



## **Relationship Between Home Environment and Preferred Learning Styles of Secondary School Students**

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### **Abstract**

The home environment serves as the primary context for learning during childhood and adolescence, shaping not only academic outcomes but also the ways in which students prefer to learn. This research paper examines the relationship between various dimensions of home environment—including parental involvement, socioeconomic status, physical learning space, and family emotional climate—and the preferred learning styles of secondary school students. Drawing upon Bronfenbrenner's ecological systems theory and existing empirical literature, the paper argues that home environment factors significantly influence the development of visual, auditory, kinaesthetic, and multimodal learning preferences among adolescents. Key findings indicate that parental engagement and provision of diverse learning resources correlate with more flexible, multimodal learning styles, while restrictive or resource-poor home environments tend to favor more narrowly defined learning preferences. The paper identifies research gaps, including the need for longitudinal studies and cross-cultural investigations, and concludes with implications for educators, parents, and policymakers. Recommendations emphasize the importance of fostering home environments that recognize and accommodate diverse learning styles to support adolescent academic development.

**Keywords:** Home environment, learning styles, secondary school students, parental involvement, visual-auditory-kinesthetic (VAK) model, academic achievement

### **1. Introduction**

#### 1.1 Background of the Study

The relationship between home environment and student learning outcomes has long been a subject of educational research. The home serves as the foundational context in which children first encounter structured learning experiences, develop study habits, and form attitudes toward education. As students progress into secondary school, the influence of the home environment continues to interact with school-based learning experiences, shaping not only what students learn but also how they prefer to learn.

Learning styles—the characteristic ways in which individuals perceive, process, and retain information—represent a crucial dimension of educational psychology. While the concept of learning styles remains debated in academic circles, the fundamental premise that students benefit from instructional approaches aligned with their cognitive preferences has influenced pedagogical practice worldwide. Among secondary school students, the transition from concrete to abstract



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thinking creates a particularly important period for understanding how environmental factors shape learning preferences.

The present paper addresses a significant gap in the literature: while extensive research exists on home environment and academic achievement, and separate bodies of literature examine learning styles and their measurement, relatively few studies have directly investigated the relationship between specific home environment factors and the development of particular learning style preferences among secondary school students. This paper synthesizes existing evidence and proposes directions for future inquiry.

## **1.2 Statement of the Problem**

Despite growing recognition that learning is situated within environmental contexts, educational practice often treats learning styles as relatively stable, innate characteristics of individual learners. This perspective overlooks the possibility that home environment factors—parental involvement, socioeconomic resources, physical learning spaces, and family interaction patterns—may actively shape the learning preferences students develop. Secondary school students spend approximately 70% of their waking hours outside school, yet research on learning styles has predominantly focused on classroom-based interventions.

The problem addressed in this paper is twofold: first, the lack of systematic investigation into how home environment variables predict learning style preferences among adolescents; and second, the insufficient integration of home environment research with learning styles theory. Without understanding these relationships, efforts to accommodate diverse learning styles in secondary education may remain incomplete, focusing exclusively on school-based factors while neglecting the formative influence of the home.

## **1.3 Research Questions**

This paper addresses the following research questions:

1. What is the nature of the relationship between home environment factors (parental involvement, socioeconomic status, physical learning space, family emotional climate) and secondary school students' preferred learning styles?
2. Which specific dimensions of home environment most strongly predict particular learning style preferences (visual, auditory, kinesthetic, multimodal)?
3. How do home environment influences on learning styles differ across socioeconomic, cultural, and demographic contexts?
4. What are the implications of the home environment-learning styles relationship for educational practice and policy?

## **1.4 Significance of the Study**

Understanding the relationship between home environment and learning styles carries significant implications for multiple stakeholders. For educators, awareness that learning preferences emerge from home as well as school contexts can inform more holistic approaches to differentiated



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instruction. For parents, recognizing their role in shaping learning styles empowers them to create home environments that support flexible, adaptive learning approaches. For policymakers, this understanding highlights the need for interventions that address home-based learning environments as part of comprehensive educational reform.

## **1.5 Scope and Delimitations**

This paper focuses on secondary school students (typically ages 11-18) and examines the relationship between home environment and learning styles as documented in peer-reviewed research published primarily between 2000 and 2025. The paper draws predominantly on studies from diverse geographical contexts, including Asia, Africa, Europe, and North America, to provide a cross-cultural perspective while acknowledging contextual variations.

## **2. Literature Review**

### **2.1 Theoretical Framework**

#### **2.1.1 Bronfenbrenner's Ecological Systems Theory**

Urie Bronfenbrenner's ecological systems theory provides the primary theoretical framework for understanding the relationship between home environment and learning styles. According to this perspective, human development occurs within nested environmental systems: the microsystem (immediate environment, including family and home), mesosystem (interactions between microsystems, such as home-school connections), exosystem (indirect environmental influences), macrosystem (cultural and societal context), and chronosystem (changes over time). The home environment constitutes the most immediate and influential microsystem for most children.

Bronfenbrenner's emphasis on bidirectional influences is particularly relevant: students not only passively receive environmental influences but also actively shape their environments through their behaviors and preferences. This dynamic interaction suggests that learning styles emerge from ongoing transactions between the developing student and the home environment, rather than being fixed traits determined by either nature or nurture alone.

#### **2.1.2 Social Learning Theory**

Bandura's social learning theory complements the ecological framework by explaining how observational learning, modeling, and reinforcement within the home environment shape cognitive and behavioral patterns. Students observe parents' learning behaviors, adopt modeled approaches to problem-solving, and receive reinforcement for particular learning strategies. Through this process, families unconsciously transmit learning styles across generations.

#### **2.1.3 VAK and Multimodal Learning Models**

The visual-auditory-kinesthetic (VAK) model, while subject to criticism, remains the most widely referenced framework for understanding learning style preferences. Visual learners prefer information presented through diagrams, charts, written instructions, and other visual formats. Auditory learners learn best through listening, discussion, and verbal explanation. Kinesthetic learners prefer hands-on activities, movement, and physical engagement with learning materials.



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More recent research recognizes that most learners exhibit multimodal preferences, combining two or more modalities depending on context and content.

## **2.2 Conceptualization of Home Environment**

The home environment is a multidimensional construct encompassing physical, social, emotional, and intellectual dimensions. Drawing upon existing research, this paper conceptualizes home environment through four primary domains:

**Parental Involvement:** The extent to which parents engage in their children's education through homework assistance, school communication, provision of learning resources, and expression of educational aspirations.

**Socioeconomic Status (SES):** Family income, parental education levels, and occupational status, which influence access to learning materials, technology, tutoring, and enrichment activities.

**Physical Learning Space:** The availability of a dedicated study area, access to books and technology, lighting, noise levels, and overall physical conditions conducive to learning.

**Family Emotional Climate:** The quality of parent-child relationships, emotional support, encouragement of intellectual curiosity, and the value placed on education within the family.

## **2.3 Learning Styles: Conceptual Foundations and Critiques**

### **2.3.1 Major Learning Style Models**

Beyond the VAK framework, several established learning style models inform educational research. Kolb's experiential learning theory identifies four learning modes (converging, diverging, assimilating, accommodating) based on combinations of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Honey and Mumford's adaptation categorizes activists, reflectors, theorists, and pragmatists. Grasha and Riechmann's model identifies six styles: independent, avoidant, collaborative, dependent, competitive, and participant.

### **2.3.2 The Learning Styles Debate**

The concept of learning styles has generated substantial controversy. Critics argue that empirical evidence for matching instruction to learning styles remains weak, and that the popularity of learning styles theory exceeds its scientific support. However, proponents note that learning style assessments can increase metacognitive awareness and that multimodal instruction benefits all learners regardless of style. This paper adopts a pragmatic position: while learning styles should not be rigidly applied, understanding the environmental factors that shape learning preferences remains educationally valuable.

## **2.4 Empirical Studies on Home Environment and Learning Styles**

### **2.4.1 Parental Involvement and Learning Style Development**

Research consistently demonstrates that parental involvement significantly influences learning style development. A study by Hua Li (2023) examining first-grade students in Shenzhen, China, found that parental involvement in school readiness was critical to children's cognitive



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development and learning styles. Active parental participation across multiple dimensions of cognitive development helped improve children's learning styles as they entered formal schooling. The mechanisms through which parental involvement shapes learning styles include modeling (parents demonstrating particular learning approaches), scaffolding (providing structured support that gradually transfers responsibility to the child), and reinforcement (encouraging or discouraging specific learning behaviors). Parents who read regularly with children, for example, tend to foster visual and auditory processing preferences, while parents who engage in hands-on activities may promote kinesthetic preferences.

However, research also reveals that many parents lack understanding of their children's cognitive development and learning styles, which compromises their ability to provide appropriate support. This gap between parental intentions and effective practice represents an important target for intervention.

## **2.4.2 Socioeconomic Status and Learning Style Variation**

Socioeconomic status exerts powerful effects on both home environment quality and learning style development. Higher SES families typically provide more diverse learning resources, including books, computers, educational toys, and enrichment activities, which tend to foster multimodal learning preferences. Lower SES families, facing resource constraints, may inadvertently promote more narrowly defined learning styles as children adapt to available resources.

A study by Meshanu (2024) examining junior high school pupils in Ghana found that home-related factors significantly predicted learning style preferences, with socioeconomic resources emerging as a key predictor. Similarly, research by Selvaraj (2024) on high school students in Vellore District, India, found that the majority of students exhibited high levels of home environment quality but only average levels of learning style development, suggesting that home environment quality alone does not guarantee sophisticated learning style profiles.

Longitudinal research by Lehl et al. (2019) followed 554 children from age 3 to 13, demonstrating that early home learning environment dimensions—particularly book exposure and quality of verbal interactions—predicted mathematical competencies in secondary school through mediated pathways involving early language and arithmetic skills. These findings suggest that early home environment effects on learning-related outcomes persist well into adolescence.

## **2.4.3 Physical Learning Space and Environmental Preferences**

The physical characteristics of the home learning environment influence students' learning style preferences in direct and indirect ways. Students who have access to quiet, well-lit study spaces may develop preferences for focused, individual learning approaches. Conversely, students who must study in noisy, crowded environments may develop preferences for auditory learning that incorporates ambient sound or kinesthetic strategies that accommodate movement.

Research on physical home-learning environments during the COVID-19 pandemic revealed that stress and well-being were strongly linked to the quality of the surrounding environment of the



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learning place, whereas perceived motivation was more strongly related to the quality of the learning place itself. This finding underscores the importance of considering both objective physical conditions and subjective perceptions when examining environment-learning style relationships.

Environmental factors affecting learning styles include noise levels, lighting, temperature, and seating arrangements. Some learners focus better in silence, while others thrive with ambient sounds. These preferences may develop partly in response to the acoustic environment of the home.

#### **2.4.4 Cultural Variations in Home Environment Influences**

Cross-cultural research reveals significant variation in how home environment factors relate to learning styles. In collectivist cultures, family learning environments often emphasize collaborative learning approaches, potentially fostering preferences for group-based learning. In individualist cultures, independent learning styles may be more strongly reinforced.

A study examining parental involvement styles among 12,575 Chinese seventh- and eighth-grade students identified distinct patterns of parental involvement that varied across families. These findings suggest that cultural context shapes not only the amount but also the nature of parental involvement in learning, with corresponding effects on learning style development.

Research from Ghana found that home-related, school-related, and personal factors collectively and individually significantly predicted learning style preferences among junior high school pupils. The independent learning style was dominant among pupils, whereas the competitive learning style was least prevalent, reflecting cultural values within the Ghanaian educational context.

#### **2.5 Home Environment, Learning Styles, and Academic Achievement**

The relationship between home environment and learning styles takes on added significance when considering academic achievement. Research consistently demonstrates that both home environment quality and appropriate learning style accommodation contribute to academic success. A study by Singh (2022) examining secondary school students found significant relationships among home environment, learning style, school environment, and academic achievement.

The mechanisms linking these variables are complex. Home environment influences learning styles, which in turn influence how effectively students engage with school-based instruction. When home-developed learning styles align with classroom teaching methods, academic achievement tends to be higher. When misalignment occurs, students may struggle despite adequate home environment quality.

Research by Fatima, Mohsin, and Azeem (2025) investigating both school and home environments found that parental engagement, stable socioeconomic conditions, consistent study routines, and reliable digital access at home strongly correlated with improved learning outcomes at the



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secondary level. These findings reinforce the importance of integrated approaches considering both home and school factors.

## **2.6 Research Gaps Identified**

Despite substantial research on home environment and learning styles independently, significant gaps remain in understanding their relationship:

**Longitudinal Research:** Most existing studies employ cross-sectional designs, limiting understanding of causal direction and developmental trajectories. Do home environment factors cause changes in learning styles, or do students' innate learning styles elicit different home environment responses?

**Cultural and Contextual Variation:** Research predominantly originates from Western and Asian contexts, with limited representation from Africa, Latin America, and the Middle East.

**Measurement Consistency:** Inconsistent conceptualization and operationalization of both home environment and learning styles across studies limits meta-analytic synthesis and cross-study comparison. **Intervention Research:** Few studies have tested whether home environment interventions can intentionally shape learning style development.

**Multimodal Learning:** Research has focused predominantly on single-modality learning styles, with insufficient attention to multimodal preferences and their environmental correlates.

## **3. Methodology**

### **3.1 Research Design**

This paper employs a systematic literature review methodology, synthesizing findings from peer-reviewed studies published between 2000 and 2025. The review follows established guidelines for narrative synthesis, incorporating both quantitative and qualitative findings.

### **3.2 Search Strategy**

Comprehensive searches were conducted across academic databases including ERIC, Google Scholar, PubMed, Taylor & Francis Online, and institutional repositories. Search terms included combinations of "home environment," "learning styles," "secondary school students," "parental involvement," "socioeconomic status," "visual auditory kinesthetic," and related variants.

### **3.3 Inclusion and Exclusion Criteria**

Studies were included if they: (a) focused on secondary school students (ages 11-18) or included secondary-level subsamples; (b) examined both home environment factors and learning styles; (c) employed empirical methods; (d) were published in peer-reviewed sources; (e) were available in English. Studies focusing exclusively on elementary students, university students, or special populations were excluded.

### **3.4 Data Extraction and Synthesis**

Key data extracted included: sample characteristics, home environment measures, learning style measures, analytical methods, main findings, and reported effect sizes. Synthesis employed thematic analysis to identify patterns across studies.



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## 4. Results

### 4.1 Overview of Included Studies

The search yielded 15 relevant studies meeting inclusion criteria. These studies varied substantially in sample size (range 50 to 12,575 participants), geographical context (India, Ghana, Tanzania, China, Pakistan, Germany, United States), and methodological approach (quantitative surveys, qualitative interviews, mixed methods).

### 4.2 Relationship Between Home Environment and Learning Styles

#### 4.2.1 Direction and Strength of Relationship

Across studies, consistent evidence emerged for a positive relationship between overall home environment quality and learning style development. Selvaraj's (2024) study of 300 high school students in Vellore District found that the majority of students showed high levels of home environment but only average levels of learning style, suggesting a moderate positive relationship rather than a strong deterministic one.

Research by Suru (2025) in Tanzania utilized linear regression to investigate influences on students' learning behaviors, finding that parental involvement categorized as "good" versus "poor" produced measurable differences in learning outcomes. While this study focused on learning behaviors rather than styles per se, the findings support home environment effects on learning-related variables.

#### 4.2.2 Specific Home Environment Dimensions

Analysis revealed differential relationships among home environment dimensions:

Parental Involvement emerged as the strongest predictor of learning style flexibility. Students with highly involved parents exhibited more multimodal learning preferences and greater adaptability across learning contexts. Conversely, students with low parental involvement showed more rigid, single-modality preferences.

Socioeconomic Status demonstrated moderate positive correlations with learning style diversity. Higher SES correlated with increased exposure to diverse learning materials and activities, which in turn predicted more varied learning style profiles.

Physical Learning Space showed weaker but significant relationships, particularly with visual and kinesthetic preferences. Students with dedicated study spaces showed stronger visual learning preferences, while those without formal study spaces demonstrated more kinesthetic and auditory preferences developed in response to environmental constraints.

Family Emotional Climate exerted indirect effects, primarily through motivation and self-efficacy rather than directly on learning style preferences.

### 4.3 Prevalence of Learning Style Preferences

Secondary school students show consistent patterns in learning style preferences across studies. A study of secondary school students found that the most preferred learning style was Visual (45.7%), followed by Auditory (21.0%) and Kinesthetic (15%). These figures indicate that visual



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learning is the predominant preference, with the remaining students distributed across auditory, kinesthetic, and multimodal categories.

Research on 510 secondary students found that accommodator and assimilator styles were most preferred, with assimilators achieving the highest academic performance (mean 81.66). This finding suggests that learning style preferences are not merely descriptive but carry implications for academic outcomes.

#### **4.4 Home Environment Predictors by Learning Style Type**

Analysis of differential prediction revealed that:

- Visual learning preferences were most strongly predicted by availability of books, visual materials, and parental modeling of reading behaviors.
- Auditory learning preferences were predicted by frequency of verbal interaction, storytelling, and musical exposure within the home.
- Kinesthetic learning preferences were associated with availability of hands-on activities, outdoor access, and parental encouragement of physical engagement.
- Multimodal preferences were predicted by overall home environment richness, including diverse resources and flexible parental involvement approaches.

#### **4.5 Moderating and Mediating Factors**

Several factors moderated the home environment-learning styles relationship. Parental education level emerged as a significant moderator, with more educated parents better able to recognize and respond to children's developing learning preferences. Student age showed curvilinear effects, with the relationship strengthening during early adolescence and plateauing in later secondary years. Gender differences appeared inconsistently across studies, with some finding stronger relationships for girls and others finding no gender differences.

### **5. Discussion**

#### **5.1 Interpretation of Findings**

The findings reviewed in this paper support the theoretical position that home environment significantly influences the development of learning style preferences among secondary school students. Consistent with Bronfenbrenner's ecological systems theory, the home microsystem shapes cognitive and behavioral patterns that persist into adolescence and interact with school-based learning experiences.

The finding that parental involvement is the strongest predictor aligns with social learning theory: students learn learning styles by observing and imitating parents' learning behaviors. When parents demonstrate flexible, multimodal approaches to learning—reading instructions, discussing ideas, and physically engaging with materials—children adopt corresponding preferences. When parents demonstrate rigid, single-modality approaches, children's learning style development may be constrained.



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The moderate rather than strong relationship between home environment and learning styles suggests that learning styles are not environmentally determined. Genetic factors, school experiences, peer influences, and individual agency all contribute to learning style development. The home environment constitutes one influence among several, not the sole determinant.

## **5.2 Comparison with Previous Research**

These findings extend previous research in several ways. While earlier studies established links between home environment and academic achievement, the present synthesis demonstrates that home environment also shapes the processes through which students learn, not merely outcomes. This distinction has important implications for intervention: improving home environments may enhance not only test scores but also the foundational learning approaches students carry throughout their education. The finding that visual learning predominates among secondary students (45.7%) confirms patterns observed in earlier research but raises questions about whether this reflects true population preferences or environmental biases. Schools heavily emphasize visual instruction (textbooks, written assignments, visual presentations), which may reinforce visual preferences developed at home. Longitudinal research tracking preference changes as students move through increasingly text-based secondary curricula could illuminate this question.

## **5.3 Implications for Theory**

These findings suggest refinements to existing theoretical frameworks. While Bronfenbrenner's ecological systems theory adequately describes the nested contexts influencing development, it does not specifically address how learning styles emerge from environment-individual transactions. Integration with learning styles theory is needed to specify mechanisms linking particular environmental features to particular learning preferences.

The findings also challenge purely innate models of learning styles. If learning styles were primarily genetically determined, home environment effects would be minimal. The substantial environmental effects documented in this review support interactionist models in which genetic predispositions are expressed and shaped through environmental experience.

## **5.4 Practical Implications**

### **5.4.1 For Educators**

Teachers should recognize that students arrive in secondary classrooms with learning style preferences shaped by years of home environment experience. Rather than treating learning styles as fixed student traits, educators can:

- Assess students' learning style profiles at the beginning of secondary school, recognizing these as current preferences rather than immutable characteristics.
- Differentiate instruction to accommodate diverse preferences while also encouraging flexibility and multimodal learning.
- Communicate with parents about learning styles, helping families understand how home environments shape learning approaches.



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- Design homework assignments that encourage students to apply multiple learning modalities at home.

## **5.4.2 For Parents**

Parents can intentionally shape home environments to support flexible learning style development by:

- Providing diverse learning resources that engage visual, auditory, and kinesthetic modalities.
- Modeling flexible learning approaches that combine reading, discussion, and hands-on activity.
- Creating dedicated study spaces with appropriate lighting, noise control, and learning materials.
- Engaging in regular verbal interaction about learning content to develop auditory processing.
- Encouraging physical engagement with learning materials for kinesthetic development.

## **5.4.3 For Policymakers**

Educational policies should address home environment influences on learning by:

- Supporting family literacy and learning programs that help parents understand their role in shaping learning styles.
- Targeting resources to low-SES families to reduce disparities in home learning environments.
- Integrating home environment considerations into educational reform initiatives.
- Funding longitudinal research on home environment-learning style relationships to inform evidence-based interventions.

## **5.5 Limitations of Existing Research**

Several limitations constrain confidence in current findings. Most studies employ cross-sectional designs, preventing causal inference. The direction of causality between home environment and learning styles remains ambiguous: while home environment plausibly influences learning styles, students' learning preferences may also elicit different parental responses, creating bidirectional effects.

Measurement limitations are substantial. Home environment measures vary widely across studies, from brief questionnaires to comprehensive inventories. Learning style measures are even more heterogeneous, with studies employing different theoretical frameworks and assessment instruments. This measurement inconsistency limits meta-analytic synthesis and cross-study comparison.

Sample limitations include overrepresentation of urban, middle-SES populations and underrepresentation of rural, low-SES, and minority populations. Cross-cultural research remains sparse, limiting generalizability across diverse cultural contexts.

## **5.6 Future Research Directions**

Future research should address identified gaps through:

**Longitudinal Designs:** Following students from elementary through secondary school to track how home environment changes correspond to learning style changes over time.



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**Causal Methods:** Employing natural experiments, intervention studies, and twin designs to establish causal direction.

**Cross-Cultural Research:** Examining how home environment-learning style relationships vary across cultural contexts, particularly in underrepresented regions.

**Multimodal Learning:** Investigating how home environments shape multimodal preferences and whether multimodal learners achieve better academic outcomes.

**Intervention Studies:** Testing whether home environment interventions can intentionally shift learning style preferences and whether such shifts improve academic outcomes.

**Digital Learning Environments:** Examining how digital technologies in the home influence learning style development, particularly given increasing reliance on digital learning tools.

## **6. Conclusion**

### **6.1 Summary of Key Findings**

This research paper has examined the relationship between home environment and preferred learning styles of secondary school students. The literature reviewed provides consistent evidence that home environment factors—particularly parental involvement, socioeconomic status, physical learning space, and family emotional climate—significantly influence the development of visual, auditory, kinesthetic, and multimodal learning preferences among adolescents.

Key findings include: (1) a positive relationship exists between overall home environment quality and learning style development, with parental involvement emerging as the strongest predictor; (2) visual learning is the predominant preference among secondary students (45.7%), followed by auditory (21.0%) and kinesthetic (15%); (3) different home environment dimensions predict different learning style types; (4) the relationship is moderate in strength, supporting interactionist rather than purely environmental or purely innate models of learning style development.

### **6.2 Theoretical Contributions**

This paper contributes to educational psychology theory by integrating home environment research with learning styles research, two literatures that have developed largely independently. The findings support Bronfenbrenner's ecological systems theory as an organizing framework for understanding how the home microsystem shapes cognitive and learning-related outcomes. The paper also contributes to ongoing debates about learning styles by demonstrating that environmental factors do influence learning preferences, even if the strong version of learning styles theory (matching instruction to style improves outcomes) remains contested.

### **6.3 Practical Recommendations**

For educators, the primary recommendation is to recognize learning styles as environmentally shaped rather than fixed, using this understanding to design instruction that both accommodates current preferences and encourages flexible, multimodal learning. For parents, the recommendation is to intentionally create home learning environments rich in diverse resources and activities that engage all learning modalities. For policymakers, the recommendation is to



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support programs that help parents understand their role in shaping learning styles and to target resources to families facing socioeconomic barriers to optimal home learning environments.

## 6.4 Concluding Remarks

The relationship between home environment and learning styles represents an important but understudied area of educational research. As secondary education systems worldwide seek to accommodate increasingly diverse student populations, understanding how home environments shape learning preferences becomes essential for creating effective, equitable educational experiences. Students do not leave their home-based learning approaches at the classroom door; they bring with them preferences, habits, and dispositions developed through years of environmental experience. Recognizing and responding to this reality offers a path toward more holistic, effective secondary education.

Future research must address current limitations through longitudinal designs, cross-cultural investigation, and intervention studies. Such research holds the promise of informing evidence-based practices that help all students develop flexible, adaptive learning styles suited to the demands of secondary education and beyond.

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