



A Systematic Literature Review of Bilingual Education Models: Approaches and Educational Outcomes

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Abstract

This systematic literature review explores various bilingual education models—Dual Language Immersion (DLI), Two-Way Immersion (TWI), Transitional Bilingual Education (TBE), and Maintenance Bilingual Education (MBE) to assess their pedagogical approaches and corresponding educational outcomes. 1,128 articles were identified from databases including ERIC, JSTOR, Google Scholar, Wiley Online Library, and SAGE Journals and screened using the PRISMA framework. Twenty-one studies met the inclusion criteria. The findings show that the DLI model consistently produces strong literacy, academic performance, and language retention results. The TWI, TBE, and MBE models yielded more varied outcomes. Geographic analysis revealed a research concentration in North America, Europe, and Asia. This review highlights practical approaches for educators and policymakers while identifying gaps for future research.

Keywords: Academic performance; Dual language immersion; Language instruction; Maintenance bilingual education; Transitional bilingual education.

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INTRODUCTION

In an increasingly globalized and multilingual world, bilingual education has become a crucial strategy for addressing diverse learners' linguistic and academic needs, particularly in multilingual societies where students are expected to function in more than one language. Broadly defined, a bilingual education model refers to instructional programs that use two languages to teach academic content, aiming to develop students' proficiency in both their native language and a target language, often English (Vance, 2021). As classrooms become more diverse in linguistic and cultural aspects, policymakers and educators explore pedagogical models that promote cognitive growth, cross-cultural understanding, and equitable educational opportunities. For instance, countries such as Taiwan, Singapore, and the Philippines have implemented various bilingual education models to embrace linguistic and cultural diversity in education. In Taiwan, the government introduced the FERTILE model under its Bilingual 2030 policy, emphasizing flexibility and the role of Bilingual Professional Learning Communities (BPLCs) to support teachers and administrative teams in delivering bilingual instruction (Lin, 2024). Singapore's bilingual policy mandates English as the primary language of instruction, complemented by a mother tongue—Mandarin, Malay, or Tamil—based on students' ethnic backgrounds, resulting in high bilingual proficiency and cognitive benefits (Tan, 2006). In the Philippines, a partial bilingual model is used, with English and Filipino as mediums of instruction, and transitional bilingualism is allowed in the early grades to accommodate

regional languages (Tan, 2006).

Despite its widespread implementation, bilingual education remains a complex and contested field. Different educational systems have implemented various models, including DLI, TWI, TBE, and MBE. These models differ in structure and instructional strategies and their intended outcomes—linguistic, cognitive, or academic. Studies consistently show that the effectiveness of bilingual education models depends on their structure and goals. DLI and TWI programs promote substantial academic achievement and bilingual proficiency among English learners and native English speakers (Castro et al., 2025; Mercado, 2002). These models support balanced literacy and content learning without compromising either language (Bialystok, 2018). TBE, while helpful for reading comprehension and early language support, often results in more limited bilingual development, particularly when students transition too quickly to English-only instruction (Vargas, 2006; Lopez-Ucles & Garcia-Gutierrez, 2022). Comparative studies also suggest that MBE and DLI offer the most long-term cognitive and academic benefits (Hasanzade, 2023).

Given the growing importance of bilingual education and its models, a systematic review is needed to examine how different approaches influence educational outcomes. Although numerous studies exist on individual models, there is a limited synthesis of findings that comprehensively compares and evaluates their effectiveness. This review aims to investigate and analyze existing research on bilingual education models, focusing on instructional approaches and educational outcomes. Specifically, it seeks to answer the following questions:

1. What bilingual education models have been implemented across different educational contexts?
2. What are the reported educational outcomes associated with these approaches?

By providing a structured synthesis of current evidence, this review intends to support educators, policymakers, and researchers in understanding which models and practices are most effective and yield positive educational results under what conditions.

This review is grounded in a synthesis of language acquisition, sociocultural, and educational equity theories to critically examine the effectiveness of bilingual education models. The analysis is primarily informed by Cummins' (1979, 2000) theories of bilingual proficiency, particularly the Common Underlying Proficiency (CUP) model and the distinction between additive and subtractive bilingualism. These concepts frame how Dual Language Immersion (DLI) and Two-Way Immersion (TWI) programs promote sustained development in both the first language (L1) and the second language (L2). At the same time, Transitional Bilingual Education (TBE) may risk diminishing L1 proficiency by prioritizing early transition to English.

Complementing this linguistic perspective is Vygotsky's sociocultural theory, which posits that language is both a cognitive and social tool. This theory supports the view that bilingual programs function as linguistic frameworks and environments for identity formation, cultural affirmation, and meaningful academic engagement. In particular, Two-Way Immersion models, which bring together students from different language backgrounds, exemplify how language use in social contexts facilitates academic and interpersonal growth.

To further contextualize program outcomes, this review also draws on Bronfenbrenner's ecological systems theory, highlighting the interplay between individuals and the multiple environmental systems that affect them. Macro-level policies, community attitudes, teacher preparation, and school resources often shape the success or limitations of a bilingual education model. This lens is especially valuable in analyzing issues of access and equity, as seen in spatial disparities in bilingual program availability (Holtz, 2023).

Together, these theoretical perspectives provide a multidimensional foundation for interpreting bilingual education models' educational, linguistic, and social outcomes. They guide the selection and analysis of literature by emphasizing both internal program structures and the broader socio-political contexts in which these models are implemented.

RESEARCH METHODS

This study employed a Systematic Literature Review (SLR) approach to explore and synthesize various models of bilingual education. The design aimed to examine their pedagogical characteristics and educational outcomes by reviewing published empirical studies. The SLR method was chosen to allow the identification of patterns, comparisons across contexts, and research gaps in bilingual education models. To maintain a rigorous and transparent review process, this study adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to structure each phase of the review process, including identification, screening, eligibility, and inclusion.

Research Design

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The study was conducted from January to May 2025, with data retrieval and analysis carried out through online database searches from various digital libraries. As this is a literature-based research, the "place" refers to virtual platforms and journal repositories accessed during the research period.

Research Target/Subject

The subjects of this research were peer-reviewed articles that discussed the implementation, pedagogical approaches, and educational outcomes of bilingual education programs. The units of analysis included studies that investigated Dual Language Immersion (DLI), Two-Way Immersion (TWI), Transitional Bilingual Education (TBE), and Maintenance Bilingual Education (MBE), with participants across education levels (pre-primary, primary, secondary, and adult education), without geographical limitation.

Research Procedure

The research process followed the PRISMA systematic review flow. 1,128 articles were initially retrieved from five academic databases: ERIC, JSTOR, Google Scholar, Wiley Online Library, and SAGE Journals. Search strategies used Boolean operators and keyword combinations such as "bilingual education," "dual language model," "academic outcomes," "Dual Language Immersion," "Two-Way Immersion," "Transitional Bilingual Education," and "Maintenance Bilingual Education." Inclusion and exclusion criteria were applied to refine results. After removing 87 duplicate records using Zotero, 1,041 articles remained. These were screened by title and abstract, yielding 78 full-text articles for eligibility checking. Finally, 21 articles met all criteria and were included in the final synthesis.

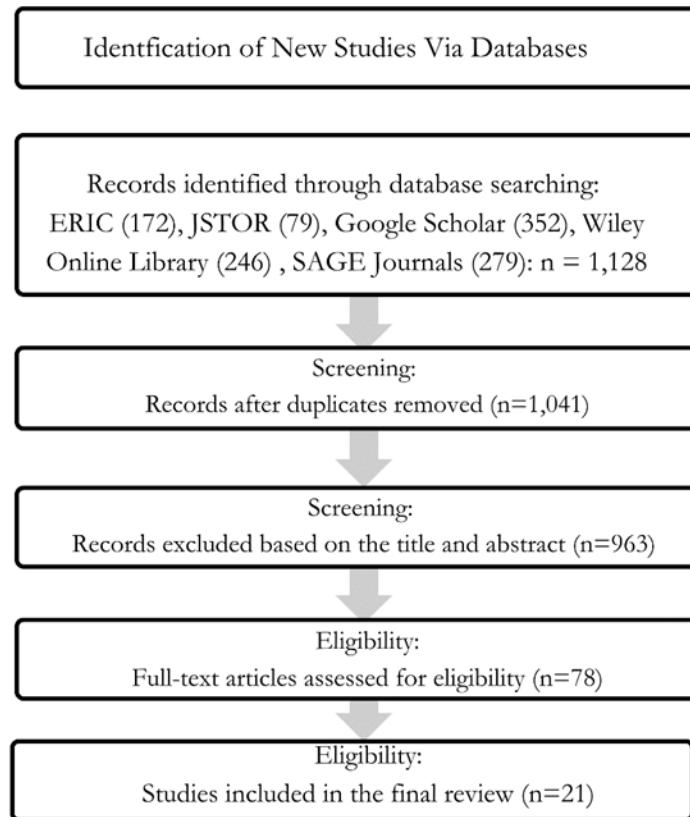


Figure 1 PRISMA Flow Diagram of Study Selection Process (Gersalia&Estremera, 2025)

Instruments and Data Collection Techniques

Data collection was carried out using document analysis of selected journal articles. The instrument in this context is the PRISMA-based checklist, which guided the systematic selection and inclusion of studies. The inclusion criteria were: (1) articles published in English, (2) peer-reviewed, (3) published between 2010 and 2024, (4) focusing on bilingual education models, (5) reporting educational outcomes (e.g., academic achievement, language proficiency, identity), and (6) involving participants from any educational level. Exclusion criteria involved non-peer-reviewed materials, opinion pieces, studies not focused on bilingual education, and publications outside the specified date range.

Table 1 Exclusion and Inclusion Criteria

Inclusion Criteria	Exclusion Criteria
Articles published in English.	Non-peer-reviewed sources (e.g., dissertations, opinion pieces).
Peer-reviewed journal articles.	Studies have not focused on bilingual education models.
Published between 2010 and 2024.	Lacks empirical data or educational outcome measures.
Focus on bilingual education models (DLI, TWI, TBE, MBE).	Published outside the 2010–2024 range.
Reports educational outcomes (e.g., academic achievement, language proficiency, identity).	
Includes learners from pre-primary, primary, secondary, or adult education.	
Global scope; no geographical limitation.	

Data analysis technique

The analysis used qualitative synthesis to identify recurring patterns, pedagogical features, and effectiveness across the selected studies. The studies were grouped according to the type of bilingual education model and the outcomes measured. This method enabled the identification of trends, strengths, challenges, and research gaps. The structured synthesis also ensured that the findings were methodologically valid and aligned with the research objectives of the SLR.

RESULTS AND DISCUSSION

Results

This review analyzed 21 empirical studies (2010–2024) focused on four bilingual education models: Dual Language Immersion (DLI), Two-Way Immersion (TWI), Transitional Bilingual Education (TBE), and Maintenance Bilingual Education (MBE). The DLI model emerged as the most frequently studied ($n=13$), consistently associated with improved academic performance, language development, and bilingual retention across various learner groups. TWI ($n=5$) also demonstrated strong outcomes, particularly in promoting bilingualism, literacy growth, and cross-cultural integration. In contrast, TBE ($n=2$) showed moderate success in early language development but limited long-term benefits. Only one study addressed MBE, highlighting its value for first-language maintenance and noting implementation challenges.

Table 2 Summary of Educational Outcomes by Bilingual Model

Bilingual Education Model	No. of studies	Common Outcomes
Dual Language Immersion (DLI)	13	<p>Increased enrollment interest, positive attitude toward bilingualism, improved academic outcomes (Call, 2015)</p> <p>Support for bilingualism in content learning (e.g., math); sustained bilingual growth (Renn & Chiu, 2021)</p> <p>Equitable literacy growth; improved academic outcomes; positive social outcomes (Arteagoitia & Yen, 2020)</p> <p>Higher Spanish proficiency gains compared to the transitional model (Murphy, 2024)</p> <p>Performance differences in reading and math; better outcomes in Dual Language programs (Mendez et al., 2017)</p> <p>Adequate language appropriation; balanced bilingual development (Garcia, 2022)</p> <p>Improved academic outcomes and language development in ELs (Hageman, 2022)</p> <p>Language-rich environment; improved academic and language development for Deaf and Hard of Hearing students (Hammel, 2024)</p> <p>More equitable math outcomes; enhanced engagement and achievement for bilingual students (Miller, 2024)</p> <p>Enhanced Spanish proficiency in Dual Language programs; varying outcomes by time, teacher, and student characteristics (Morita-Mullaney et al., 2022)</p> <p>Enhanced cross-cultural understanding and collaboration; improved parent-school relationships (Porter, 2018)</p> <p>Improved academic achievement, increased engagement, and community support (Lopez & Frick, 2010)</p> <p>Improved phonological awareness; enhanced early reading readiness (Schultz & Rossa, 2011)</p>
Two-way Immersion (TWI)	5	<p>Positive academic and language outcomes for Latino students (Brooke-Garza, 2015)</p> <p>Improved program effectiveness through well-structured design (De Jong, 2014)</p>

Bilingual Education Model	No. of studies	Common Outcomes
Transitional Bilingual Education (TBE)	2	Enhanced bilingualism and biculturalism; improved cognitive abilities and social integration (Van Booven, 2012) Unequal access based on geographic and socio-economic factors; equity concerns (Holtz, 2023) Promoted racial integration and understanding through bilingual education models; enhanced social cohesion (Uzzell & Ayscue, 2021)
Maintenance Bilingual Education (MBE)	1	Reading and language development gains; moderate outcomes for literacy (Durán et al., 2015) TWI programs show better reading outcomes than TBE for ELs; strong literacy growth in TWI (Polanco & Luft de Baker, 2018) Language maintenance, improved L1 development, and challenges in implementation (Morrison, 2010)

Comparative analysis reveals that additive bilingual models (DLI and TWI) outperform subtractive approaches (TBE) in academic and sociocultural domains. DLI programs frequently reported higher reading and math scores, equitable literacy gains, and greater language retention than TBE counterparts. TWI similarly promoted academic success and bilingual proficiency, fostering racial integration and social cohesion. In contrast, TBE was found to support short-term gains but often led to premature English dominance, weakening L1 development. MBE, though underrepresented, suggests potential for sustaining minority languages, pending stronger institutional support.

Geographically, most studies were conducted in North America, Europe, and parts of Asia, reflecting a concentration of research in developed multilingual education systems.



Figure 2 Geographical Distribution of Studies on Bilingual Education Models

Discussion

The analysis of the reviewed studies revealed important distinctions in the educational outcomes associated with the four bilingual education models. Dual Language Immersion (DLI) emerged as the most consistently effective model for promoting bilingualism, academic achievement, and sociocultural development. Studies by Call (2015), Garcia (2022), and Hageman (2022) demonstrated that DLI programs not only fostered improved academic outcomes and language development but also enhanced students'

positive attitudes toward bilingualism (Estremera, 2025). Lopez and Frick (2010) found that participation in DLI programs significantly increased student engagement and academic achievement, particularly in urban settings. In a longitudinal study, Morita-Mullaney, Renn, and Chiu (2022) confirmed that DLI settings promoted stronger Spanish language proficiency over time than English as a Second Language (ESL) models. Renn and Chiu (2021) further emphasized the effectiveness of language allocation in DLI math instruction, supporting conceptual understanding and bilingual growth. These results suggest that well-structured DLI programs provide robust cognitive and linguistic benefits across student populations, including English learners and students who are deaf or hard of hearing (Hammel, 2024; Estremera & Gonzales, 2025).

Equity was a recurring theme in DLI models. Arteagoitia and Yen (2020) reported equitable literacy gains and social outcomes for emerging bilingual students, while Miller (2024) highlighted how DLI could promote more inclusive mathematics instruction, particularly for historically underserved learners. Porter (2018) and Schultz and Rossa (2011) also found that DLI fostered improved parent-school relationships and early literacy skills, respectively. Integrating content and culture within DLI contributed to sustained engagement, biliteracy development, and community support.

Two-Way Immersion (TWI) models, while less represented, showed similarly strong results. Brooke-Garza (2015) found that Latino students in TWI programs demonstrated academic and linguistic gains, confirming the value of dual-language approaches that serve minority and majority language speakers. TWI's structural emphasis on equity and integration was further reinforced by Uzzell and Ayscue (2021), who observed that TWI programs encouraged racial integration and social cohesion. Holtz (2023) added a spatial equity dimension, showing disparities in access to TWI programs based on geography and socio-economic status. Meanwhile, De Jong (2014) identified that intentional program design enhanced the effectiveness of TWI implementation. Van Booven (2012) extended the model's relevance to adult learners, documenting gains in bilingualism and bicultural understanding.

In contrast, Transitional Bilingual Education (TBE) was associated with more limited and short-term outcomes. Durán, Roseth, and Hoffman (2015) reported gains in early literacy and language skills among Spanish-speaking preschoolers, but noted the moderate impact on long-term literacy growth. Murphy (2014) provided comparative data indicating that students in DLI programs demonstrated greater Spanish proficiency than their TBE counterparts. This finding was echoed by Polanco and Luft de Baker (2018), whose study showed that TWI participants outperformed those in TBE in reading outcomes. These patterns suggest that while TBE may support initial L1 development, it often lacks the duration and additive language focus necessary for sustained bilingualism and academic success.

Finally, Maintenance Bilingual Education (MBE) was the least represented model, with only Morrison's (2010) Thai case study addressing its implementation. Despite its challenges, the study highlighted MBE's role in maintaining students' first language and cultural identity. However, the effectiveness of MBE was hampered by limited institutional support and resource constraints, illustrating the need for stronger systemic backing in minority language contexts.

While much of the reviewed literature originates from North America and parts of Asia, studies from Europe, South America, and Africa also offer valuable comparative insights. In Spain, inclusive bilingual models integrating Basque, Catalan, or Galician with Spanish have successfully promoted regional language revitalization alongside academic achievement (Sánchez-Barbero et al., 2025). In Colombia and Chile, bilingual programs rooted in indigenous and Afro-descendant communities have been linked to cultural preservation and increased school attendance, although often limited by funding and infrastructure. In South Africa, additive bilingual models that combine English with Afrikaans or local languages have improved access to higher education among marginalized populations. These examples reinforce the global relevance of additive bilingualism and demonstrate the importance of tailoring bilingual approaches to sociopolitical and cultural contexts.

The findings of this review provide strong empirical support for the theoretical frameworks guiding the study, particularly Cummins' Common Underlying Proficiency (CUP) model and Vygotsky's sociocultural theory. These theories illuminate why additive bilingual education models, such as Dual

Language Immersion (DLI) and Two-Way Immersion (TWI), produce superior linguistic, academic, and sociocultural outcomes.

Cummins' CUP theory posits that proficiency in a second language builds on the foundation of a learner's first language. This idea of interdependence was reflected in the studies reviewed. DLI and TWI models, which maintain and develop both languages concurrently, were shown to support substantial academic achievement and biliteracy development, affirming that cognitive and linguistic gains in L1 transfer to L2. For example, research demonstrating higher reading and math outcomes in DLI settings (Mendez et al., 2017; Garcia, 2022) aligns directly with CUP, illustrating that bilingual instruction enhances rather than hinders learning. In contrast, the diminished long-term effectiveness of Transitional Bilingual Education (TBE) aligns with Cummins' concern about subtractive bilingualism, where a rushed transition to English can undermine L1 development and cognitive growth.

Vygotsky's sociocultural theory, which emphasizes the central role of language in learning through social interaction and cultural mediation, is equally evident in the findings. TWI programs, in particular, promote meaningful interaction between learners of different linguistic backgrounds, fostering collaboration, cultural exchange, and mutual respect. These socially embedded learning experiences enhance bilingual proficiency and sociocultural integration, as studies by Uzzell & Ayscue (2021) and Brooke-Garza (2015) noted. The engagement of parents, communities, and culturally responsive teaching practices within DLI and TWI programs further reinforces Vygotsky's view of learning as socially constructed and culturally situated.

These theoretical lenses help explain why additive, integrative bilingual models are more effective and sustainable. They underscore the need for educational models that preserve and develop the first language, provide equitable second-language acquisition opportunities, and create inclusive, socially rich learning environments.

Additionally, several recent studies contribute additional insights into the evolving nature of bilingual education. Hsu, Sánchez Pérez, and Su (2025) examined how bilingualism in health sciences education in Chile promotes linguistic and content mastery, offering a novel perspective on bilingualism's role in professional settings. In Taiwan, Chen et al. (2025) outlined a national strategy to transform English as a Foreign Language (EFL) education, focusing on achieving bilingualism by 2030. Solano-Campos and Valdez (2025) discussed the role of Latinas in shaping dual language education, emphasizing cultural and identity intersections. De Jong et al. (2025) advocated affirming diversity in bilingual education, highlighting culturally responsive teaching practices. Bai and Zang (2025) investigated bilingual learning motivation among Chinese-English bilingual students, revealing complex dynamics between intrinsic and extrinsic motivation. Salmerón, Valdez, and Clark (2025) utilized community cultural wealth as a framework to explore the development of bilingual education research. Miller and Movahedazarhoughligh (2025) focused on enhancing dual language development in preschool settings through intentional language instruction. Zhang, Wang, and Ma (2025) explored the connection between social competence and foreign language achievement among Chinese adolescent learners. Feroce, Liu, and Chattergoon (2025) assessed the impact of a Computer-Assisted Language Learning (CALL) tool on emergent bilinguals. Lastly, Pando, León, Dougherty, and del Rosal (2025) examined dual language teachers' perceptions of using ChatGPT in bilingual education, adding to the growing research on technology integration in language learning.

CONCLUSION

This systematic literature review examined four key bilingual education models—Dual Language Immersion (DLI), Two-Way Immersion (TWI), Transitional Bilingual Education (TBE), and Maintenance Bilingual Education (MBE)—to evaluate their educational outcomes and inform future bilingual instructional practices. The evidence strongly supports the conclusion that additive bilingual models, particularly DLI and TWI, provide the most comprehensive benefits for students, including higher academic achievement, stronger bilingual proficiency, and positive sociocultural identity development. In contrast, subtractive models like TBE were found to offer limited long-term benefits, while MBE, though promising in promoting language maintenance, remains under-researched and under-supported. The findings reinforce

sociocultural and cognitive theories of bilingual education, particularly Cummins' theory of Common Underlying Proficiency and Vygotsky's sociocultural perspective, emphasizing the interdependence of languages and the social context of learning. The consistent success of DLI and TWI programs demonstrates that bilingual education is not merely a transitional mechanism but a dynamic model of academic and linguistic enrichment. Furthermore, the emphasis on equity and integration in TWI reflects a broader shift toward education models that acknowledge language as both a right and a resource.

From a practical standpoint, the following implications are emphasized for educational stakeholders:

- **Policymakers** should support the expansion of additive bilingual education by allocating sustained funding for DLI and TWI programs and embedding these models into national and regional education frameworks. Legislation should ensure equitable access, especially in linguistically marginalized and low-income communities, by addressing spatial disparities and promoting inclusive enrollment policies.
- **School leaders and administrators** must ensure the availability of qualified bilingual teachers through recruitment incentives, specialized training programs, and certification pathways. Successful implementation of DLI and TWI requires strategic planning in curriculum design, language allocation, and community partnerships. Leadership should prioritize data-driven monitoring to assess student progress and inform continuous improvement.
- **Practitioners** are encouraged to apply bilingual pedagogies integrating language development with content mastery. Teachers should foster affirming classroom environments that value students' home languages and cultural identities while maintaining high academic expectations in both languages.
- **Curriculum developers and education planners** should design instructional materials and assessment tools that reflect bilingual goals and cultural inclusivity. Language instruction should be balanced, with intentional scaffolding to support biliteracy across subjects.
- **Teacher preparation programs** must develop specialized tracks for bilingual educators, including applied linguistics, multicultural education, and classroom-based bilingual strategies. Practicum experiences in DLI and TWI settings will ensure readiness for real-world application.
- **Community engagement** is also vital. Stakeholders must collaborate with families to reinforce language learning beyond the classroom and ensure that bilingual education is responsive to the cultural and linguistic assets of the communities it serves.

This review revealed a critical need for more longitudinal and comparative studies, especially in the context of Maintenance Bilingual Education (MBE), which remains significantly underexplored. Future research should examine the implementation of MBE in both minority and indigenous language communities, assess long-term cognitive and identity-related outcomes, and explore its potential as a countermeasure to language endangerment. Furthermore, cross-national comparisons could offer valuable insight into how political and policy environments influence the success of the bilingual model. This review was limited to peer-reviewed articles published between 2010 and 2024, potentially excluding relevant gray literature or localized reports. Additionally, while the review categorized studies based on broadly defined models, program structures, and implementation fidelity varied across contexts, which may influence generalizability. As such, findings should be interpreted considering local socio-political and institutional conditions.

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