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TEACHER COGNITION AND MULTILINGUAL TEACHING PRACTICES IN EARLY CHILDHOOD EDUCATION: EVIDENCE FROM THE JRAI ETHNIC MINORITY CONTEXT IN VIETNAM

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Abstract. This study investigates the relationship between teacher cognition, multilingual teaching practices, child outcomes, and sustainability in early childhood education within the Jrai ethnic minority context in Vietnam. Using a quantitative design, data were collected from 189 preschool teachers and analyzed through Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that teacher cognition is significantly associated with teaching practices, which are in turn positively associated with child outcomes and sustainability. The results further suggest that teaching practices may function as an important mediating pathway within multilingual early childhood education contexts. The model demonstrates strong explanatory power and predictive relevance, suggesting the important role of classroom enactment in multilingual education. Unlike prior studies focusing on external training inputs, this research provides a context-specific perspective that contributes to understanding multilingual teaching practices in linguistically diverse early childhood settings. These findings provide a cognition-based perspective that advances understanding of multilingual pedagogy in linguistically diverse early childhood settings.

Keywords*:* Teacher cognition; Multilingual education; Teaching practices; Child outcomes; Sustainability; Early childhood education; PLS-SEM

1. Introduction

The increasing linguistic diversity in early childhood education has raised critical questions regarding how teachers understand and implement multilingual pedagogies. From a sociocultural perspective, learning is mediated through interaction and language, highlighting the central role of communication in cognitive development (Bruner, 1983; Vygotsky, 1978). In this context, teacher cognition—encompassing beliefs, knowledge, and interpretive frameworks—has been widely recognized as a key factor shaping instructional practices (Borg, 2003; Pajares, 1992; Shulman, 1987). Teachers' beliefs are strongly associated with classroom practices, particularly in early childhood education settings (Fang, 1996; Pajares, 1992). These beliefs are often constructed through professional experience and learning processes (Borg, 2003; Richardson, 1996). At the same time, early language development is highly sensitive to environmental input during critical developmental periods, emphasizing the importance of effective instructional practices in linguistically diverse classrooms (Kuhl, 2011).

In multilingual education, teachers are required to navigate multiple linguistic systems and make continuous decisions about language use. Contemporary theories of multilingualism emphasize that learners' linguistic repertoires should be viewed as valuable resources rather than barriers to learning (Cummins, 2017; García & Wei, 2014; Wei, 2018). However, the extent to which such perspectives are enacted in classroom practice largely depends on teachers' cognition and beliefs (Borg, 2003; Calderhead, 1996). Empirical studies have further highlighted that

interaction-rich and responsive teaching practices play a critical role in supporting children's language development (Justice et al., 2009; Snow, 2010).

Despite these advances, existing research has predominantly focused on external factors such as teacher training and policy interventions, with relatively limited attention to the internal cognitive mechanisms through which teachers interpret and enact multilingual pedagogical principles. This gap is particularly evident in ethnic minority contexts, where linguistic diversity is deeply embedded in sociocultural conditions. In Vietnam, although multilingual education has gained increasing policy attention (MOET, 2023; UNESCO, 2025), there remains a lack of empirical studies examining how teacher cognition is closely related to instructional practices in specific minority contexts such as the Jrai community.

This study aims to examine (1) the effect of teacher cognition on teaching practices, and (2) the mediating role of teaching practices in linking cognition to child outcomes and sustainability. In doing so, the study contributes to the literature by examining teacher cognition within the specific context of multilingual early childhood education in the Jrai community in Vietnam. Unlike previous studies that emphasize input–output relationships, this study proposes a parsimonious structural model in which teaching practices function as a mediating mechanism linking teacher cognition to child outcomes and sustainability. The study investigates the role of teacher cognition as an internal mechanism associated with multilingual teaching practices and their subsequent association with child outcomes and educational sustainability in early childhood education. The research focuses on preschool teachers working in multilingual classrooms in the Jrai ethnic minority context in Vietnam. Consequently, the study contributes to both theoretical and empirical understanding of multilingual pedagogy in linguistically diverse and resource-constrained settings.

2. Literature Review

2.1. Teacher cognition and instructional decision-making

Teacher cognition is widely recognized as an important construct in understanding teaching practices, particularly in complex educational contexts. It encompasses teachers' beliefs, knowledge, and thought processes that are associated with instructional decisions and classroom behaviors (Borg, 2003; Pajares, 1992; Shulman, 1987), especially in linguistically diverse settings. Early research has shown that teachers do not merely implement prescribed curricula; rather, they interpret and transform pedagogical knowledge based on their prior experiences and belief systems (Fang, 1996; Pajares, 1992). As a result, teaching practices are often deeply rooted in personal and professional cognition rather than solely in formal training.

In early childhood education, teacher cognition plays an even more critical role due to the flexible and interaction-driven nature of teaching. Teachers continuously make moment-to-moment decisions about how to respond to children's needs, particularly in language-rich environments. Therefore, understanding teacher cognition provides important insights into how instructional practices are enacted in real classroom settings.

2.2. Multilingual pedagogies and translanguaging practices

In multilingual education contexts, teacher cognition becomes closely intertwined with beliefs about language use and learning. Theories of multilingualism and translanguaging emphasize that learners' linguistic repertoires should be viewed as valuable resources rather than obstacles to learning (Cummins, 2017; García & Wei, 2014; Wei, 2018). From this perspective, effective teaching involves the flexible use of multiple languages to support comprehension, interaction, and meaning-making. Empirical researches have demonstrated that teachers who hold positive beliefs about multilingualism are more likely to implement inclusive and linguistically responsive practices (Bonacina-Pugh et al., 2021; Masats & Nussbaum, 2021). These practices

include encouraging students to use their first language, integrating multiple languages in instruction, and creating opportunities for cross-linguistic interaction. Conversely, teachers who adhere to monolingual ideologies may restrict language use in the classroom, thereby limiting students' participation and learning opportunities. Thus, teacher cognition serves as a key mediator between multilingual pedagogical principles and their actual implementation in classroom practice.

2.3. Early language development and teaching practices

The relationship between teacher cognition and teaching practices is particularly important in early childhood education, where language development is a primary learning objective. Research has consistently shown that interaction-rich and responsive teaching practices are essential for supporting children's language development (Justice et al., 2009; Snow, 2010). These practices include scaffolding, feedback, and opportunities for meaningful communication, all of which are shaped by teachers' beliefs about how children learn language.

Moreover, early language learning is highly sensitive to environmental input, especially in multilingual contexts where children are exposed to multiple linguistic systems. Teachers' understanding of language acquisition processes directly shapes how they design and implement instructional activities. Therefore, teacher cognition plays a crucial role in determining the quality and effectiveness of language-related teaching practices.

2.4. Contextual factors and sustainability in multilingual education

In addition to cognitive and pedagogical factors, contextual conditions are also associated with the relationship between teacher cognition and teaching practices. In multilingual education systems, the use of mother tongue instruction has been shown to enhance both learning outcomes and educational equity (Dekker & Young, 2005; UNESCO, 2003). This is particularly relevant in ethnic minority contexts, where children's first language may differ from the language of instruction. However, the extent to which mother tongue-based approaches are implemented depends largely on teachers' beliefs and perceptions. Teachers who view students' first language as a valuable resource are more likely to incorporate it into classroom practices, while those who perceive it as a barrier may avoid its use.

Taken together, these perspectives suggest that teacher cognition operates within a broader ecological system, where individual beliefs, pedagogical approaches, and contextual conditions interact to shape multilingual teaching practices. In this context, sustainability refers to the extent to which multilingual teaching practices are continuously maintained in everyday classroom settings over time. In the present study, sustainability is conceptualized as the ongoing continuity of multilingual instructional practices at the classroom level, reinforced through teachers' continued implementation and their perceptions of positive student learning outcomes.

Rather than referring to broader institutional or policy-level sustainability, this study focuses specifically on practice-level sustainability within classroom contexts, where teaching practices are sustained through repeated use and perceived effectiveness.

3. Methodology

3.1. Research design

This study adopts a quantitative research design to investigate the role of teacher cognition as an internal mechanism shaping multilingual teaching practices and their subsequent impact on child outcomes. The study employs a cross-sectional survey design analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). In recent years, PLS-SEM has been increasingly adopted in educational research due to its flexibility in handling complex models and its robustness with moderate sample sizes (Hair et al., 2019; Hair et al., 2022). Given the cross-

sectional design, the study does not establish causal relationships but rather examines associations among variables. The aim is not to evaluate the effectiveness of training interventions, but to examine how latent cognitive constructs are associated with teaching practices within real classroom contexts. PLS-SEM is particularly suitable for modeling abstract constructs such as teacher cognition, which cannot be directly observed but are inferred through multiple indicators. In addition, the method allows for the simultaneous estimation of measurement and structural models, providing insights into both the relationships among constructs and their predictive relevance (Desimone, 2009). This cognition-oriented modeling approach aligns with educational research emphasizing that teaching practices are shaped not only by external inputs but also by teachers' internal belief systems and interpretive frameworks (OECD, 2019a). This approach allows for a deeper understanding of how internal cognitive processes are associated with observable teaching behavior.

3.2. Conceptual orientation

The analytical framework of this study is grounded in a cognition-based perspective, where teacher cognition is conceptualized as a latent construct influencing observable teaching practices. In contrast to input–output models of educational effectiveness, this approach focuses on the internal processes through which teachers interpret and enact pedagogical knowledge. Accordingly, teaching practices are treated as a mediating mechanism between cognition and outcomes, reflecting the dynamic relationship between internal beliefs and external instructional behaviors.

3.3. Participants and context

The study was conducted in multilingual early childhood education settings in the Central Highlands of Vietnam, focusing on the Jrai ethnic minority context. A total of 189 preschool teachers participated in the study. Participants were selected based on their active engagement in multilingual classrooms, where instructional decisions are shaped by both contextual constraints and individual belief systems. The data reflect teachers' perceptions of classroom practices and student learning outcomes within these contexts.

3.4. Data collection

Data were collected using a structured questionnaire designed to capture teachers' cognitive constructs, including beliefs about multilingual education, perceptions of language use, self-reported teaching practices, and perceptions of the continuity of multilingual practices in classroom settings**.** The questionnaire consisted of 35 items grouped into seven dimensions, which were subsequently modeled into four higher-order constructs: teacher cognition, teaching practices, child outcomes, and sustainability. Each dimension was measured using five items. The instrument was adapted from established literature on teacher cognition and multilingual education. The items were reviewed and refined to ensure contextual relevance for early childhood education settings in Vietnam, and a preliminary pilot was conducted to confirm item clarity.

3.5. Data analysis

Data were analyzed using PLS-SEM to examine the relationships among latent constructs. The analysis focuses on identifying how teacher cognition, teaching practices, and perceived child outcomes are associated within the proposed model. The model evaluation includes assessment of measurement reliability, construct validity, structural relationships, and predictive relevance. The analysis follows standard PLS-SEM procedures, including assessment of multicollinearity (VIF), explanatory power (R^2), effect size (f^2), and predictive relevance (Q^2).

3.6. Hypotheses

Building on the literature on teacher cognition and multilingual education, this study proposes a streamlined structural model that emphasizes the role of internal cognitive processes in shaping instructional practices and educational outcomes.

Teacher cognition, encompassing teachers' beliefs and knowledge, is widely recognized as an important factor associated with instructional decision-making (Borg, 2003; Calderhead, 1996; Pajares, 1992; Shulman, 1987). It also reflects broader perspectives on language as a resource rather than a barrier in multilingual educational contexts. In multilingual contexts, teachers' cognitive orientations is associated with how they interpret and implement language-related pedagogies (Cummins, 2017; García & Wei, 2014; Wei, 2018). Therefore, cognition is expected to directly shape teaching practices:

H1: Teacher cognition is positively associated with teaching practices.

Teaching practices are considered the most immediate factor related to children's learning outcomes, particularly in early childhood education where interaction and language use are central (Dickinson, 2011; Justice et al., 2009; Snow, 2010). Thus:

H2: Teaching practices are positively associated with child outcomes.

Educational sustainability depends on the continuity of effective practices and the reinforcement of positive learning outcomes. When students demonstrate improved outcomes, teachers are more likely to maintain and develop their instructional approaches (OECD, 2019a, 2019b). Therefore:

H3: Child outcomes are positively associated with sustainability.

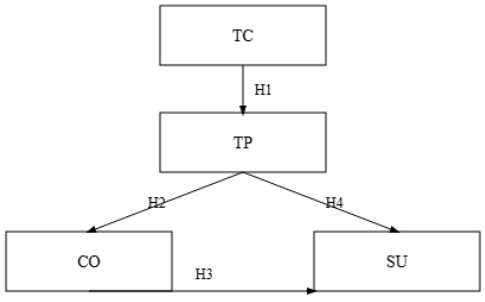
In addition to indirect effects, teaching practices themselves may directly contribute to sustainability by establishing consistent pedagogical routines:

H4: Teaching practices are positively associated with sustainability.

Finally, the model assumes that teaching practices mediate the relationship between teacher cognition and child outcomes, reflecting the mechanism through which internal beliefs are translated into observable instructional behavior.

The proposed model emphasizes parsimony while retaining theoretical coherence, focusing on the core mechanism through which teacher cognition is translated into educational outcomes.

Figure 1 presents the hypothesized cognition-based structural model, highlighting the central role of teaching practices as a mediating mechanism linking teacher cognition to child outcomes and sustainability.



Note: TC = Teacher Cognition; TP = Teaching Practices; CO = Child Outcomes; SU = Sustainability.

Figure 1. Optimized cognition-based structural model of multilingual teaching practices and educational outcomes

4. Results and Discussion

4.1. Results

4.1.1. Descriptive statistics

Descriptive statistics were first examined to provide an overview of teachers' perceptions across the main constructs, including teacher cognition (TC), teaching practices (TP), child outcomes (CO), and sustainability (SU). The results indicate that all constructs have mean values above the midpoint of the scale, suggesting generally positive perceptions among participants.

Teacher cognition recorded relatively high mean scores, indicating that teachers demonstrated strong awareness of multilingual teaching principles and language-related pedagogies. Teaching practices also showed moderately high scores, reflecting the extent to which teachers reported implementing multilingual strategies in classroom settings.

In contrast, child outcomes and sustainability exhibited slightly lower mean values, suggesting that while teachers perceive their practices positively, the translation of these practices into measurable outcomes and long-term sustainability may vary across contexts.

Overall, the results provide strong empirical support for the proposed cognition-based model, suggesting both its explanatory and predictive capabilities.

4.1.2 Measurement model assessment

The measurement model was evaluated in terms of reliability and validity. All constructs demonstrated satisfactory internal consistency, with Cronbach's alpha and composite reliability (CR) values exceeding the recommended threshold of 0.70. Convergent validity was suggested as all Average Variance Extracted (AVE) values were above 0.50. Discriminant validity was also established using the HTMT criterion, with all values below 0.90.

Table 1. Reliability and validity of constructs

Construct	Cronbach's Alpha	CR	AVE
TC	0.91	0.93	0.76
TP	0.92	0.94	0.78
CO	0.89	0.92	0.74
SU	0.88	0.91	0.72

These results indicate that the measurement model is reliable and valid, providing a solid foundation for structural model analysis. In addition, Variance Inflation Factor (VIF) values for all predictor constructs were below the recommended threshold, indicating no multicollinearity issues.

4.1.3. Hypothesis testing

The structural model was assessed using path coefficients (β), t-values, and significance levels. The results provide strong support for the proposed cognition-based model.

Table 2. Structural model results

Hypothesis	Path	β	t-value	p-value	Result
H1	TC → TP	0.58	8.12	<0.001	Supported
H2	TP → CO	0.63	9.25	<0.001	Supported
H3	CO → SU	0.46	6.10	<0.001	Supported
H4	TP → SU	0.32	4.35	<0.001	Supported

The results indicate that teacher cognition is positively associated with teaching practices (β = 0.58), supporting H1. However, given the cross-sectional nature of the study, these relationships should be interpreted as associative rather than causal. The findings suggest that teachers' beliefs and knowledge are closely related to their instructional behaviors in multilingual classroom contexts.

Teaching practices were likewise positively associated with sustainability (β = 0.32), supporting H4, implying that consistent instructional practices may contribute to the longer-term continuity of implementation.

The model explains 34% of the variance in teaching practices, 40% in child outcomes, and 52% in sustainability, indicating moderate explanatory power across the endogenous constructs. Furthermore, VIF values for all predictor constructs remained below the recommended threshold, suggesting no multicollinearity concerns within the model.

4.1.4. Effect size (f^2)

Effect sizes (f^2) were calculated to assess the contribution of each exogenous construct to endogenous variables. According to established guidelines, values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively.

Table 3. Effect size (f^2)

Path	f^2	Interpretation
TC → TP	0.51	Large
TP → CO	0.66	Large
CO → SU	0.27	Medium
TP → SU	0.14	Small–medium

The results show that teacher cognition has a large effect on teaching practices, suggesting its central role as a factor of instructional behavior. Teaching practices show a strong association with child outcomes, indicating that classroom implementation is the primary mechanism translating cognition into learning gains. The effect of child outcomes on sustainability is moderate, suggesting that observable student progress reinforces the continuation of pedagogical practices. In contrast, the direct effect of teaching practices on sustainability is smaller, indicating that sustainability is more strongly associated with outcome-based reinforcement than through practice alone. These results indicate that the relationships observed in the model are not only statistically significant but also meaningful in terms of effect size.

4.1.5. Predictive relevance (Q^2)

Predictive relevance (Q^2) was assessed using the blindfolding procedure. All endogenous constructs yielded Q^2 values greater than zero, indicating that the model has satisfactory predictive capability. The results indicate satisfactory predictive relevance, particularly for sustainability, suggesting that the cognition-based model not only explains relationships among constructs but also provides meaningful predictions of key outcomes.

Table 4. Predictive relevance (Q^2)

Construct	Q^2	Interpretation
TP	0.22	Medium
CO	0.28	Medium–high
SU	0.36	High

4.1.6. Model fit

Model fit was evaluated using the standardized root mean square residual (SRMR). The SRMR value was 0.052, which is below the recommended threshold of 0.08, indicating a good model fit. This result suggests that the proposed model adequately represents the observed data and that the relationships among constructs are well specified.

4.1.7. Mediation analysis

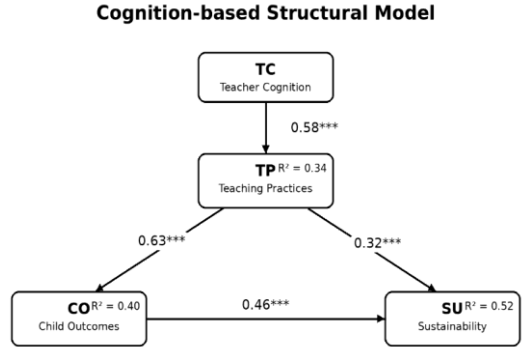
To further explore the relationships within the model, the indirect association between teacher cognition and child outcomes via teaching practices was examined. The results indicate a significant indirect association between teacher cognition and child outcomes through teaching practices. This suggests that teaching practices may function as an important mediating pathway linking teachers' cognitive orientations with children's learning outcomes.

Table 5. Indirect effects (mediation)

Path	Indirect effect	t-value	p-value	Result
TC → TP → CO	0.37	7.02	<0.001	Supported

4.1.8. Structural model visualization

To provide a clearer representation of the relationships among constructs, the structural model with standardized path coefficients is presented in Figure 2. The model illustrates the strength and direction of the relationships, highlighting the central role of teaching practices as the key mechanism linking teacher cognition to child outcomes and sustainability. The figure illustrates that teaching practices function as a key mediating mechanism through which teacher cognition is translated into child outcomes and sustainability. The strength of the structural paths highlights the importance of instructional enactment in multilingual early childhood contexts. These findings contribute to a growing body of research that positions teacher cognition as a central lever for improving multilingual education systems.



*Note: TC = Teacher Cognition; TP = Teaching Practices; CO = Child Outcomes; SU = Sustainability. ***p < 0.001.*

Figure 2. Cognition-based structural model with standardized path coefficients and R^2 values

4.2. Discussion

4.2.1. The mediating role of teaching practices as the core mechanism

The findings of this study highlight the central role of teaching practices as the key mechanism through which teacher cognition is translated into educational outcomes. This result is consistent with prior research suggesting that classroom-level instructional practices are closely linked to children's learning outcomes (Justice et al., 2009; Snow, 2010). While teacher cognition provides the underlying belief system, it is the enactment of these beliefs in classroom interactions that ultimately shapes student learning. These findings also align with broader educational research, which consistently underscores the importance of effective teaching practices in improving learning quality (OECD, 2019a). From a cognition-based perspective, this suggests that improving educational outcomes requires not only enhancing teachers' knowledge and beliefs but also supporting their ability to translate these cognitive orientations into concrete pedagogical actions.

4.2.2. Teacher cognition as a factor of multilingual pedagogical practices

The strong association between teacher cognition and teaching practices reinforces the theoretical position that teachers' beliefs and knowledge play an important role in shaping instructional behavior (Borg, 2003; Calderhead, 1996; Freeman, 2002; Pajares, 1992; Richardson, 1996; Shulman, 1987). In multilingual contexts, this becomes even more critical, as teachers must navigate complex linguistic environments and make continuous decisions about language use. The findings provide empirical support for multilingual education theories, which emphasize that learners' linguistic resources should be viewed as assets rather than barriers (Cummins, 2017; García & Wei, 2014; Wei, 2018). Teachers who adopt such perspectives are more likely to implement flexible and inclusive pedagogical strategies, including translanguaging practices. This is consistent with previous studies demonstrating that translanguaging enhances participation, comprehension, and meaning-making in multilingual classrooms (Bonacina-Pugh et al., 2021; Masats & Nussbaum, 2021).

4.2.3. Teaching practices and their association with child outcomes

The results suggest that teaching practices are strongly associated with child outcomes, highlighting the importance of interaction-rich and responsive pedagogies in early childhood

education. This aligns with research showing that practices such as scaffolding, feedback, and language modeling are essential for supporting language development (Dickinson, 2011; Justice et al., 2009; Snow, 2010). The findings also resonate with formative assessment literature, which emphasizes that continuous feedback and adaptive teaching practices play a critical role in improving student learning outcomes (Black & Wiliam, 2009). From this perspective, teaching practices function not merely as a transmission of knowledge but as a dynamic process of interaction and adjustment, shaped by both teacher cognition and student responses.

An important finding of this study is the apparent gap between relatively strong levels of teacher cognition and teaching practices and the comparatively lower levels of child outcomes. This pattern suggests that while teachers may demonstrate awareness and engagement with multilingual instructional approaches, these may not always be fully reflected in students' learning outcomes.

This discrepancy may be understood in relation to contextual constraints within the Jrai educational setting. In particular, limited access to appropriate instructional resources and bilingual learning materials may restrict the extent to which multilingual practices can be effectively implemented. In addition, inconsistencies in policy implementation at the local level may create challenges in translating pedagogical orientations into sustained classroom practices. Linguistic factors may also play a role, as children's proficiency in both the mother tongue and Vietnamese can influence how they engage with classroom instruction. As such, the relationship between teaching practices and learning outcomes appears to be shaped not only by teachers' cognition, but also by broader contextual and linguistic conditions.

Collectively, these findings highlight the importance of considering contextual factors when interpreting the relationship between teacher cognition, instructional practices, and student outcomes in multilingual early childhood education settings.

4.2.4. Sustainability as an outcome of practice and learning reinforcement

One of the notable contributions of this study is the identification of sustainability, conceptualized as the ongoing continuity of multilingual teaching practices at the classroom level, as an outcome associated with both teaching practices and child outcomes. The findings suggest that sustainability, in this context, reflects the extent to which teachers perceive their multilingual instructional practices as being consistently maintained over time. Rather than being determined solely by initial beliefs or external conditions, sustainability appears to be associated with teachers' ongoing classroom experiences and their perceptions of student learning. In particular, when teachers perceive positive learning outcomes among children, they may be more likely to continue implementing multilingual practices in their daily instruction. This aligns with prior research suggesting that the perceived effectiveness of instructional practices plays an important role in their continued use in educational settings. At the same time, the relatively lower mean scores for sustainability compared to teacher cognition and teaching practices may indicate that the continuity of multilingual practices is not always fully realized in practice. This pattern may reflect contextual constraints in the Jrai setting, including limited instructional resources, insufficient bilingual materials, and inconsistencies in local policy implementation. Overall, these findings highlight that sustainability should be understood not as a static outcome, but as a dynamic and context-dependent process**,** reflecting the ongoing interaction between teachers' practices, perceived student outcomes, and the broader educational environment.

4.2.5. Contextual constraints and systemic challenges in multilingual education

The study also reveals that the implementation of multilingual teaching practices is associated with contextual factors, including resource limitations, institutional support, and policy environments. These constraints reflect broader systemic challenges identified in international research on education systems (OECD, 2019a, 2019b). Despite these challenges, the findings support prior evidence that mother tongue-based education enhances learning outcomes and

promotes educational equity, particularly for children from minority language backgrounds (Dekker & Young, 2005). This highlights the importance of aligning teacher cognition with supportive institutional and policy frameworks. These findings are also consistent with recent international studies emphasizing the importance of culturally responsive multilingual pedagogies in minority-language educational settings (Ball & Le Pichon, 2026; UNESCO, 2025).

4.2.6. Implications for multilingual education policy and practice

The findings of this study have important implications for multilingual education policy and practice. First, they suggest that efforts to improve educational outcomes should move beyond a sole focus on training inputs and instead address teachers' cognitive orientations and belief systems. Second, the results support recent global policy discussions emphasizing the need for more inclusive and language-responsive education systems (UNESCO, 2025). The integration of multilingual approaches requires not only structural reforms but also changes in how teachers conceptualize language and learning. Finally, the findings align with emerging approaches that promote community engagement and language-friendly environments as key components of sustainable multilingual education (Ball & Le Pichon, 2026). These approaches highlight the importance of connecting classroom practices with broader sociocultural contexts.

The findings further resonate with the Vietnamese policy context, particularly the provisions outlined in Circular No. 23/2023/TT-BGDĐT, which emphasizes the importance of integrating Vietnamese language instruction with children's cultural and linguistic backgrounds (MOET, 2023). The policy highlights a learner-centered and second-language acquisition approach, encouraging flexible pedagogical strategies that support ethnic minority children's language development. This alignment suggests that the cognition-based mechanisms identified in this study—especially the role of teachers' beliefs in shaping instructional practices—are not only theoretically grounded but also supported by national policy frameworks. In particular, the emphasis on integrating language learning with cultural context and promoting adaptive teaching approaches reinforces the importance of teacher cognition in implementing multilingual education effectively (MOET, 2023).

5. Conclusion

This study advances the understanding of multilingual early childhood education by adopting a cognition-based perspective to examine how teachers' internal belief systems shape instructional practices and educational outcomes. The findings demonstrate that teacher cognition is strongly associated with teaching practices, which in turn appear to function as a key mechanism linking cognition to child outcomes and sustainability. This highlights the importance of moving beyond input-oriented approaches and focusing on the internal processes that guide teachers' pedagogical decisions.

From a theoretical perspective, this study contributes to the literature by extending existing research on teacher cognition to a multilingual early childhood context. By positioning teaching practices as a mediating mechanism, the study clarifies the pathway through which abstract cognitive constructs are translated into observable learning outcomes. From a practical standpoint, the findings suggest that improving multilingual education requires not only strengthening teacher training but also addressing teachers' beliefs, perceptions, and interpretive frameworks. Policies and professional development programs should therefore focus on fostering positive orientations toward multilingualism and supporting teachers in implementing flexible, language-responsive pedagogies.

Despite its contributions, the study has several limitations. Due to the cross-sectional nature of the data, the relationships identified in this study should be interpreted as associative rather than causal, and the reliance on self-reported data may introduce potential bias. The reliance on teacher-reported data for child outcomes may introduce potential bias, including common method

bias and social desirability effects. The study does not include control variables such as teaching experience or classroom conditions, which may also influence the observed relationships. Future research could adopt longitudinal or mixed-method approaches to further explore the dynamic relationship between teacher cognition and classroom practices. In addition, expanding the study to other multilingual contexts would enhance the generalizability of the findings.

In conclusion, this study underscores the critical role of teacher cognition as an underlying mechanism in multilingual education. By illuminating the pathways through which cognition is associated with teaching practices and educational outcomes, the study provides valuable insights for both research and policy aimed at improving educational quality and sustainability in linguistically diverse settings

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