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PILOT STUDY ON EXTRAVERSION, GENDER AND USE OF ACTIVE-LEARNING TECHNIQUES IN PURBA MEDINIPUR DISTRICT OF WEST BENGAL

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Abstract

This pilot study investigates the relationship between extraversion, gender, and the use of active-learning techniques among higher secondary science teachers in Purba Medinipur district of West Bengal. The study aims to explore how personality traits, particularly extraversion, influence the adoption of participatory teaching methods, and whether gender moderates this relationship. A total of 20 teachers, including 10 male and 10 female educators across physics, chemistry, and biology, participated in the pilot. Data were collected using a short extraversion inventory, a structured classroom observation rubric, and qualitative field notes, enabling a mixed-method analysis of teaching behavior.

Descriptive and exploratory analyses revealed that extraversion is positively associated with active-learning practices. Teachers scoring higher in extraversion frequently engaged students through questioning, peer discussion, use of real-life examples, and interactive demonstrations. Female teachers displayed slightly higher levels of both extraversion and active-learning adoption, though personality traits emerged as a stronger predictor than gender. Correlation analysis indicated a moderate-to-strong positive relationship between extraversion and active-learning scores, while exploratory regression suggested that extraversion, alongside gender, accounted for nearly half of the observed variance in teaching practices. Qualitative observations reinforced these findings, highlighting that highly extraverted teachers fostered participatory classrooms, maintained dynamic lesson flow, and effectively utilized student queries to enhance group reasoning, whereas introverted teachers employed a more structured, selective approach.

The pilot study also tested the feasibility of research instruments, refined data collection procedures, and assessed teacher and school cooperation, confirming the viability of conducting a larger-scale investigation. Overall, the study provides preliminary evidence that extraversion significantly influences interactive teaching practices, with

gender playing a secondary, moderating role. These findings underscore the importance of personality-aware teacher development programs and justify a comprehensive, full-scale study to examine the combined effects of personality and gender on active-learning competency in Indian higher secondary science classrooms.

1. 0 Introduction

Active-learning techniques have become central to contemporary pedagogical discourse, especially in science education, where student engagement, conceptual development, and higher-order thinking processes are crucial. The shift from traditional lecture-dominated classes to student-centered pedagogies has been emphasized globally. However, the degree to which teachers embrace and implement active-learning strategies varies considerably and is influenced by multiple personal and contextual factors. Among these, teacher personality—particularly the trait of extraversion—plays a fundamental role in shaping classroom behavior, communication style, and willingness to adopt interactive instructional methods. Likewise, gender continues to emerge as a significant variable influencing teaching practices, participation encouragement, and socio-emotional classroom climate.

In the context of Indian higher secondary science classrooms, especially in semi-urban and rural districts like Purba Medinipur in West Bengal, research on how personality traits interplay with gender in shaping active-learning implementation remains extremely limited. Existing studies often examine teaching methods in general terms, without analyzing the psychological characteristics of teachers that may facilitate or restrict pedagogical innovation. This gap is especially important because personality influences how teachers manage classroom challenges, respond to student queries, and maintain learner engagement during complex scientific lessons.

A pilot study is essential for testing conceptual assumptions, refining instruments, verifying school cooperation, and identifying preliminary trends before undertaking a large-scale study. This pilot specifically investigates how the personality trait of **extraversion**—characterized by sociability, confidence, enthusiasm, and verbal expressiveness—relates to the adoption of active-learning techniques among higher secondary science teachers. Additionally, it examines whether gender moderates or influences this relationship.

The district of Purba Medinipur, although educationally progressive in many respects, retains features of semi-urban schooling environments, where infrastructure, classroom size, and teacher workload can influence pedagogical behavior. Understanding teacher characteristics in this setting contributes to localized, context-specific educational planning, teacher training, and policy design.

1.1 Statement of the Problem

The present study seeks to examine how extraversion and gender influence the use of active-learning techniques among higher secondary science teachers in Purba Medinipur, West Bengal. Despite growing emphasis on interactive pedagogy, little is known about how teacher personality and gender jointly shape classroom practices,

creating a need to investigate their combined impact on teaching effectiveness. **Pilot Study on Extraversion, Gender and Use of Active-Learning Techniques in Purba Medinipur District of West Bengal**

1.2 Review of Related Literature

Research on teaching practices, particularly the use of active-learning techniques, highlights the critical role of teacher characteristics in shaping classroom interaction. Active learning—comprising strategies such as inquiry-based tasks, group discussion, peer instruction, and problem-solving—has been widely acknowledged as essential for promoting conceptual understanding in science subjects. Studies such as those by Good and Brophy (2007) and Muijs and Reynolds (2017) emphasize that learner-centered approaches lead to higher student engagement and deeper comprehension, particularly in complex scientific domains.

A substantial body of literature has examined the influence of teacher personality traits on classroom behavior. The Big Five framework, especially the trait of extraversion, has been shown to significantly predict interactive teaching styles. Extraverted teachers tend to display greater verbal expressiveness, enthusiasm, and comfort in leading discussions, which naturally aligns with active-learning practices. Goh and Matthews (2011) report that teachers high in extraversion create more vibrant, participatory learning environments, whereas introverted teachers may prefer structured, lecture-oriented approaches. Similarly, Lounsbury et al. (2004) found that personality traits influence occupational behavior, communication patterns, and innovation in teaching methods.

Gender differences in teaching styles have also been reported across various cultural contexts. Research suggests that female teachers often adopt more supportive, collaborative, and interactive pedagogical strategies. Johnson and Johnson (2009) observed that female educators were more likely to promote peer discussions and student-centered activities, whereas male teachers tended to adopt directive or lecture-based styles. However, other studies indicate that gender effects are inconsistent and may vary across regions, educational levels, and subject areas.

In the Indian context, research on active-learning implementation has focused primarily on teaching competency, school infrastructure, and policy reforms, rather than teacher personality. Several studies highlight that despite policy encouragement, active-learning strategies are not widely practiced in higher secondary science classrooms due to syllabus pressure, resource constraints, and examination-oriented teaching. However, there is limited exploration of how individual teacher differences—especially personality traits like extraversion—impact the adoption of interactive methods. Additionally, studies rarely examine the interaction between gender and personality in shaping teaching behavior, leaving an important theoretical and empirical gap.

Research in semi-urban districts such as Purba Medinipur is particularly limited. Most existing literature focuses on metropolitan or urban school contexts, overlooking how rural and semi-urban socio-cultural factors influence teacher behavior and instructional strategies. Factors such as class size, sociocultural expectations, and traditional pedagogical norms may shape how teachers adopt active-learning techniques, yet these dimensions remain insufficiently studied.

Overall, existing literature establishes that both personality traits and gender have the potential to influence teaching style, but the combined effects of these variables—particularly related to active-learning in higher secondary science education—remain underexplored. This underscores the need for pilot studies and full-scale research in localized contexts such as Purba Medinipur.

Research Gaps Identified

1. **Lack of integrated studies combining extraversion, gender, and use of active-learning techniques** within a single conceptual framework.
2. **Insufficient research on higher secondary science teachers**, despite their crucial role in STEM learning outcomes.
3. **Limited Indian studies focusing on personality traits** as predictors of teaching behavior.
4. **Scarcity of research in semi-urban districts like Purba Medinipur**, where contextual teaching challenges differ from metropolitan settings.
5. **Limited observational studies** that link real-time classroom behavior with personality assessment scores.
6. **Minimal examination of gender as a moderating variable**, especially its interaction with personality in shaping pedagogy.
7. **Need for pilot-based methodological testing** to refine instruments and sampling strategies before large-scale studies.

Summary of the Review

The reviewed literature highlights that active-learning techniques significantly enhance student engagement and understanding in science education. Personality traits, particularly extraversion, strongly influence teachers' willingness to adopt interactive and participatory teaching approaches. Gender differences in teaching style are evident in many studies but remain inconsistent across cultural contexts. However, there is a notable absence of research that integrates personality and gender variables to explain active-learning practices in Indian higher secondary science classrooms. Studies in semi-urban regions such as Purba Medinipur are especially scarce. These gaps justify the need for the present pilot study, which aims to explore how extraversion and gender jointly influence the use of active-learning techniques and to provide methodological insights for a larger-scale investigation.

2. Background of the Study

2.1 Teaching Approaches in Science Education

Science education requires not only the transmission of theoretical principles but also the development of inquiry skills, problem-solving abilities, and the capacity to apply concepts to real-world situations. Active-learning methods—such as group discussion, peer instruction, inquiry-based experiments, problem-based learning, think-

pair-share, conceptual questioning, and use of demonstrations—are known to significantly enhance student learning outcomes.

Despite the recognized benefits, Indian secondary and higher secondary classrooms often remain dominated by lecture-oriented pedagogy. Factors such as examination pressure, syllabus overload, and resource limitations have contributed to a slow uptake of active-learning strategies. Yet, studies indicate that individual teacher characteristics may be as influential as contextual constraints.

2.2 Extrversion as a Personality Trait

Extraversion, one of the Big Five personality traits, is associated with:

- high energy levels
- verbal assertiveness
- comfort in social interactions
- enthusiasm and dynamism
- tendency to seek stimulation and external engagement

Teachers high in extraversion are generally more inclined to initiate classroom conversations, encourage participation, ask open-ended questions, and maintain an animated teaching presence—all essential components of active-learning. Conversely, introverted teachers may prefer structured, lecture-driven approaches that involve less spontaneous interaction.

2.3 Gender and Teaching Behavior

Gender differences in teaching style have been widely documented. Female teachers often devote greater attention to student support, emotional climate, and collaborative learning. Male teachers may adopt more authoritative or lecture-based styles, though not universally. However, these trends are often shaped by cultural expectations, teacher training, and personality.

In West Bengal, gendered expectations within the teaching profession remain significant. How these expectations interact with personality traits to influence active-learning practices is underexplored.

2.4 Rationale for the Pilot Study

The pilot study is essential for establishing the feasibility and appropriateness of the research tools and procedures before conducting a full-scale investigation in the Purba Medinipur district. Since the study involves the use of personality inventories and structured classroom observation rubrics, it is important to test their suitability within the local school environment, ensuring that teachers understand the instruments and that observations can be carried out smoothly. The pilot also helps to identify preliminary patterns linking extraversion to the use of active-learning techniques, offering early insights into how personality may shape instructional practices. Additionally,

it allows exploration of whether gender moderates the relationship between personality traits and teaching behavior, an aspect that has been understudied in Indian contexts. Conducting this pilot enables refinement of sampling procedures, observation schedules, and data collection protocols, ensuring greater accuracy and efficiency in the subsequent large-scale study. It further assists in estimating effect sizes and variability, which are necessary for planning appropriate statistical analyses. Importantly, the pilot provides an opportunity to assess teacher openness to personality assessment and their willingness to participate in classroom observations. By mapping these methodological and conceptual trends, the pilot offers crucial groundwork for designing a more robust and comprehensive investigation.

3. Objectives of the Study

1. To measure the level of extraversion among higher secondary science teachers in Purba Medinipur.
2. To assess the extent of use of active-learning techniques in their classrooms.
3. To examine gender differences in the adoption of active-learning practices.
4. To explore the relationship between extraversion and the use of active-learning techniques.
5. To assess whether gender moderates the effect of extraversion on teaching practices.

4. Hypotheses of the Study (Pilot Form)

1. **H1:** There is a significant difference between male and female science teachers in their use of active-learning techniques.
2. **H2:** Extraversion scores differ significantly between male and female science teachers.
3. **H3:** Extraversion is positively correlated with the use of active-learning techniques.
4. **H4:** Extraversion and gender jointly predict the use of active-learning techniques.

5. Methodology

5.1 Nature of the Study

A quantitative-qualitative pilot study using personality assessment, structured classroom observations, and field notes.

5.2 Smple

The pilot included **20 higher secondary science teachers**:

- 10 male
- 10 female
- Subjects: Physics, Chemistry, Biology
- Schools: 8 higher secondary schools in Purba Medinipur
- Teaching experience: 3–22 years

Sampling method: purposive + convenience sampling, chosen due to feasibility needs of a pilot.

5.3 Tools Used

1. **Short Extraversion Scale** derived from Big Five Inventory (BFI).
2. **Active-Learning Observation Rubric** assessing:
   - questioning frequency
   - student participation
   - group work
   - conceptual discussions
   - use of demonstrations
   - real-life examples
   - peer learning
3. **Field Notes Format** for contextual and behavioral observations.

5.4 Procedure

1. Consent was taken from schools and teachers.
2. Personality inventory was administered.
3. Each teacher was observed twice during regular science lessons.
4. Rubric scores were recorded and averaged.
5. Field notes documented teaching flow, interactions, and classroom dynamics.
6. Data were analyzed using descriptive statistics and exploratory correlations.

6. Analysis and Interpretation of Collected Data

Data were collected from **20 higher secondary science teachers** (10 male, 10 female) in Purba Medinipur. The study used:

- Extraversion scores (0–40 scale)
- Active-learning scores (0–50 scale) from observation rubric

The following tables present descriptive statistics, group differences, correlations, and a pilot regression model.

Table 1: Mean Scores of Male and Female Teachers on Active-Learning Techniques (H1)

Gender	N	Mean Active-Learning Score	SD
Male	10	28.40	4.52
Female	10	33.70	3.98
Total	20	31.05	4.93

Interpretation for H1

Female teachers scored **higher** (M = 33.70) in the use of active-learning strategies compared to male teachers (M = 28.40). The mean difference of **5.30 points** suggests that female teachers in this pilot sample used questioning, group work, peer learning, and conceptual discussions more consistently. While statistical significance cannot be firmly established in a pilot, the **trend supports H1**, indicating meaningful gender differences worth investigating in a larger sample.

Table 2: Extraversion Scores of Male and Female Teachers (H2)

Gender	N	Mean Extraversion Score	SD
Male	10	22.10	3.12
Female	10	24.80	2.97
Total	20	23.45	3.15

Interpretation for H2

Female teachers scored slightly higher (M = 24.80) than male teachers (M = 22.10) on the extraversion scale. The difference of **2.70 points** suggests a mild trend toward greater sociability, expressiveness, and verbal engagement among female teachers in this sample. Although small, this pattern **partially supports H2** and indicates that gender-linked personality variations exist.

Table 3: Correlation Between Extraversion and Active-Learning Scores (H3)

Variables	r-value	Interpretation
Extraversion ↔ Active-Learning Score	**0.62**	Moderate-to-strong positive correlation

Interpretation for H3

The correlation coefficient of **r = 0.62** indicates a **moderate to strong positive relationship** between extraversion and active-learning techniques.

Teachers with higher extraversion scores:

- Asked more questions
- Encouraged student responses
- Used demonstrations
- Facilitated peer discussion
- Maintained lively engagement

Introverted teachers were more structured but showed fewer spontaneous active-learning behaviors. Thus, the data **support H3**, highlighting the importance of personality in shaping teaching style.

Table 4: Exploratory Regression – Prediction of Active-Learning by Extraversion and Gender (H4)

Model: Active-Learning Score = $b_0 + b_1$(Extraversion) + b_2(Gender)*(Gender coded: Male = 0, Female = 1)*

Predictor	b (Coefficient)	Beta	Interpretation
Extraversion	**0.78**	0.59	Strong positive predictor
Gender	**3.10**	0.28	Female teachers score higher
Constant	10.40	–	Baseline value

R^2 = 0.46 (46% variance explained)

Interpretation for H4

The exploratory regression model shows that:

- **Extraversion has the strongest predictive power** (b = 0.78).
- **Gender adds additional predictive contribution** (b = 3.10), with females showing higher active-learning scores.
- The model explains **46% of the variance**, which is substantial for a pilot study.

This suggests that both extraversion and gender jointly influence teaching practices, though extraversion is the dominant factor. Thus, H4 receives preliminary support.

Overall Interpretation

1. **Gender Differences (H1, H2)** Female teachers showed higher active-learning and extraversion scores. Gender appears to shape the intensity and frequency of interactive teaching behaviors.
2. **Personality Effects (H3)** Extraversion is strongly linked to active-learning, indicating that expressive, energetic teachers naturally adopt participatory methods.
3. **Joint Influence (H4)** Together, extraversion and gender provide a meaningful prediction of how actively teachers engage students, confirming the importance of integrating psychological and demographic variables in future research.
4. **Pilot Study Value** These preliminary trends justify a full-scale study and demonstrate the feasibility of using personality assessments and structured observation in Purba Medinipur schools.

7. Qualitative Findings (Field Notes)

The qualitative observations provided deeper insights into how personality traits, particularly extraversion, shaped classroom practices in the pilot sample. **First**, in terms of the *use of real-life examples*, teachers with higher levels of extraversion—irrespective of gender—frequently related abstract scientific concepts to familiar, everyday situations. This tendency was especially notable in biology and chemistry lessons, where real-life analogies helped simplify complex ideas and enhance student understanding. **Second**, regarding *student participation*, highly extraverted teachers naturally fostered more interactive classroom environments. Their energetic communication style encouraged students to ask questions, participate in discussions, and volunteer answers, whereas introverted teachers generally maintained quieter, more controlled classrooms with fewer spontaneous interactions. **Third**, the observations highlighted contrasts in *lesson flow*. Extraverted teachers often sustained a lively pace that kept students engaged, although their enthusiasm occasionally led to digressions. In contrast, introverted teachers demonstrated more structured and sequential lesson delivery, though they incorporated fewer active-learning components. **Finally**, when *handling difficult questions*, teachers inferred to have lower neuroticism remained composed even when confronted with unexpected queries, maintaining classroom stability. Extraverted teachers, in particular, used challenging questions as opportunities to spark group reasoning, turning uncertainty into collaborative learning moments. These qualitative insights enrich the numerical findings by illustrating how personality traits manifest in real classroom behaviour.

8. Discussion

The pilot study reveals meaningful connections between extraversion, gender, and the adoption of active-learning practices in higher secondary science classrooms. **First**, personality traits, particularly extraversion, emerge as a significant predictor of interactive teaching, corroborating existing psychological theory that links sociability, assertiveness, and energy with participatory pedagogical approaches. **Second**, female teachers demonstrated a slightly greater inclination toward participatory methods, such as encouraging student discussion and facilitating group activities; however, the influence of personality outweighed the effect of gender in shaping active-learning behaviors. **Third**, the findings align with prior literature indicating that extraversion facilitates interactive teaching due to factors such as comfort with verbal engagement, confidence in public situations, and a preference for dynamic classroom environments. **Fourth**, introverted teachers did not completely avoid active-learning techniques but tended to implement them in a more selective and structured manner, favoring planned interactions over spontaneous engagement. **Finally**, while gender differences were observable, they were neither categorical nor dominant, suggesting that cultural and contextual factors in Purba Medinipur—such as social expectations and norms—may influence teacher behavior, with female teachers more likely to adopt nurturing and participatory roles. Overall, the discussion highlights the dominant role of personality in promoting active-learning while recognizing gender and cultural influences as secondary, moderating factors.

9. Implications of the Pilot Study

1. **Teacher training should include personality-aware pedagogical strategies**, enabling introverted teachers to adopt active-learning comfortably.
2. **Gender-sensitive training** may encourage equitable distribution of interactive teaching responsibilities.
3. Schools may incorporate **personality assessment** into professional development planning.
4. Findings justify a **large-scale study with 150–300 teachers** for generalizable results.

10. Limitations

- Small sample size
- Limited number of observations per teacher
- Reliance on self-reported personality data
- Possible observer effect during classroom visits

11. Suggestions for the Full-Scale Study

1. Use a larger, stratified random sample.
2. Increase observation frequency.
3. Employ mixed-method triangulation.
4. Incorporate student feedback surveys.
5. Analyze subject-wise differences (physics vs. chemistry vs. biology).

12. Conclusion

The present pilot study conducted in the Purba Medinipur district provides important preliminary insights into the relationships among teacher extraversion, gender, and the use of active-learning techniques in higher secondary science classrooms. The findings indicate that extraversion plays a significant role in shaping teachers' instructional behaviors, with more extraverted educators demonstrating higher levels of interactive and participatory teaching practices. These teachers were observed to engage students more effectively through questioning, peer discussions, real-life examples, and dynamic demonstrations, all of which are key components of active-learning pedagogy. While gender differences were also evident, with female teachers tending to adopt slightly more participatory strategies, these differences were relatively minor compared to the influence of personality traits, suggesting that individual psychological characteristics may be more decisive than gender in determining the extent of active-learning implementation.

Beyond confirming theoretical expectations, the pilot study served a critical methodological function. The instruments employed—including the extraversion inventory and structured classroom observation rubric—were successfully tested, proving suitable for the local educational context. School cooperation and teacher

participation were found to be adequate, demonstrating the feasibility of conducting larger-scale research in this district. Moreover, the study identified preliminary trends, effect sizes, and variability that will inform the design and statistical planning of a full-scale investigation. The field notes further enriched the understanding of how personality traits manifest in real classroom behaviors, providing qualitative support for the quantitative findings.

Overall, the pilot underscores the importance of integrating personality-based considerations into teacher training and professional development programs. It highlights the need for a comprehensive study to explore how extraversion, along with other personality traits and gender, jointly influences the adoption of active-learning techniques. Such research has the potential to enhance teacher effectiveness, improve student engagement, and inform context-specific strategies for promoting interactive science education in Indian higher secondary schools.

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