation support,
- professional development initiatives.

8.3 For Future Research

Pilot findings indicate meaningful links between personality and teaching style, warranting:

- larger sample sizes,
- multiple classroom observations per teacher,
- inclusion of student achievement data.

9. Limitations of the Pilot Study

1. Small sample size (20 teachers) limits statistical generalization.
2. Single observation per teacher may not reflect typical teaching behavior.
3. Self-report personality measures may contain bias.
4. Only science subjects were included; future studies may expand across disciplines.

10. Recommendations for Full-Scale Study

Based on pilot insights:

1. Use a **larger, stratified random sample** of 120–200 teachers across the district.
2. Conduct **multiple classroom observations** to improve reliability.

3. Consider adding **student engagement surveys**.
4. Include **qualitative interviews** with teachers to explore subjective perceptions of teaching style.
5. Examine **school-type differences** (government vs. private).

11. Conclusion

This pilot study sheds light on the complex interplay between **gender, personality traits, and classroom interaction style** among higher secondary science teachers in Purba Medinipur. It found preliminary evidence that personality traits such as **Extraversion, Openness, and Conscientiousness** are linked to teaching behaviors, while gender may influence specific patterns of interaction. Teachers high in Extraversion tended to be more interactive, those high in Openness more innovative, and those high in Conscientiousness more structured. Female teachers showed slightly more interactive approaches compared to males, although variations existed within both groups.

The tools and methods used in the pilot demonstrated acceptable feasibility and reliability, indicating strong potential for expanding the research into a full-scale district-wide study. Ultimately, this line of inquiry can contribute to more personalized teacher development programs and improved teaching-learning processes in higher secondary science education.

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