

Bilingual education for primary students in Vietnam's Mekong Delta: Roles of contextual, community, and family factors



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ABSTRACT

Bilingual education is an important approach for improving academic achievement, promoting language equity, and preserving cultural identity in multilingual settings. In Vietnam's Mekong Delta, Khmer–Vietnamese Bilingual Education (KhVBE) supports the use of Vietnamese as the national language while maintaining the Khmer language and culture. This study investigates the factors influencing the effectiveness of KhVBE, with a focus on three key constructs: Contexts for the Application of Bilingual Education (CABE), Community Factors (CF), and Family Factors (FF). Survey data were collected from 269 school administrators and teachers and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results indicate that CABE and CF have strong and significant effects on KhVBE effectiveness, emphasizing the roles of institutional support, program structure, and community involvement. In contrast, FF does not show a significant effect, suggesting that family influence is more indirect. Overall, the findings highlight the importance of strong school and community environments in sustaining bilingual education and provide policy implications for improving teacher training, enhancing educational resources, and strengthening community partnerships. Recommendations for university administrators and other stakeholders are also discussed.

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1. Introduction

Bilinguals can be classified into two principal categories: Majority bilinguals, who speak their mother tongue as the national language in addition to a foreign language, and minority bilinguals, who use their indigenous minority language alongside the official language of the country (Feng, 2005). Compared with their majority counterparts, minority bilinguals often face restricted access to what Bourdieu (1991) terms linguistic capital, as such capital is typically linked to the dominant language of the majority. Consequently, minority bilinguals warrant particular scholarly attention in studies of language and identity. To participate fully in mainstream society, they are compelled to acquire and use the majority language as a means to access linguistic capital, secure social benefits, and pursue mobility opportunities.

Vietnam exemplifies the complexities of language policy in a multiethnic nation officially comprising 54 ethnic groups, with the Kinh accounting for more than 85% of the population and 53 minority groups forming the remainder. Historically, state institutions have been shaped by Kinh linguistic and cultural norms (Nguyen and Hamid, 2018; Nguyen and Huynh, 2023). Since independence in 1945, Vietnamese—the language of the Kinh majority—has been established as the national language and the only medium of instruction throughout the education system. At the same time, the government has officially recognized the importance of minority languages and affirmed the right of ethnic minority groups to receive education in their mother tongues. For example, the 1960 Constitution and the 2019 Law on Education of Vietnam acknowledge the right of minority communities to preserve their spoken and written languages as part of cultural development. These legal documents also state that learning and using Vietnamese is both a right and a responsibility of all citizens, regardless of ethnicity. However, research indicates that monolingual policies and practices in schools have strengthened structural inequalities in educational outcomes between majority and minority students (Bhowmik et al., 2018; Nguyen and Ha, 2023). Although these

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challenges have been widely acknowledged, contemporary educational policies and practices still fail to fully embrace or mobilize the bilingual and multilingual resources of minority students.

Bilingual education is widely acknowledged as a crucial pedagogical approach for fostering linguistic diversity, preserving cultural heritage, and promoting equitable academic outcomes in multilingual societies. It employs two languages in systematic ways to advance students' academic achievement, linguistic proficiency, and sociocultural awareness, while simultaneously maintaining heritage languages and supporting broader social integration (Hornberger, 2009). A robust body of empirical research further shows that well-designed bilingual programs not only enhance educational attainment but also strengthen the cultural identity of minority learners (García and Wei, 2015). Over the past decades, scholars have proposed a range of models, such as Two-Way Bilingual Education (TWBE), Transitional Bilingual Education (TBE), Content and Language Integrated Learning (CLIL), Mother Tongue-Based Bilingual Education, and Immersion programs, each tailored to specific sociolinguistic contexts (Griva et al., 2014). Among these, TWBE has gained notable prominence for integrating majority- and minority-language students in shared classrooms, with the goals of fostering additive bilingualism and biliteracy, ensuring high levels of academic achievement, and cultivating intercultural competence and mutual respect (Lindholm-Leary, 2012; Hamman-Ortiz and Palmer, 2023).

In Vietnam, Circular No. 34 issued by the Ministry of Education and Training officially incorporated eight minority languages: Hmong, Ê Đê, Gia Rai, Ba Na, Cham, Thai, Mnong, and Khmer into the national school curriculum from Grade 1 through Grade 12. At present, two dominant models of bilingual education coexist: (1) Vietnamese–ethnic minority bilingual programs and (2) Vietnamese–foreign language bilingual programs. Vietnam provides a particularly salient case for examining bilingual education, given its highly diverse multiethnic and multilingual composition. The nation is home to 53 officially recognized ethnic minority groups, many of whom speak mother tongues distinct from Vietnamese. Within this context, the Khmer community, primarily concentrated in the Mekong Delta, constitutes one of the largest minority populations. Bilingual practices in this region arise from the simultaneous use of Vietnamese, the national language, and Khmer, the heritage language, presenting both opportunities and challenges for educational policy and classroom practice. Against this backdrop, the present study adopts the TWBE model, which not only corresponds with national policy directives and strategic orientations but also reflects practical approaches currently applied to ethnic minority education across Vietnam.

Despite ongoing initiatives, the implementation of Khmer–Vietnamese bilingual education (KhVBE) remains inconsistent and constrained by systemic

barriers. Evidence shows that ethnic minority students often underperform academically compared to their majority peers, a gap frequently attributed to limited Vietnamese proficiency. Research highlights the multifaceted influences of demographic variables, family engagement, cultural identity, socio-economic status, school-level resources, and teacher bilingual competence on KhVBE outcomes for Khmer primary students. Among these factors, internal learner factors, including motivation, attitudes, language aptitude, and cultural competence, have proven critical in shaping bilingual learning trajectories (Perez, 2020). Learners with high motivation and positive attitudes toward both their heritage and national languages are more likely to sustain academic achievement and attain balanced bilingual proficiency (García and Wei, 2015).

Teacher-related variables further complicate implementation. Monolingual teachers, or those with limited bilingual competence, often struggle with misunderstandings and reduced interaction in classrooms (Nguyen and Huynh, 2023; Nguyen et al., 2024). Compounding this challenge is the persistent shortage of qualified bilingual teachers in the Mekong Delta, which continues to impede program effectiveness (Phung et al., 2024). Professional development plays a mediating role: Continuous training equips teachers to adopt and institutionalize evidence-based bilingual pedagogies, whereas limited opportunities force reliance on self-directed learning or the uncritical borrowing of external models (Babinski et al., 2018).

Empirical research indicates that students who engage with digital resources, such as online dictionaries, subtitled videos, and instant messaging platforms, tend to develop stronger vocabulary and literacy skills (Almansour and Kurt, 2022). Likewise, teachers' participation in professional networks, workshops, and peer collaborations facilitates the contextualization and adaptation of bilingual programs (Tran et al., 2023). Conversely, fragmented or underdeveloped information channels constrain teachers' capacity to integrate culturally relevant practices and impede the broader scalability of bilingual initiatives. Collectively, these findings suggest that the effectiveness of Khmer–Vietnamese bilingual education extends beyond structural frameworks or curriculum design; rather, it depends on the dynamic interplay of learner dispositions, teacher competence, family involvement, and institutional infrastructures. Nevertheless, despite the expanding global literature on bilingual education, there remains a paucity of empirical research that systematically investigates how contextual, social, and familial factors intersect to shape bilingual outcomes for Khmer primary students in Vietnam's Mekong Delta.

Against this backdrop, the present study seeks to empirically validate the KhVBE model for Khmer ethnic minority primary students in the Mekong Delta through the application of the TWBE framework. Specifically, it examines the effects of

three independent constructs: Contexts for the Application of Bilingual Education (CABE), Community Factors (CF), and Family Factors (FF) on the implementation of KhVBE. Building on theoretical foundations and prior empirical evidence, the study proposes the following hypotheses:

H1: CABE exerts a positive influence on KhVBE.

H2: CF exerts a positive influence on KhVBE.

H3: FF exerts a positive influence on KhVBE.

2. Methodology

2.1. Subjects

A purposive non-probability sampling strategy was adopted to ensure that respondents possessed direct and relevant expertise in KhVBE. This approach was selected because the study aimed to obtain informed insights from individuals who were actively involved in the implementation, management, and evaluation of KhVBE programs rather than from a random sample of teachers with limited or no exposure to bilingual education. Given the highly specialized nature of bilingual instruction in the Mekong Delta, random or stratified probability sampling would likely include participants lacking the specific experience required to evaluate program effectiveness, thereby diluting the accuracy and contextual relevance of the findings.

The purposive design thus prioritized information-rich cases—teachers and administrators whose roles provided direct engagement with bilingual teaching practices, program coordination, and policy application. Teachers were selected based on three inclusion criteria: (a) active involvement in bilingual or minority-language teaching, (b) at least two years of experience in classroom instruction, and (c) familiarity with Khmer–Vietnamese materials and pedagogical approaches. Administrators were included if they (a) oversaw bilingual programs, (b) managed professional development or assessment activities, and (c) possessed knowledge of MOET’s bilingual education policies. These criteria collectively ensured that respondents had substantial professional and contextual grounding in KhVBE implementation.

The study was conducted across three Mekong Delta provinces—An Giang, Sóc Trăng, and Trà Vinh—selected for their large Khmer populations and distinctive bilingual education ecosystems. These provinces represent varying stages of program development, from temple-based community models to formal school-led initiatives, thereby offering a balanced view of program diversity within the region. Between April and June 2024, a total of 269 valid responses were collected from 300 invitations (response rate = 89.67%). This sample size is considered robust for Partial Least Squares Structural Equation Modeling (PLS-SEM) and provides strong representational adequacy for exploring stakeholder perspectives on Khmer–

Vietnamese bilingual education implementation in the Mekong Delta.

2.2. Instruments

As shown in Table 1, this study utilized a questionnaire consisting of 18 items to measure factors related to the KhVBE, in which the dependent variable in this study. For each item, respondents were asked to rate the level of a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. In this study, the independent variables were categorized into three dimensions: CABE, CF, and FF. The measurement instrument was developed accordingly, consisting of 10 items for CABE, 7 items for CF, and 13 items for FF (Table 2). To ensure both linguistic precision and cultural appropriateness, the full set of items, including those for the dependent and independent variables—were translated into Vietnamese using a rigorous back-translation and expert review procedure, consistent with established guidelines for cross-cultural instrument adaptation. Two domain experts were invited to validate the translated version: one specialist in the Vietnamese language and applied English linguistics, and one educational researcher with extensive expertise in educational sciences. Their evaluation focused on maintaining semantic equivalence with the original wording, while ensuring clarity, contextual appropriateness, and accessibility for Vietnamese respondents. This systematic validation process enhanced the reliability of the measurement instrument and strengthened its suitability for empirical research in the context of KhVBE.

2.3. Data analysis

The present study employed Partial Least Squares Structural Equation Modeling (PLS-SEM) as the primary analytical technique, given its suitability for exploratory research designs and its emphasis on prediction. All analyses were executed with the SmartPLS software package. This methodological choice was particularly appropriate for examining the interrelations among the CABE, CF, and FF as they pertain to KhVBE for Khmer ethnic minority primary students in Vietnam.

PLS-SEM provides notable flexibility for estimating complex structural models involving multiple latent constructs, including both reflective and formative indicators. Such versatility is essential for this investigation, which incorporates constructs related to knowledge acquisition and acceptance. In addition, the technique is well recognized for its effectiveness in studies based on moderate sample sizes, as it prioritizes the maximization of explained variance (R^2) and supports a predictive rather than purely confirmatory orientation. To ensure the robustness of hypothesis testing, bootstrapping procedures were implemented, yielding more reliable estimations of path coefficients and enhancing the statistical validity of the findings.

Table 1: Measurement items description for the dependent variable (Howard et al., 2018; Tran et al., 2023)

Dimension	Construct items	Description
Leadership and awareness	KhVBE 1. Awareness of administrators and teachers	The degree to which school leaders and teachers recognize the importance of bilingual education.
	KhVBE 2. Program supervision	Extent of close monitoring and guidance provided by program managers.
Program objectives	KhVBE 3. Clear bilingual education goals	Presence of specific, detailed, and measurable objectives.
	KhVBE 4. Student-oriented program design	Alignment of bilingual programs with learners' needs and local contexts.
Resources and materials	KhVBE 5. Adequate teaching materials	Availability of textbooks and teaching aids that are appropriate and sufficient.
	KhVBE 6. Access to authentic bilingual resources	Opportunities for teachers and students to use credible and relevant resources.
	KhVBE 7. Diverse instructional processes	Use of varied teaching approaches within the classroom.
Teaching and learning	KhVBE 8. Teacher professional preparation	The extent to which teachers receive formal and specialized training.
	KhVBE 9. Supervised classroom learning	Mechanisms for monitoring and guiding student learning processes.
	KhVBE 10. Experiential learning activities	Integration of hands-on, practical activities to promote student engagement.
Assessment and evaluation	KhVBE 11. Transparent student evaluation	Fairness, clarity, and accountability in assessment and reporting.
	KhVBE 12. Professional standards	Proportion of teachers meeting bilingual education professional standards.
Teacher workforce	KhVBE 13. Teacher sufficiency	Adequacy of teacher numbers to support program sustainability.
School context	KhVBE 14. Geographical location	Relationship between school location and student residential areas.
	KhVBE 15. Educational facilities	Availability and quality of infrastructure to support bilingual teaching.
Instructional diversity	KhVBE 16. Flexible forms of organization	Range and adaptability of organizational forms in program delivery.
	KhVBE 17. Parental participation	The extent to which parents are encouraged and supported to participate in school activities, communicate with teachers, and reinforce bilingual learning at home.
	KhVBE 18. Exchanging information among schools	Degree of collaboration and knowledge exchange among schools implementing KhVBE programs to improve instructional practices and program quality.

Table 2: Measurement items description for independent variables

Variable	Construct items	Reference
CABE	CABE 1 Social context (residential communities)	Mifsud et al. (2021), Udry and Berthele (2025), and Li et al. (2021)
	CABE 2 Political context (local political institutions)	
	CABE 3 Local/community cultural context	
	CABE 4 Respecting and promoting the status of minority languages and cultures	
	CABE 5 Clear allocation of responsibilities and mechanisms for program monitoring and support	
	CABE 6 Digital transformation context (application of technology and media in education)	
	CABE 7 Use of multimedia software	
	CABE 8 Use of social media platforms	
	CABE 9 Use of computer-mediated communication tools	
	CABE 10 Use of online reference materials	
CF	CF 1 Labor recruitment policies	Nguyen (2021) and Scheer (2025)
	CF 2 Community engagement activities	
	CF 3 Societal pressures	
	CF 4 Khmer language proficiency within Khmer communities	
	CF 5 Influence of ethnic and religious factors	
	CF 6 Community participation and support	
	CF 7 The role of Buddhist temples (Khmer pagodas)	
FF	FF 1 Parental involvement and attention	Hao and Bonstead-Bruns (1998), Nguyen (2021), and Nguyen and Hamid (2017)
	FF 2 Number of siblings in the family	
	FF 3 Household economic constraints	
	FF 4 Family well-being and happiness	
	FF 5 Parents' educational attainment	
	FF 6 Siblings' educational attainment	
	FF 7 Parents' occupations	
	FF 8 Siblings' occupations	
	FF 9 Parents' gender	
	FF10 Family awareness of the importance of educational activities	
	FF 11 Family traditions and practices	
	FF 12 Parents' Vietnamese language proficiency	
	FF 13 Family members' Vietnamese language proficiency	

3. Results

3.1. Reliability and validity

A two-step Structural Equation Modeling (SEM) approach was employed to evaluate the proposed framework. In the first stage, the measurement model was rigorously examined to ensure construct reliability and validity. Reliability was assessed through Cronbach's alpha, Composite Reliability (CR), and individual factor loadings. The Cronbach's

alpha coefficients indicated excellent internal consistency across all constructs, with values of 0.994 for KhVBE, 0.984 for CABE, 0.980 for CF, and 0.986 for FF. All constructs surpassed the recommended thresholds, with Cronbach's alpha and CR values exceeding 0.70 and all factor loadings above 0.60, thereby confirming measurement reliability.

A methodological limitation of this study concerns the exceptionally high Cronbach's alpha values observed across all scales (0.980–0.994).

Although these values confirm strong internal consistency, they may also reflect partial item redundancy, as some items could capture closely related aspects of the same construct (Tavakol and Dennick, 2011; Streiner, 2003). The relatively long scales used in this study—particularly for CAFE, FF, and KhVBE—likely contributed to these elevated coefficients, since alpha tends to increase with the number of items. Nevertheless, exploratory factor analyses confirmed that all constructs were unidimensional and met discriminant validity criteria, indicating that the high reliability values largely represent genuine measurement coherence. Future research could refine the instrument by shortening item sets to improve efficiency and

reduce overlap, while maintaining conceptual completeness and psychometric robustness.

Convergent validity was confirmed as all constructs reported Average Variance Extracted (AVE) values above the recommended threshold of 0.50 (Hair et al., 2019). Table 3 provides a consolidated overview of the reliability and validity indices, including Cronbach’s alpha, composite reliability (CR), item loadings, and AVE. To further establish construct distinctiveness, discriminant validity was assessed using the Fornell-Larcker criterion (Fornell and Larcker, 1981). As shown in Table 4, the square root of each construct’s AVE exceeded its inter-construct correlations, thereby substantiating the adequacy of discriminant validity.

Table 3: Item loadings, reliability, and convergent validity

	Factor loading	α	rho_A	CR	AVE
KhVBE		0.994	0.994	0.995	0.910
KhVBE 1	0.928				
KhVBE 2	0.955				
KhVBE 3	0.941				
KhVBE 4	0.942				
KhVBE 5	0.956				
KhVBE 6	0.959				
KhVBE 7	0.965				
KhVBE 8	0.940				
KhVBE 9	0.956				
KhVBE 10	0.975				
KhVBE 11	0.965				
KhVBE 12	0.951				
KhVBE 13	0.973				
KhVBE 14	0.942				
KhVBE 15	0.961				
KhVBE 16	0.969				
KhVBE 17	0.947				
KhVBE 18	0.948				
CAFE		0.984	0.985	0.986	0.874
CAFE 1	0.892				
CAFE 2	0.955				
CAFE 3	0.914				
CAFE 4	0.928				
CAFE 5	0.934				
CAFE 6	0.930				
CAFE 7	0.959				
CAFE 8	0.946				
CAFE 9	0.946				
CAFE 10	0.945				
CF		0.980	0.981	0.983	0.894
CF 1	0.928				
CF 2	0.968				
CF 3	0.920				
CF 4	0.955				
CF 5	0.942				
CF 6	0.958				
CF 7	0.946				
FF		0.986	0.987	0.987	0.855
FF 1	0.906				
FF 2	0.934				
FF 3	0.937				
FF 4	0.924				
FF 5	0.926				
FF 6	0.916				
FF 7	0.919				
FF 8	0.929				
FF 9	0.944				
FF10	0.963				
FF 11	0.950				
FF 12	0.947				
FF 13	0.817				

Table 4: Discriminant validity using the Fornell-Larcker criterion

	CAFE	FF	KhVBE	CF
CAFE	0.935			
FF	0.657	0.925		
KhVBE	0.756	0.722	0.954	
CF	0.666	0.855	0.780	0.945

3.2. Structural model testing

An initial descriptive analysis was performed to evaluate the distribution patterns of participants' responses across the constructs specified in the conceptual framework. Table 5 presents the mean scores and standard deviations for CAFE, CF, FF, and KhVBE, highlighting noticeable variation in students' engagement with each construct. Following this step, the hypothesized structural relationships were examined. As summarized in Table 6, the findings confirmed support for all proposed hypotheses. The model explained a substantial proportion of variance in KhVBE, with an R² value of 0.708, thereby demonstrating satisfactory explanatory strength.

Table 5: Descriptive analysis (N = 269)

	KhVBE	CAFE	CF	FF
Mean	3.43	3.35	3.34	3.38
SD	1.17	1.05	1.10	1.04

To assess the statistical significance of the direct relationships and their corresponding standard errors, the bootstrap resampling procedure with 5,000 subsamples was employed. The outcomes of

the structural model hypothesis testing are summarized in Table 6.

The structural model analysis indicated that CAFE had a statistically significant and positive impact on KhVBE (H1: $\beta = 0.415$, $t = 5.161$, $p < 0.001$), thereby supporting Hypothesis 1. Likewise, CF exerted a consistent positive effect on KhVBE (H2: $\beta = 0.447$, $t = 5.577$, $p < 0.001$), providing strong evidence for Hypothesis 2. These findings imply that enhanced conditions of CAFE and CF foster more favorable perceptions among students regarding key dimensions of KhVBE, including leadership and awareness, program objectives, teaching and learning processes, instructional resources, assessment practices, teacher capacity, school context, and pedagogical diversity. In contrast, the effect of FF on KhVBE was negative and statistically non-significant (H3: $\beta = 0.066$, $t = 0.746$, $p = 0.456$), leading to the rejection of Hypothesis 3.

Taken together, the results of the structural model demonstrate that CAFE and CF exert the most substantial and consistent influences across the examined outcomes. By contrast, FF did not exhibit a statistically significant effect on KhVBE.

Table 6: Structural model hypotheses and statistical testing results

	β	t	p	Results
H1: CAFE -> KhVBE	0.415	5.161	0.000	Supported
H2: CF -> KhVBE	0.447	5.577	0.000	Supported
H3: FF -> KhVBE	0.066	0.746	0.456	Not Supported
R ²	0.708			

4. Limitation

Several limitations should be acknowledged when interpreting the findings of this study. First, the use of a purposive non-probability sampling strategy, while appropriate for targeting respondents with direct involvement in KhVBE, constrains the generalizability of the results. The participants—administrators and teachers actively engaged in bilingual education programs—represent a specialized subgroup with substantial professional experience and awareness of bilingual pedagogy. Consequently, their perspectives may not fully capture the broader spectrum of educators, policymakers, or community members involved in bilingual or minority-language education in Vietnam.

Second, the research was conducted exclusively within three Mekong Delta provinces—An Giang, Sóc Trăng, and Trà Vinh. Although these areas are home to the largest Khmer populations in Vietnam and thus provide an appropriate context for studying KhVBE, their distinctive sociocultural and institutional characteristics limit the extent to which the findings can be generalized to other multilingual or ethnic minority regions. In particular, the strong role of Theravāda Buddhist institutions, dense community networks, and long-standing Khmer literacy traditions may shape the observed relationships among contextual, community, and family factors in ways not replicated in other regions such as the Central Highlands or Northern mountainous provinces.

Third, while the exceptionally high reliability coefficients across the measurement constructs indicate strong internal consistency, they may also reflect partial item redundancy. Long item sets, particularly for CAFE, FF, and KhVBE, could have inflated Cronbach's alpha values (Streiner, 2003; Tavakol and Dennick, 2011). Although factor analyses confirmed unidimensionality and discriminant validity, future research should refine the instrument to streamline item pools without compromising construct coverage, thereby enhancing parsimony and minimizing potential measurement overlap.

Fourth, the cross-sectional design of the study precludes causal inference. While the structural model provides strong evidence of association among contextual, community, and family factors, it does not capture temporal dynamics or evolving interactions among these domains. Longitudinal or mixed-methods approaches would enable deeper insights into how bilingual education implementation evolves over time and across varying policy environments.

Finally, the study relied on self-reported data, which may be subject to response bias, particularly social desirability effects or subjective interpretation of questionnaire items. Incorporating classroom observations, interviews, and document analysis in future research would strengthen triangulation and enhance the validity of findings. Overall, while these limitations delineate the boundaries of generalization, they also point to meaningful

directions for advancing empirical research on bilingual education for ethnic minority students in Vietnam.

5. Discussion

The results reveal that the success of KhVBE, operationalized as the dependent outcome, is significantly influenced by the CAFE, CF, and FF (Mifsud et al., 2021; Hao and Bonstead-Bruns, 1998; Li et al., 2021; Nguyen, 2021; Nguyen and Hamid, 2017; Nguyen et al., 2024; Perez, 2020). These findings are aligned with theoretical foundations emphasizing the interdependence of language development and sociocultural participation in bilingual education (García and Wei, 2015; Lindholm-Leary, 2012). Importantly, the results underscore the need for policies and practices that reinforce school–community–family linkages, promote culturally responsive pedagogy, and enhance institutional support structures in multilingual learning environments (Howard et al., 2018).

Regarding Hypothesis 1, the present study confirms that CAFE exerts a statistically significant influence on the KhVBE construct. Interestingly, this outcome diverges from previous empirical work, which has generally emphasized contextual conditions as pivotal in shaping successful bilingual education outcomes. For instance, Udry and Berthele (2025) reported that the integration of online reference tools, such as electronic learning resources within broader digital transformation initiatives can increase learner engagement with technology and thereby facilitate language acquisition. The contrast between the current results and earlier evidence underscores the multifaceted and potentially context-sensitive nature of CAFE. It further implies that contextual effects may be mediated by critical variables, including the availability of technological infrastructure, teacher readiness, and the degree of learner autonomy.

Emerging scholarship highlights that digital transformation in education holds considerable promise for addressing persistent inequities in bilingual and minority-language contexts. Digital tools, including videos, interactive platforms, and technology-supported pedagogy, not only enrich instructional delivery but also help narrow opportunity gaps by enabling more inclusive access to knowledge (Scherzinger and Brahm, 2023). At the same time, social media and ICT networks have been recognized as powerful mechanisms for safeguarding and revitalizing minority languages, thereby reinforcing cultural identity and linguistic rights in multilingual societies (Wang et al., 2024). From a policy perspective, such affordances position digital innovation as a strategic means to democratize access to education for marginalized learners.

Research on computer-mediated communication (CMC) further underscores this potential. Studies show that CMC environments extend learning

opportunities beyond traditional classroom boundaries. For example, Barrs (2012) observed that learners sustain interactions in the target language outside formal instruction, while Blake (2000) demonstrated that online discourse promotes authentic language practices and diversifies access to meaningful communicative experiences. These findings collectively suggest that integrating digital infrastructures into bilingual programs is not merely a pedagogical enhancement but a necessary condition for equitable participation in global knowledge societies. For the KhVBE model, this implies that digital integration can compensate for the chronic shortage of bilingual resources in rural and minority-dominated areas. By creating alternative pathways for Khmer primary students to engage with both Vietnamese and Khmer, digital transformation contributes to reducing structural inequalities in education and advancing broader goals of equity, cultural sustainability, and democratic participation.

Beyond empirical considerations, the findings reaffirm that multilingual education is both a pedagogical strategy and an instrument for advancing equity and democratic participation in globalized and multicultural contexts. Bilingual education provides students with opportunities to develop linguistic and intercultural competencies essential for active engagement across sociocultural domains. These insights resonate with Hornberger's (2009) assertion of multilingual education as a vehicle for social justice. Embedding bilingual education within digital transformation and inclusive development agendas is, therefore, crucial for ensuring that minority learners acquire the skills and cultural capital necessary for meaningful engagement in an interconnected society.

Concerning Research Hypothesis 2, the findings confirm that community factors (CF) significantly shape the KhVBE construct. The results indicate that when Khmer communities attach positive value to their heritage language, viewing it as both symbolically prestigious and practically useful, students are more likely to sustain bilingual competence. By contrast, pressures to adopt Vietnamese exclusively undermine motivation and limit opportunities for Khmer language practice. Comparative evidence from Cambodia reinforces this conclusion, showing that when schools and communities jointly establish explicit “spaces of use” for the mother tongue during early primary education, students' academic performance improves (Lee et al., 2015). Active community engagement, including the involvement of class boards, cultural advisors, and temple-based Khmer literacy instructors, further strengthens program effectiveness by balancing instructional time between minority and majority languages, thereby reducing the risk of a “mechanical rupture” between linguistic systems. However, structural constraints persist. Limited interaction with the wider social environment restricts Khmer communities' opportunities to develop Vietnamese vocabulary,

weakening parental capacity to support children's bilingual learning. This challenge is compounded by recruitment practices and social pressures that privilege English for employment and Khmer for intra-community use, while undervaluing Vietnamese, thus posing a systemic obstacle to national bilingual education policies. Consequently, Vietnamese receives less emphasis, creating a structural obstacle to the government's objectives of implementing bilingual education policies for Khmer ethnic minority students.

The present findings are in line with prior scholarship, which consistently highlighted the Khmer temple (Wat) as a cornerstone of community life, serving both cultural and educational functions. Previous studies have documented that the Khmer in Southern Vietnam have long practiced Theravāda Buddhism, a tradition that permeates social norms and everyday practices. Within this socio-religious framework, the Wat not only sustains spiritual devotion but also acts as a conduit for intergenerational transmission of linguistic and cultural knowledge. By hosting Khmer language and literacy classes, temples equip children with foundational skills that facilitate their integration into primary bilingual education while fostering continued engagement with Khmer literacy beyond formal schooling (Taylor, 2013). Furthermore, community festivals such as Chôl Chnam Thmây, Sene Dolta, and Ok Om Bok-typically organized under temple leadership create interactive environments where learners participate in authentic language practices, including chanting, storytelling, and performance. Importantly, the symbolic authority of temples also elevates the social status of Khmer as a medium of instruction. As Scheer (2025) noted, when religious institutions normalize Khmer usage, community attitudes toward bilingual education become more supportive. These insights suggest that linking grassroots language initiatives with formal education policies is vital. One practical approach is to engage monks and temple-based teachers as literacy instructors, supported by short-term training aligned with provincial educational standards, thereby addressing the shortage of qualified bilingual educators and ensuring the long-term sustainability of KhVBE programs.

With respect to Research Hypothesis 3, the findings indicate that Family Factors (FF) did not exert a statistically significant influence on KhVBE. This outcome diverges from much of the existing literature, which consistently highlights the importance of parental involvement, educational background, and household resources in shaping bilingual learning outcomes (Hao and Bonstead-Bruns, 1998; Nguyen, 2021; Nguyen and Hamid, 2017; Taylor, 2013). Previous studies have shown that parental attitudes toward bilingualism, educational attainment, and family language practices substantially influence children's motivation and proficiency in both the national and heritage languages (Mak et al., 2023; Tran et al.,

2023). Families that foster a "bilingual atmosphere" at home, by deliberately alternating between Khmer and Vietnamese, tend to promote stronger linguistic balance and overall academic achievement.

However, the non-significant family effect observed in this study reflects the distinctive sociocultural and economic realities of Vietnam's Mekong Delta, where community and institutional forces appear to play a more decisive role. Three interrelated contextual mechanisms likely explain this pattern.

First, Khmer community institutions (especially Theravāda Buddhist pagodas) serve as powerful educational and cultural hubs that partially substitute for direct family influence. In provinces such as Trà Vinh, Sóc Trăng, and An Giang, pagodas provide Khmer literacy classes, moral instruction, and youth tutoring, functioning as long-standing centers of knowledge transmission and social cohesion (Taylor, 2013). These temple-based networks create collective learning environments that reduce variability in home-based educational input, thereby mediating the relationship between family conditions and children's bilingual development.

Second, widespread economic migration has reshaped traditional family engagement. High levels of labor mobility in the Delta - driven by agricultural instability and limited local employment-have resulted in many children being raised by grandparents or relatives (van der Geest et al., 2012). Such caregiving arrangements, while socially adaptive, often diminish the direct academic supervision and linguistic support that parents typically provide (Nguyen and Vu, 2025). In response, pagodas and local organizations have assumed supplementary educational functions, ensuring continuity of instruction but further diffusing the family's direct role.

Third, linguistic asymmetry within households limits parental involvement. Many older Khmer adults, particularly those with limited Vietnamese proficiency, face challenges assisting children with schoolwork delivered primarily in Vietnamese. This language gap shifts educational support responsibilities toward teachers and community-based bilingual educators (Bui et al., 2025).

Taken together, these mechanisms suggest that Khmer families in the Mekong Delta operate within a broader socio-institutional ecology dominated by communal and religious institutions. The strong effects of Contextual and Community Factors (CABE and CF) observed in this study underscore this dynamic, where bilingual education success depends less on individual family resources and more on collective community structures that sustain learning, moral development, and language preservation. Future research should adopt mixed-method and longitudinal designs to explore how migration, community governance, and intergenerational linguistic gaps interact to mediate family engagement. Such approaches would deepen understanding of how educational responsibility is

redistributed across family, school, and community domains in multilingual minority contexts.

6. Conclusion

The structural model reveals that Contexts for the Application of Bilingual Education (CABE) and Community Factors (CF) exert the most pronounced and consistent influences on the outcomes of KhVBE. In contrast, Family Factors (FF) were not found to have a statistically significant impact. This suggests that the effectiveness of bilingual education in this context relies more heavily on institutional conditions and community engagement than on direct family involvement.

From a policy perspective, these findings underscore the need to prioritize investments in school resources, teacher professional development, and community-based partnerships that strengthen the implementation of bilingual education programs. Efforts should focus on enhancing instructional quality, providing culturally responsive materials, and fostering collaboration between schools and local communities to create an enabling environment for minority language maintenance alongside national language acquisition.

Future research should further investigate the mediating and moderating mechanisms that might explain the limited influence of family-related factors, such as socio-economic disparities, parental language proficiency, and shifting cultural values. Longitudinal and mixed-methods studies are particularly warranted to capture the dynamic interactions between family, school, and community domains, thereby offering a more comprehensive understanding of how multiple contextual layers jointly shape bilingual education outcomes.

List of abbreviations

α	Cronbach's alpha
AVE	Average variance extracted
β	Standardized path coefficient
CABE	Contexts for the application of bilingual education
CF	Community factors
CLIL	Content and language integrated learning
CMC	Computer-mediated communication
CR	Composite reliability
FF	Family factors
ICT	Information and communication technology
KhVBE	Khmer-Vietnamese bilingual education
MOET	Ministry of education and training
N	Sample size
p	P-value
PLS-SEM	Partial least squares structural equation modeling
R^2	Coefficient of determination
ρ_A	Dijkstra-Henseler's ρ_A reliability coefficient
SD	Standard deviation
SEM	Structural equation modeling
t	T-statistic
TBE	Transitional bilingual education
TWBE	Two-way bilingual education

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Compliance with ethical standards

Ethical considerations

This study was reviewed and approved by the Ethics Review Board (ERB) of the University of Social Sciences and Humanities, Vietnam National University – Ho Chi Minh City (USSH, VNU-HCM) (ERB application number: 10-2025; approval date: 29 April 2025). All procedures were conducted in accordance with institutional ethical guidelines for research involving human participants. Participation was voluntary, informed consent was obtained from all respondents prior to data collection, and anonymity and confidentiality were strictly maintained. No personally identifiable information was collected, and all data were used solely for academic research purposes.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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