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IMPACT OF LEARNING STYLES ON ACADEMIC ACHIEVEMENT IN ENGLISH AMONG SECONDARY SCHOOL STUDENTS

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ABSTRACT

English language competence has become increasingly vital for academic success in contemporary Indian education. This investigation examines how different approaches to learning affect student performance in English at the secondary level. Drawing from five educational institutions in Darbhanga District, Bihar, this research analyses data from 100 students in classes 9 and 10. The study focuses on four primary learning approaches: visual, auditory, reading/writing, and hands-on learning, plus combinations of these styles. Achievement data came from standardized English examinations, while learning preferences were assessed through Fleming's VARK inventory. Findings reveal that students who flexibly employ multiple learning approaches tend to achieve higher scores compared to those relying on single methods. These results carry practical significance for teaching strategies and instructional design in English classrooms throughout Bihar and similar educational contexts.

Keywords: Learning preferences, Student achievement, English instruction, Secondary education, VARK framework, Darbhanga

1. INTRODUCTION:

Bihar's educational landscape has undergone considerable transformation in recent decades, yet challenges persist in delivering quality English instruction. Darbhanga District presents a microcosm of these challenges, where English remains a critical subject that students must master for future academic and career opportunities. Despite continuous efforts to improve teaching standards, many students struggle to achieve satisfactory proficiency levels.

Understanding how students absorb and process information most effectively represents a fundamental question in education. Every learner brings unique cognitive patterns and preferences to the classroom. Some students grasp concepts better through visual representations, others through listening and discussion, while still others need physical engagement with learning materials. These individual differences, collectively termed learning styles, have attracted substantial attention from educators and researchers seeking to optimize instructional effectiveness.

The concept of learning styles emerged from observations that students respond differently to various teaching methods. While one student might excel when teachers use diagrams and charts, another might perform better with verbal explanations or hands-on activities. Recognizing and accommodating these differences could potentially transform classroom dynamics and student outcomes.

Darbhanga, historically a center of learning in Bihar, faces contemporary educational challenges including resource constraints, varying teacher quality and socioeconomic disparities affecting student learning. Most classrooms still operate through traditional

teacher-centered methods, with limited adaptation to individual student needs. English instruction particularly suffers from this one-size-fits-all approach, as language acquisition benefits substantially from varied instructional techniques matching learner preferences.

This research emerges from a practical need to understand what works for students in this specific context. Rather than importing foreign educational models wholesale, this study grounds itself in local realities while drawing on established theoretical frameworks. The goal is generating actionable insights that teachers and administrators in Darbhanga and similar districts can implement to enhance English learning outcomes.

2. REVIEW OF LITERATURE:

Educational psychology has long grappled with understanding individual differences in learning. Early work by cognitive psychologists established that people process information through multiple sensory channels, with individuals showing preferences for certain channels over others. This foundation led to various models categorizing learning preferences.

Fleming and Mills (1992) developed the VARK framework, identifying four primary modalities through which people prefer to receive and process information. Visual learners benefit from seeing information presented graphically through diagrams, flowcharts, maps, and other visual formats. Auditory learners absorb material more effectively through listening, whether to lectures, discussions, or audio materials. Reading/writing oriented learners prefer textual information and learn through written words. Kinesthetic learners need physical engagement and hands-on experiences to grasp concepts effectively.

Dunn and Dunn (1978) pioneered comprehensive research on learning styles, proposing that students learn differently based on environmental, emotional, sociological, physical and psychological factors. Their extensive work demonstrated that when students receive instruction matching their learning style preferences, they achieve higher academic scores and display more positive attitudes toward learning. Their model has been widely applied in educational settings, particularly in identifying optimal classroom environments and instructional methods for diverse learners.

Kolb (1984) introduced the experiential learning theory, proposing four learning styles: diverging, assimilating, converging and accommodating. His research emphasized that learning is a continuous process grounded in experience and individuals develop preferences for how they perceive and process information. Kolb's work has been particularly influential in adult education and professional training contexts, though its principles apply across age groups.

Cassidy (2004) provided a comprehensive review of learning styles literature, analyzing over 70 different learning style models. His critical examination revealed both the potential benefits and limitations of learning styles research. While acknowledging that individuals do have preferences for how they learn, Cassidy cautioned against oversimplification and stressed the importance of developing flexible learning approaches rather than rigidly categorizing students. This balanced perspective has influenced contemporary educational practice.

Choudhary and Dutt (2009) conducted research on learning styles among undergraduate students in Indian universities, examining the relationship between learning preferences and academic performance. Their study revealed that Indian students demonstrated diverse learning style preferences, with a significant proportion showing multimodal tendencies. They emphasized that traditional lecture-based teaching methods prevalent in Indian

education systems often fail to address the varied learning needs of students, particularly those with kinesthetic and visual preferences.

Dobson (2010) investigated learning styles among secondary school students in Delhi, focusing on the relationship between learning preferences and achievement in science subjects. The study found that visual and kinesthetic learning styles were predominant among Indian adolescents, yet classroom instruction remained predominantly auditory through lectures and verbal explanations. Dobson's research highlighted the mismatch between student learning preferences and actual teaching practices in Indian secondary schools, suggesting this gap contributes to suboptimal learning outcomes.Research specific to Bihar or similar contexts remains remarkably sparse. Few studies have examined learning dynamics in resource-constrained schools serving predominantly rural and lower socioeconomic populations. This gap means educators lack locally validated evidence to guide instructional decisions. The present study addresses this need by focusing specifically on Darbhanga's educational environment.

3. OBJECTIVES OF THE STUDY:

This investigation pursued three specific aims:

Objective 1: To determine which learning style preferences, predominate among secondary school students within Darbhanga District's educational system.

Objective 2: To evaluate English language achievement levels across students exhibiting different learning style preferences.

Objective 3: To analyze whether systematic relationships exist between learning style preferences and academic performance in English.

4. HYPOTHESES:

Three null hypotheses guided the statistical analysis:

H_o1: No statistically significant differences exist in how learning style preferences distribute across the student population in Darbhanga District secondary schools.

H_o2: English achievement scores show no statistically significant variation between students with different learning style preferences.

H_o3: No statistically significant correlation exists connecting learning style preferences to English academic achievement among secondary school students.

5. RESEARCH METHODOLOGY:

Research Design

This study employed a descriptive correlational approach, examining relationships between learning preferences and English achievement without experimental manipulation. This design allows identification of naturally occurring patterns and associations between variables of interest.

Population and Sample

The research population comprised all students enrolled in classes 9 and 10 across Darbhanga District's secondary schools during the 2024-25 academic year. Five schools were purposively selected to represent the district's diversity: two from Darbhanga city's urban core, two from semi-urban areas near the city, and one from a rural location. This selection

strategy ensured representation across different socioeconomic contexts and educational environments.

From these five schools, 100 students participated: 50 from class 9 and 50 from class 10. The sample maintained gender balance with 50 boys and 50 girls. Selection within schools occurred randomly from class rosters, ensuring every eligible student had equal selection probability. This sample size, while modest, proves adequate for correlational analysis with moderate effect sizes.

Tools and Instruments

Two primary instruments facilitated data collection:

VARK Learning Styles Inventory: This study utilized an adapted Hindi-English bilingual version of Fleming's VARK questionnaire. The instrument contains 16 scenarios, each describing a learning situation. Students select from four response options corresponding to visual, auditory, reading/writing, or kinesthetic approaches. Scoring identifies dominant preferences. Students selecting multiple options with similar frequency are classified as multimodal learners. The instrument has demonstrated acceptable reliability across diverse cultural settings.

Academic Achievement Measure: English achievement came from students' final examination scores from the 2023-24 academic year. These examinations, administered uniformly across Bihar's secondary schools, assess reading comprehension, writing ability, grammar knowledge, and literature understanding. Scores range from 0 to 100. School records provided this achievement data with proper administrative authorization.

Data Collection Procedure

Data collection occurred between July and September 2024. Initial permissions came from district education authorities and individual school principals. Parents received information sheets explaining the study, with consent forms returned signed before student participation.

The VARK inventory was administered during regular school hours in familiar classroom settings to minimize anxiety. Researchers provided instructions in both Hindi and English, ensuring comprehension across language proficiency levels. Students completed the inventory independently, typically requiring 20-25 minutes. Researchers remained available to clarify questions without influencing responses.

Academic achievement data came directly from official school records maintained by examination coordinators. Schools provided certified copies of mark sheets, ensuring accuracy.

Data Analysis

Analysis employed both descriptive and inferential statistical techniques. Descriptive statistics (frequencies, percentages, means, standard deviations) characterized the sample and variables. Chi-square goodness-of-fit tests examined whether learning style distributions differed significantly from chance expectations. One-way analysis of variance (ANOVA) compared achievement scores across learning style groups, with post-hoc comparisons where overall tests showed significance. Pearson correlation coefficients quantified relationships between continuous variables. All analyses used SPSS version 25.0, with alpha set at 0.05 for significance testing.

6. RESULTS AND ANALYSIS:

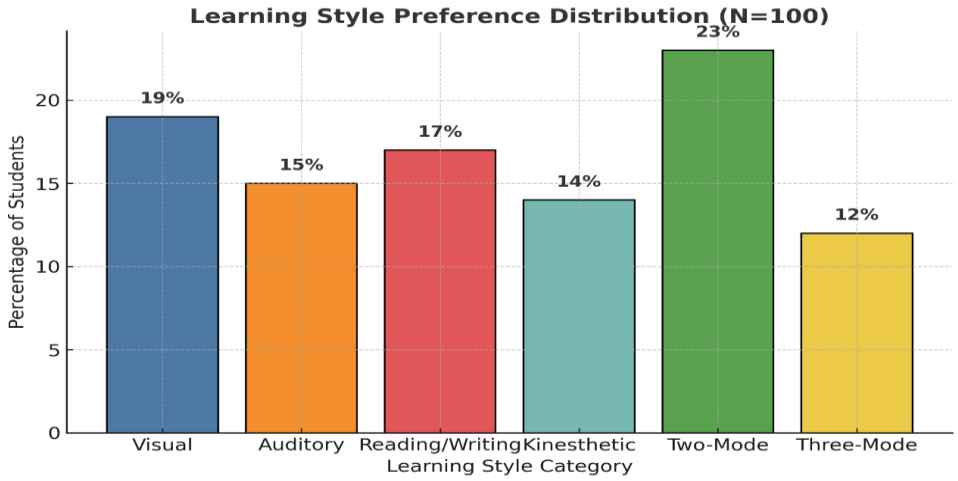
Distribution of Learning Style Preferences

The first research objective sought to map the landscape of learning preferences within the sample. Analysis of VARK inventory responses revealed the distribution presented in Table 1.

Table 1: Learning Style Preference Distribution (N=100)

Learning Style Category	Number of Students	Percentage	Male/Female Split
Primarily Visual	19	19%	10/9
Primarily Auditory	15	15%	7/8
Primarily Reading/Writing	17	17%	8/9
Primarily Kinesthetic	14	14%	7/7
Two-Mode Combination	23	23%	12/11
Three-Mode Combination	12	12%	6/6
Total	**100**	**100%**	**50/50**

Chi-square = 4.12, df = 5, p = 0.533



Results show relatively even distribution across categories, with multimodal learners (combining two or more preferences) representing 35% of the sample. Visual preferences slightly edged out other single preferences at 19%, while kinesthetic showed the smallest proportion at 14%.

Statistical testing revealed no significant deviation from expected equal distribution ($p = 0.533$), suggesting heterogeneity in learning preferences rather than clear dominance of any single style. Gender distribution proved remarkably balanced across all categories, indicating that preference patterns did not differ systematically between boys and girls in this sample.

Testing H_o1: The null hypothesis receives support. Learning style preferences distribute relatively evenly across the student population, showing no statistically significant concentration in particular categories ($p > 0.05$).

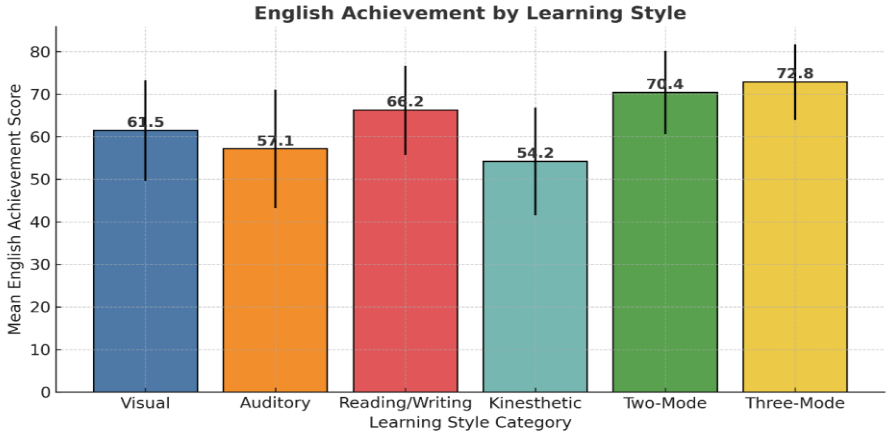
Achievement Levels Across Learning Styles

The second objective examined whether English achievement varied meaningfully across learning preference groups. Table 2 presents descriptive statistics and ANOVA results.

Table 2: English Achievement by Learning Style

Learning Style	N	Mean Score	Standard Deviation	Score Range
Primarily Visual	19	61.47	11.83	42-84
Primarily Auditory	15	57.13	13.92	36-79
Primarily Reading/Writing	17	66.24	10.46	48-87
Primarily Kinesthetic	14	54.21	12.68	35-76
Two-Mode Combination	23	70.39	9.74	51-89
Three-Mode Combination	12	72.83	8.91	58-88
Overall	**100**	**64.13**	**12.47**	**35-89**

ANOVA: F(5,94) = 8.43, p < 0.001



Significant Pairwise Differences (Tukey HSD):

- Three-mode vs. Kinesthetic: $p < 0.001$
- Two-mode vs. Kinesthetic: $p < 0.01$
- Three-mode vs. Auditory: $p < 0.01$
- Reading/Writing vs. Kinesthetic: $p < 0.05$

Achievement scores varied considerably across preference groups. Students demonstrating three-mode learning flexibility achieved the highest average (72.83), while kinesthetic-preference students scored lowest (54.21)—a substantial 18-point difference. Reading/writing preference students showed strong performance (66.24), logical given that English examinations heavily emphasize reading comprehension and written expression.

ANOVA results confirmed these differences reached high statistical significance ($p < 0.001$), indicating genuine variation beyond chance fluctuation. Post-hoc comparisons revealed that multimodal learners significantly outperformed kinesthetic and auditory preference students, while single-preference students showed more variable outcomes.

Testing H_o2: The data strongly contradict the null hypothesis. Significant achievement differences exist across learning style groups ($p < 0.001$), warranting hypothesis rejection.

Relationship Between Learning Styles and Achievement

The third objective explored whether learning preferences and achievement showed systematic associations. Table 3 presents correlation analysis results.

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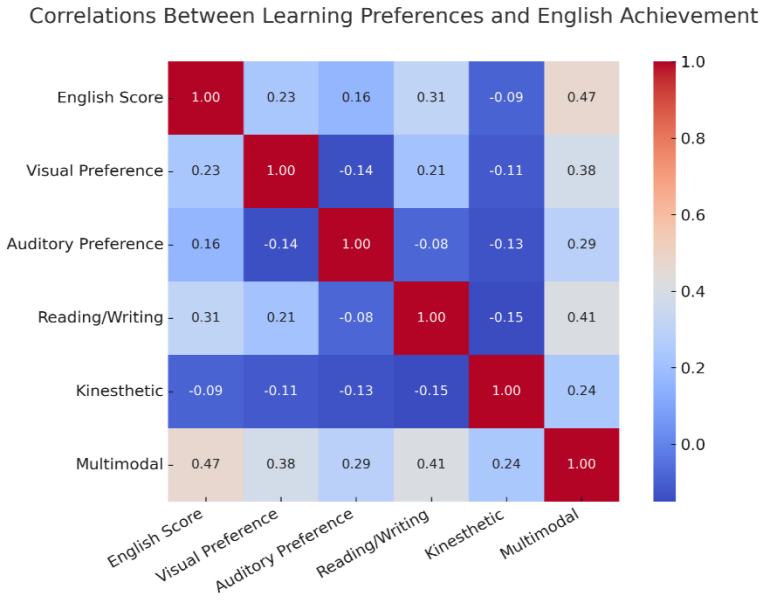
Table 3: Correlations Between Learning Preferences and English Achievement

Variables	1	2	3	4	5	6
1. English Score	—	0.23	0.16	0.31	-0.09	0.47
2. Visual Preference	0.23	—	-0.14	0.21	-0.11	0.38
3. Auditory Preference	0.16	-0.14	—	-0.08	-0.13	0.29
4. Reading/Writing	0.31	0.21	-0.08	—	-0.15	0.41
5. Kinesthetic	-0.09	-0.11	-0.13	-0.15	—	0.24
6. Multimodal	0.47	0.38	0.29	0.41	0.24	—

$p < 0.05$, **$p < 0.01$**



Correlation analysis illuminated several noteworthy patterns. Multimodal learning flexibility showed the strongest association with English achievement ($r = 0.47$, $p < 0.01$), indicating that students comfortable with multiple learning approaches tend toward higher performance. Reading/writing preference correlated moderately with achievement ($r = 0.31$, $p < 0.01$), while visual preference showed weaker but still significant association ($r = 0.23$, $p < 0.05$).

Auditory preference demonstrated weak positive correlation ($r = 0.16$) that failed to reach significance, while kinesthetic preference showed negligible negative correlation ($r = -0.09$, non-significant). These patterns suggest that certain learning approaches align better with English achievement demands than others within current instructional and assessment contexts.

Interestingly, multimodal flexibility correlated positively with all individual preferences, suggesting that flexible learners incorporate rather than exclude specific modalities.

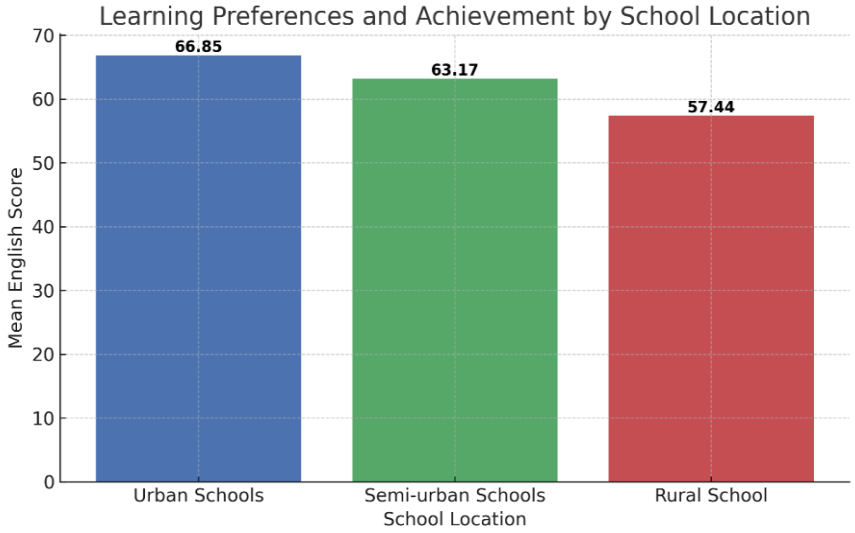
Testing H_o3: Evidence contradicts the null hypothesis. Significant correlations exist between learning preferences and achievement (particularly for multimodal, reading/writing and visual preferences), necessitating hypothesis rejection.

School Location Patterns

Exploratory analysis examined whether patterns varied across school locations. Table 4 summarizes these findings.

Table 4: Learning Preferences and Achievement by School Location

School Location	N	Dominant Preference Pattern	Mean English Score	SD
Urban Schools	54	Multimodal (40.7%)	66.85	11.32
Semi-urban Schools	30	Visual (23.3%)	63.17	12.89
Rural School	16	Reading/Writing (25%)	57.44	13.76



Urban students showed both higher multimodal preference rates and better average achievement. This pattern likely reflects broader differences in educational resources, instructional variety and learning opportunities available across contexts. Rural students, while showing lower average achievement, demonstrated fairly distributed preferences, suggesting that context affects outcomes more than innate preferences.

The urban-rural achievement gap (approximately 9 points) highlights persistent equity challenges requiring systemic attention beyond learning style considerations.

6. CONCLUSION:

This investigation demonstrates that learning style preferences relate meaningfully to English achievement among Darbhanga District secondary students. Students showing flexibility across multiple learning modalities tend toward stronger performance, while those relying primarily on single approaches show more variable outcomes. These patterns suggest that instructional approaches incorporating variety serve learners better than uniform methods.

The findings underscore that secondary classrooms contain learners with genuinely diverse needs and preferences. Effective teaching acknowledges this diversity through intentional instructional variation. While traditional methods emphasizing lecture and textbook reading serve some students adequately, they disadvantage others—particularly those with kinesthetic preferences—who require different engagement modes.

For Darbhanga District specifically, these insights can guide concrete improvements in English instruction. Teacher professional development emphasizing differentiated instruction, curriculum enrichment with diverse activities and assessment approaches recognizing multiple competency demonstrations could collectively enhance learning outcomes.

Importantly, learning preferences should not become rigid labels limiting student potential. The goal is developing adaptive learners who can flexibly employ varied strategies as

situations demand. Education should nurture this adaptability while respecting that individuals naturally gravitate toward certain approaches.

The persistent urban-rural achievement gap revealed in this study reminds us that improving learning outcomes requires addressing systemic inequities extending beyond instructional methods. Quality teaching matters immensely, but so do resources, facilities, teacher preparation and the broader sociocultural context shaping educational opportunities.

As Bihar continues pursuing educational quality improvements, research-grounded approaches attending to learner diversity can contribute meaningfully. The evidence presented here, while preliminary, suggests that understanding and accommodating how students learn represents a promising avenue for enhancing English achievement. When combined with other evidence-based practices and systemic reforms, attention to learning preferences can help create more inclusive, effective educational experiences for all students.

7. DISCUSSION:

These findings open several avenues for interpretation and reflection. The relatively even distribution of learning preferences confirms that secondary classrooms contain diverse learners with varying needs. No single instructional approach will optimally serve all students, arguing strongly for pedagogical flexibility.

The superior performance of multimodal learners deserves particular attention. Several explanations seem plausible. First, students comfortable with multiple learning approaches can adapt more readily to varied teaching methods and learning materials, extracting maximum benefit regardless of presentation format. Second, multimodal learners may possess greater metacognitive awareness, consciously selecting learning strategies matching specific tasks. Third, the ability to encode information through multiple channels may strengthen memory and understanding.

Kinesthetic learners' relatively weaker performance raises concerns. Traditional Indian classrooms, particularly in English instruction, emphasize sitting, listening, reading, and writing with minimal physical engagement. This instructional pattern disadvantages students who learn best through movement, manipulation and hands-on activity. The slight negative correlation (though non-significant) between kinesthetic preference and achievement suggests environmental mismatch rather than inherent ability limitations.

Reading/writing preference students naturally align with conventional English assessment emphasizing comprehension and composition. Their above-average performance makes intuitive sense. However, the moderate rather than strong correlation indicates that preference alone insufficient—quality of reading material, writing practice and instructional guidance matter equally.

The urban-rural achievement gap reflects well-documented systemic inequities. Urban schools typically enjoy better facilities, more experienced teachers, greater access to supplementary materials and student populations with more educational support at home. These advantages compound over time, manifesting in measurable achievement differences. The higher prevalence of multimodal preferences among urban students might result from exposure to more varied instructional approaches and learning experiences.

These patterns align substantially with broader educational research. Studies across diverse contexts have found multimodal learners often outperform unimodal learners, particularly in complex domains like language learning requiring multiple skill sets. The specific

achievement gap sizes and preference distributions reflect local conditions while confirming general principles.

8. EDUCATIONAL IMPLICATIONS:

These research findings carry practical significance for improving English instruction:

Instructional Diversification: Teachers should deliberately incorporate varied activities addressing different learning preferences. An effective English lesson might include visual elements (vocabulary maps, story illustrations), auditory components (discussion, oral presentations), reading/writing tasks (comprehension passages, creative writing), and kinesthetic activities (dramatization, physical games reinforcing language concepts). This variety benefits all learners while particularly supporting those with strong preferences.

Professional Development: Teacher training programs should address learning diversity explicitly. Many teachers received preparation emphasizing content knowledge and standardized teaching methods without adequate attention to individual learner differences. Workshops demonstrating practical strategies for differentiated instruction could substantially improve classroom practice.

Curriculum Enhancement: English textbooks and syllabi should intentionally incorporate diverse activity types. Current materials heavily emphasize reading passages and grammar exercises. Adding more visual elements, collaborative speaking activities, and physical learning games would enrich the curriculum while serving diverse learners better.

Assessment Reconsideration: Evaluating English proficiency solely through written examinations may disadvantage certain learners while failing to assess speaking and listening adequately. Incorporating oral assessments, projects and portfolios could provide fairer, more comprehensive evaluation while motivating students with various preferences.

Student Empowerment: Helping students understand their own learning preferences builds metacognitive awareness and self-directed learning capacity. Simple awareness activities where students explore how they learn best can foster more strategic learning approaches.

Equity Focus: Addressing urban-rural disparities requires systemic interventions beyond learning styles: improving rural school infrastructure, providing quality professional development for rural teachers, ensuring adequate learning materials, and potentially leveraging technology to connect rural students with enhanced resources.

9. FUTURE RESEARCH DIRECTIONS:

1. Intervention studies should test differentiated instruction effectiveness.
2. Longitudinal research could track learning preference stability over time.
3. Multi-district samples would enhance generalizability across Bihar.
4. Qualitative studies could explore teacher and student experiences.
5. Experimental designs should establish causal relationships more definitively.
6. Research on developing learning flexibility through training is needed.

10. LIMITATIONS OF THE STUDY:

1. Small sample size of 100 students from five schools limits generalizability.
2. Cross-sectional design prevents establishing causal relationships between variables.
3. Self-report questionnaires may involve social desirability bias.

4. Achievement measured only through written examinations, not oral skills.
5. Confounding variables like intelligence and socioeconomic status remained uncontrolled.
6. Single time-point measurement provides no data on preference stability.

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