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FULL PAPER

Technology-Enhanced Home Language Practices in Bilingual Families: An Integrative Review of Parental Mediation and Child Language Development

Abstract

Digital media are now embedded in bilingual family life, yet evidence remains fragmented across family language policy, digital literacy, parental mediation, and child-language research. This integrative review synthesises a verified core corpus of 17 empirical studies published between 2021 and July 2026. The corpus covers general home digital-media use, digitally supported shared reading, and polymedia or transnational communication. Descriptive mapping and convergent narrative–thematic analysis show that digital technologies can broaden access to heritage and societal languages through e-books, educational applications, audiovisual media, messaging, video calls, and social media. However, access alone did not reliably produce developmental gains. More favourable opportunities for vocabulary learning, narrative comprehension, oral participation, literacy, and heritage-language use occurred when parents or other family members supported co-use, questioning, explanation, translation, modelling, feedback, and responsive communication. Passive or background exposure was associated with fewer conversational turns. Child agency, bilingual proficiency, socioeconomic resources, parental digital literacy, language status, and content availability moderated these relationships. Only six studies directly assessed child-language behaviour or performance, and all four intervention or technology-design studies were short term and lacked delayed unaided assessment. The review proposes a recursive practice–mediation–context–outcome framework and distinguishes interaction-generating from interaction-displacing technology use. Because archived search exports and screening records could not be accessed, this synthesis is framed openly as a bounded integrative review, not as an exhaustive systematic review.

Keywords: bilingual families; child language development; digital media; family language policy; heritage-language maintenance; parental mediation

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1. Introduction

Bilingual children's language development is shaped by more than face-to-face interaction, print literacy, and parents' language choices. Digital practices are also a part of everyday family life. Video chats, messaging services, streaming services, e-books, educational apps, games, and social media allow children increased access to heritage and societal languages both synchronically and diachronically. Family language policy can thus unfold not only through traditional means but through digital media as well, highlighting how parents adopt technologies, regulate access, select language input, co-view or engage with their children, and connect with family members abroad (Little, 2020; Palviainen & Räisä, 2023; Said, 2021). Research on transnational families further demonstrates how parental language ideologies, migration histories, language status, and institutional factors impact whether home languages are maintained, balanced, or replaced (Curdts-Christiansen et al., 2023).

Existing research does not suggest that technology is inherently beneficial or harmful to children's language development. One meta-analysis found that increased screen time was generally associated with children's lower language abilities. This trend shifted when the media was educational in nature or parents watched with and engaged their children, however, both were associated with more positive outcomes. These findings highlight that mediation and learning context matter more than screen time alone (Madigan et al., 2020). These findings are particularly important for bilingual families. While technology cannot replace necessary resources for learning a language, such as books or teachers, it can serve as a valuable supplemental tool for kids who have limited access to materials, speakers, or instruction in a heritage language. Research with English–Mandarin bilingual families found significant disparities between children's English and L1 digital environments, suggesting that family socioeconomic status and the societal prestige of each language contributed to uneven digital resources and activities (Sun et al., 2022a; Sun et al., 2023).

Small-scale observational and experimental studies provide additional insights into how parent involvement impacts children's learning experiences. When navigating digital books in both Maltese and English, children were more likely to engage with the story and fluidly switch between their two languages when their parents were involved (Mifsud et al., 2021). Audiovisual enhancements supported preschoolers' attention during storybooks and subsequent story retelling in Mandarin–English bilinguals, but these enhancements did not benefit children with lower bilingual proficiency equally (Sun et al., 2022b). A randomized trial tested a similar hypothesis among Mandarin speakers in China: adult-child dialogic interaction was necessary for gains in story comprehension and retelling after listening to bilingual storybooks, but enhanced storybook prompts did not lead to increases in English vocabulary (Yang et al., 2022). Preliminary evidence with Polish–Norwegian bilingual children supports these conclusions more broadly. How parents spoke and acted with their children may have been more influential than the language of the digital book (tagged in either the child's L1 or L2) (Tunkiel & Bus, 2022).

Qualitative interviews and quantitative surveys have enriched our understanding of family language practice in recent years. Some multilingual families in Luxembourg use digital devices for language and literacy education, but not all of them and their habits differ by parent educational levels, home languages, and children's interests (Obojska & Vaiouli, 2025). Turkish parents living in Australia reported providing

digital media in Turkish and English to their children, though many also expressed confusion over appropriate apps and media (Ozturk & Ohi, 2026). Azerbaijani families used digital devices and sought multilingual content for similar reasons, though health concerns and guilt over limits also motivated their media choices (Savadova & Gillen, 2026).

Research at the intersection of technology and young children's language learning has tended to fall within the fields of family language policy, digital literacy, parental mediation, bilingual language development, and technology and early-childhood education. Studies are often constrained by small, location-specific samples, reliance on parental reports, treatment packages, or a single language combination. They also operationalize parental mediation in different ways and assess different language outcomes. With this in mind, we view technological input as a dynamic relationship. Technological affordances, parental mediation, parental language ideology, child agency, and sociolinguistic context interact to influence children's language learning. In this review, we synthesize what is known about parental mediation of digital language input for young children, discuss how specific mediation behaviors are related to vocabulary acquisition, oral language skills, narrative skills, literacy, biliteracy, and heritage-language maintenance, identify key knowledge gaps by geography, method, and theory, and propose two mechanisms—interactional intensity and linguistic alignment—to account for differences in development among children with similar levels of screen exposure. The study addresses the following research questions:

1. What forms of technology-enhanced home language practices are used in bilingual families, and how do parents mediate children's engagement through content selection, co-use, instruction, monitoring, restriction, and language-management strategies?
2. What relationships are reported between technology-enhanced home language practices, parental mediation, and children's vocabulary, oral proficiency, narrative ability, literacy, biliteracy, and heritage-language maintenance?
3. How do children's age, bilingual proficiency, agency, socioeconomic background, parental language ideology, language status, and sociocultural context influence reported outcomes, and what methodological, geographical, and theoretical gaps remain in the existing evidence?

2. Literature Review and Conceptual Background

2.1 Technology within the Bilingual Family Language Ecology

Research on bilingual families has generally focused on parents' beliefs, language-management practices, and patterns of interaction in households where family members are physically together. That perspective is increasingly insufficient, as communication now takes place across devices, platforms, modes, locations, and generations. In their systematic review of 163 migrant family language policy studies, Bose et al. (2023) found that language practice was still predominantly conceptualised as face-to-face communication, whereas only 11% of the reviewed studies incorporated digital communication. This finding indicates that the family cannot be regarded as a fixed nuclear unit located in one place. Grandparents, relatives, teachers, and community members may now participate in children's language socialisation through video calls, instant messaging, online instruction, and social media. Technology-enhanced home language practice is therefore treated as part of a broader bilingual ecology rather than as an optional addition to offline parenting.

This ecological perspective also requires consideration of polymedia, through which families select among interconnected technologies according to their linguistic goals, relationships, emotions, convenience, and children's preferences. Wang and Hamid's (2024) interviews with 15 Chinese–Australian parents showed that digital media supported heritage-language learning, cultural affiliation, and transnational family relationships. At the same time, parents reported concerns about inappropriate content, excessive use, and children's resistance to heritage-language resources. Technology therefore functioned both as a language-learning resource and as a space where family authority and language preferences were negotiated. This dual role is significant for bilingual development because technology's affordances are determined not only by access but by how it is situated in families' everyday routines, relationships, and language ideologies.

2.2 Parental Mediation as Digital Family Language Policy

Parental mediation has traditionally been categorised into discrete strategies: restriction, monitoring, active discussion, co-use, technical control, and parental modelling. Emerging research, however, suggests that these groupings are not mutually exclusive nor static. Shin and Lwin (2022), for example, compared 316 parents from Singapore and 315 parents from Australia to see how mediation related to parents' beliefs about digital media, digital literacy, and parental self-efficacy. Variations between these two nationally-grouped samples also demonstrated how mediation is impacted by cultural norms, parental confidence, and the broader digital ecology. Restriction alone, then, cannot account for parental approaches to children's media use.

Goodall et al. (2025) also discovered that parents with children between birth and three years old navigated digital opportunities and perceived threats via dynamic, overlapping, and context-dependent strategies. Instead of adhering to one type of mediation, parents shifted their approaches depending on the device, content, activity, child, and context. While this study did not focus exclusively on bilingual homes, it has implications for how we conceptualize digital media in this context. A bilingual parent might allow their child to video call with grandparents, co-watch a heritage-language show, limit access to entertainment videos, and have the child play one educational game within a single day. All of these activities also include decisions about the language(s) spoken, whether translations are given, and if the child is corrected, pushed to reply, or asked questions in the heritage or societal language. Parental mediation is thus described as simultaneously linguistic, pedagogical, relational, and protective.

Understanding parental mediation this way helps clarify how the same amount of screen time can yield different developmental prospects. A child playing independently on heritage-language videos is exposed to a different linguistic environment than one who watches the same content while their parent pauses to define new vocabulary, asks questions, encourages prediction, or relates the program to their own experiences. Restrictive mediation may also help children spend more time communicating with parents, but it could also reduce children's access to limited heritage-language resources. Accordingly, the relevant unit of analysis should not be screen time alone. The focus should be on the mediated digital activity itself—its language and content, how participants interact, the purpose of parental involvement, and its connection to later conversation or literacy practices.

2.3 Digital Exposure, Interaction, and Language Development

Naturalistic research cautions against assuming that digital exposure automatically produces language learning. Cycyk and De Anda (2021) analysed home recordings from 30 Mexican immigrant families with toddlers under three years of age. Digital media represented approximately 14% of the recorded language

environment, although exposure varied considerably among families. Greater media exposure was negatively associated with children's vocalisations and adult-child conversational turns but was not associated with the total number of adult words. The findings suggest that media may reduce children's opportunities to practise expressive language even when adult speech remains present. Moreover, child-directed programming was less likely to be available in Spanish, illustrating how the form and language of digital content may shape heritage-language opportunities differently.

Ferjan Ramírez et al. (2022) reached a related conclusion in their investigation of 37 bilingually raised Latinx infants. Based on day-long audio recordings, electronic-media exposure was associated with reduced parentese, fewer parent-infant conversational turns, and fewer infant linguistic vocalisations. The language of the electronic media was also related to the language used by the parents around the child. These findings point to an interactional view of language learning: technology has developmental value when it prompts responsive communication rather than taking its place. That distinction matters when assessing technology-supported practices at home, since it shifts the focus away from how much digital exposure children receive and toward the quality of the language participation around it.

Home-literacy research similarly indicates that bilingual outcomes depend on language use patterns and types of literacy support. Bratlie et al. (2025) followed 320 dual-language learners in Norway ages 22–68 months and identified three profiles based on patterns of first- and second-language use, spoken proficiency, and home literacy materials/supports in each language. Children in the profile characterized by greater amounts of first-language use and stronger literacy environments for both languages demonstrated relatively high proficiency in both the home language and societal language. That finding speaks to the zero-sum assumption that investment in the home language must come at the expense of the societal language. This study was not conducted exclusively in the digital sphere, but it still offers useful implications for how children learn with technology. Digital books, story applications, and online communication may benefit children most when they supplement a bilingual environment rather than replace human interaction.

Studies exploring technology design can help us understand how software and applications can be structured to encourage interactivity. He et al. (2025) developed a bilingual conversational agent embedded in electronic books for Spanish-English Latine families. When deployed during one week of home-use with 15 families, the agent stimulated bilingual verbal interaction, more substantial parent-child conversation, and Spanish vocabulary development. Notice that its impact arose from supporting a joint activity between parent and child rather than acting as a separate digital tutor. The sample size and duration were still quite small, though, preventing the researchers from identifying long-term retention rates, generalization to unassisted communication, or continued development of the heritage language. That limitation underscores a broader methodological trend: promising technologies get tested during short interventions, then researchers do not verify whether participants maintain those language gains after digital supports are withdrawn.

2.4 Heritage-Language Maintenance, Child Agency, and Contextual Inequality

Digital materials and applications may matter more where heritage-language speakers, books, schools, and culturally interesting materials are scarce or unavailable. Guskaroska and Elliott (2022) surveyed Macedonian diaspora parents and found broad enthusiasm for using technology to help maintain that language. Parents described having less time than they wanted, minimal exposure to Macedonian outside

the home, and limited access to culturally interesting digital resources made for children. It was easier to find materials suitable for adults than young children, which matters if parents struggle to find developmentally appropriate content. This does not mean technology is the problem or solution: either perfectly matched educational materials already exist online or they cannot be programmed into an app. Krajka and Gabryś-Sławińska (2022) instead explored a telecollaboration program where social media helped connect Polish speakers with heritage learners in remote Brazilian communities. Heritage-language maintenance was possible where local opportunities to learn Polish were limited or unavailable. Online communication did not automatically create access to that language and its associated culture, however. Platform-mediated conversations needed to be organized around collaborative tasks if learners were to benefit. Students did not learn Polish by logging into a computer program. This conclusion echoes our broader understanding that technology becomes educational through purposeful mediation and interaction. Family mediation of a digital language need not fall strictly along parental lines. Romanowski (2022) found that Polish fathers living in Australia played an unexpected role in guiding their children's heritage-language learning. He did not merely study fathers; he looked at how Polish-speaking dads contributed to their children's bilingual development. Fathers both maintained family traditions and adapted their approach when interacting with children through digital media (Romanowski, 2025). In both studies, heritage-language mediation flowed in both directions. Children influenced how their parents used technology for purposes of language learning just as parents regulated their children's language use. This work challenges common assumptions about which family members guide children toward a heritage language. Mothers do play a major role, but digital technology lets children shape those interactions too. Code-switching within apps or online conversations does not always represent a failure to separate languages. As children and parents negotiate technology use, code-switching can facilitate understanding, maintain conversation flow, and mark a bilingual identity.

Technology lets kids push back too. Wang and Hamid' (2024) interviews included cases where children's digital interests conflicted with their parents' language preferences. When children wanted to access certain apps or digital genres, parents held the ultimate say. Their language policy could still adapt to incorporate children's desires if they so chose. Parents negotiated how strictly to apply those rules. If policies were too rigid, children could resist language-socialization efforts; more flexible mediation led parents to incorporate popular digital genres into children's heritage-language activities. Heritage languages get some support from children's everyday technology use, then, but not all of the same kind or in the same direction. Children can exercise agency by choosing content to engage with, switching apps/platforms, requesting certain languages, and refusing materials that fail to interest them.

The research on heritage languages points to adaptability in another way. Bilgory-Fazakas and Armon-Lotem's (2025) qualitative interviews suggested that language maintenance was most resilient when it emerged through the intersection of family dedication, cultural identification, and pragmatic adjustments over time. Adaptable mediation strategies may therefore depend on mixing heritage- and societal-language content to fit the moment. Parents could switch the applications they use, translate read-alouds or video content, combine online and offline activities, or pivot in response to children's developing identities. Flexibility does not weaken consistency. A dedication to bilingual development can survive lots of changes to how that commitment gets realized through day-to-day activities.

Many other factors influence this process. Contextual inequalities influence how caregivers mediate children's technology use as well. Mediation quality varies with parents' digital literacy and educational background, but it also depends on parents' available time, income/resources, connectivity, and access to heritage-language materials/books. Limited funds can make the difference between relying on freely available videos, paying for interactive applications, using paid digital books, or scheduling live lessons. Commercial support for a language also varies by how widely it is spoken, leaving some languages with few high-quality resources or recordings. Screen time itself cannot account for why children use technology or what they learn from it.

2.5 Conceptual Gap and Analytical Proposition

Technology both increases children's access to a heritage language and competes with opportunities to converse. It connects siblings and distant relatives but sometimes introduces family tension. Devices promote bilingual literacy development while also risking too much solitary use. Studies showing both positive and null effects of technology do not imply that devices make no difference to children. They indicate that the category of "technology use" is too broad to explain differences in children's heritage-language development. Technology use becomes meaningful through the dynamic relationships between how it affords language learning, how children and parents distribute their time across languages, quality of digital materials, parental mediation, children's agency, family relationships, and sociolinguistic context.

Here, we identify a gap in theory and method. Family language policy describes parents' beliefs and stated practices without frequently testing children's language development. Language-development research measures children's exposure but often does not account for parents' beliefs about language, mediation style, or cultural contexts. Technology interventions test particular applications, yet rarely examine delayed retention, transfer to unaided communication, dependency, or long-term heritage-language maintenance. Much of the evidence is also derived from small samples, parent-reported data, single language pairs, and relatively well-resourced migration contexts. Children's perspectives, fathers, extended relatives, lower-resource languages, and families in the Global South remain comparatively underrepresented.

Most importantly, previous research has not sufficiently integrated digital practices, parental mediation strategies, contextual moderators, and specific developmental outcomes within one analytical framework. It remains unclear which combinations of co-use, active explanation, monitoring, restriction, language selection, and transnational interaction are associated with vocabulary, oral proficiency, narrative ability, literacy, biliteracy, and heritage-language maintenance. This review addresses this unresolved issue by synthesising process, context, and outcome evidence and by conceptualising technology-enhanced home language practice as a relational and developmentally situated phenomenon.

3. Method

3.1 Review Design and Epistemic Scope

This study used an integrative review design to connect quantitative, qualitative, and mixed-methods evidence across applied linguistics, family language policy, early-childhood education, communication, and developmental research. Integrative review is appropriate when a field is conceptually fragmented and contains heterogeneous designs that cannot be reduced to a single effect estimate (Whittemore & Knafl, 2005). The review therefore prioritised conceptual integration, evidential directness, and explanation of contextual variation rather than statistical pooling.

The analysis distinguished a core evidence corpus from contextual literature. The core corpus contained 17 empirical studies that directly examined technology-supported language practices in bilingual or multilingual families. Additional reviews, methodological papers, and related empirical studies were cited in the Introduction and Discussion to frame the argument, interpret the findings, and assess transferability; they were not counted in the corpus frequencies.

3.2 Corpus Identification, Eligibility, and Verification

The corpus was bounded by four concept domains: bilingual or multilingual families; digital technology or digitally mediated communication; parental or family mediation; and child language, literacy, language use, or heritage-language maintenance. Eligible reports were peer-reviewed empirical journal articles published from January 2020 to July 2026. They involved children from birth to 18 years raised with two or more languages and examined a home, family, or transnational family context. Technologies included digital books, applications, tablets, streaming and video platforms, games, messaging, social media, video calls, conversational agents, and interconnected polymedia.

A report was retained when family participation or mediation was substantively analysed. Relevant mediation included co-use, co-reading, questioning, explanation, translation, instruction, content selection, monitoring, restriction, modelling, language choice, or organisation of communication with distant relatives. Studies restricted to classroom technology, monolingual samples, general screen duration without a bilingual or family-language component, or non-language outcomes were outside the core corpus. Mixed monolingual–bilingual samples were eligible only when findings for bilingual participants could be identified.

During final manuscript preparation, the bibliographic identity, DOI, publication year, journal, population, family context, technology, and eligibility of each core study were rechecked against publisher records or authoritative bibliographic metadata. One omitted reference—Bus et al. (2023)—was restored. The original database exports, deduplication file, title-and-abstract decisions, and full-text exclusion log were not available. Accordingly, no PRISMA flow counts are reported and no claim of exhaustive or reproducible database coverage is made. The review should be read as a transparent synthesis of a verified, theoretically relevant corpus rather than as a comprehensive systematic search.

3.3 Data Extraction and Coding

A structured extraction matrix captured author and year, country or transnational setting, sample size and age, language configuration, design, technology or platform, form of family participation, mediation strategies, child agency, language-related outcomes, contextual moderators, and reported limitations. The coding scheme combined deductive and inductive logic. Initial mediation codes—active mediation, co-use, restriction, monitoring, modelling, instructional scaffolding, language management, and transnational-relational mediation—were derived from the research questions and parental-mediation literature. Additional practices and contextual conditions were added when they recurred across studies.

Studies could receive multiple mediation, outcome, and moderator codes. For the descriptive distribution in Figure 2, however, each report was assigned to one dominant technology cluster: general home digital-media practices, digital shared reading, or polymedia and transnational communication. Dominant focus was assigned according to the study aim, primary data source, and central analytical claims. Although this

single-assignment rule makes frequency reporting transparent, it does not suggest that the clusters are mutually exclusive in family life.

3.4 Synthesis and Evidence Appraisal

Descriptive counts covered publication year, region, study design, age group, technology focus, and the directness of the child-language evidence. Quantitative results were summarised according to their direction, reported size, and consistency. Qualitative results, by contrast, were brought together through iterative coding that developed descriptive and analytical themes, following the logic of thematic synthesis (Thomas & Harden, 2008). The final convergent synthesis mapped underlying practices, mediation, contexts and outcomes together. Findings that contradicted one another were preserved rather than averaged into an overall technological effect. Strength of evidence was rated without averaging the findings into an overall quality score. Five dimensions informed our interpretation: whether the measure directly assessed child language versus relied on parent report, the rigor of the research design, the sample size, the validity of the measure, and short- or longer-term horizons. For example, we gave more weight to the developmental impacts measured by direct recordings or assessments of children rather than parents' perceptions of their children. We were cautious in our interpretation of intervention impacts when the technology exposure was short-term, the samples were small, when intervention delivery occurred in the home without full reporting of fidelity to protocols, or when impacts on unaided child skills were not reported after some time. Evidence describing family language practices, in other words, was not considered causal evidence of those practices on development.

3.5 Transparency and Ethical Considerations

The review examined published studies and did not collect identifiable data from human participants. Institutional ethical approval was therefore not required. Rigour was supported through explicit separation of core and contextual evidence, bibliographic verification, preservation of negative and null findings, transparent single-assignment rules for descriptive categories, and direct acknowledgement of the missing search archive. All numerical summaries in the Results are traceable to the 17-study characteristics table in Appendix A.

4. Results

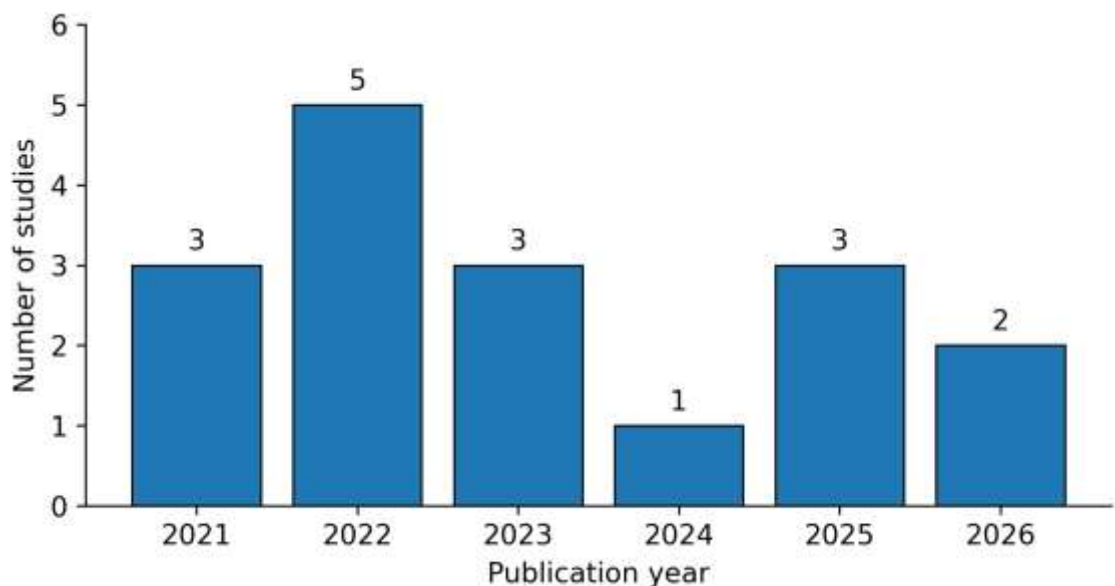
4.1 Corpus Profile

The verified core corpus comprised 17 peer-reviewed empirical studies published between 2021 and 2026. The smallest studies examined two multilingual families, whereas the largest surveyed 1,002 children. Designs included family case studies, interviews, surveys, naturalistic recordings, digital-reading experiments, and technology-design evaluations. Appendix A identifies the population, design, technology, and principal contribution of every core study.

The studies were distributed unevenly across the six-year publication period. Three studies were published in 2021, five in 2022, three in 2023, one in 2024, three in 2025, and two in 2026. The largest number appeared in 2022, representing 29.4% of the corpus. As illustrated in Figure 2, publications remained relatively consistent after 2021, although the small corpus does not support conclusions concerning broader publication trends.

Figure 1

Publication Distribution of the 17-Study Core Corpus



Note. Counts refer to one primary publication per core study. The 2026 count covers publications available by July 2026.

The corpus represented 11 clearly identifiable national settings: the United Kingdom, Malta, the United States, Singapore, China, Norway, Finland, the Netherlands, Australia, Luxembourg, and Azerbaijan. One other study examined Macedonian diaspora families living in settings that did not fit within a single national context.

Of the studies, six took place in Europe, four in Asia, three in North America, and three in Australia. One drew on a transnational diaspora sample. None of the verified studies was based in Africa, South America, or the Arab region. This left the evidence base centered largely on relatively well-resourced migration and multilingual settings, where access to digital infrastructure was comparatively strong.

Twelve studies—70.6% of the corpus—centered mainly on children from infancy to about seven years old. By contrast, just five involved school-age children, mixed-age families, or participants beyond early childhood, leaving technology-enhanced home-language practices among older children and adolescents underrepresented.

The corpus comprised five primarily qualitative studies, five quantitative observational or survey studies, four experimental, quasi-experimental, or technology-design interventions, and three mixed-methods studies. Table 1 summarises its publication, geographical, methodological, age-related, and technological characteristics.

Table 1

Profile of the 17-Study Core Corpus

Characteristic	Category	Studies, n	Percentage
Publication year	2021	3	17.6%
	2022	5	29.4%
	2023	3	17.6%
	2024	1	5.9%
	2025	3	17.6%

Characteristic	Category	Studies, n	Percentage
	2025	3	17.6%
	2026	2	11.8%
Geographical region	Europe	6	35.3%
	Asia	4	23.5%
	North America	3	17.6%
	Australia	3	17.6%
	Transnational diaspora sample	1	5.9%
Research design	Qualitative	5	29.4%
	Quantitative observational or survey	5	29.4%
	Intervention or technology-design study	4	23.5%
	Mixed methods	3	17.6%
Primary age group	Infancy to approximately seven years	12	70.6%
	School-age or mixed-age groups	5	29.4%
Principal technology focus	General home digital-media practices	7	41.2%
	Digital books and shared reading	5	29.4%
	Polymedia and transnational communication	5	29.4%

Note. Percentages are calculated from the 17 verified core studies. Each study was assigned to one dominant region, design, age group, and technology-focus category for descriptive reporting.

The methodological profile of studies was quite varied but did show a clear imbalance: far more studies documented family practices than directly assessed children's language development. Eleven studies, 64.7% of included studies, focused mainly on topics other than language development: parental beliefs, digital media practices, mediation strategies, language choices, or family experiences. Only six, representing 35.3%, used direct observations or assessments to measure children's language performance.

Seven studies, 41.2% of the corpus—included fewer than 25 children, parents, families, or parent–child dyads. Questionnaires, interviews, parental accounts, or similar self-report methods formed the main basis of ten studies. Although these approaches provided valuable context on parental mediation and family language policy, they offered only limited support for causal claims about children's language development.

4.2 Directness and Strength of Child-Language Evidence

The six studies focused directly on child-language indicators included two naturalistic recording studies and four studies involving intervention or technology design. Their samples, methods, main findings, and interpretive limitations are presented in Table 2.

Table 2

Studies Providing Direct Evidence of Child-Language Outcomes

Study	Sample	Design or technology	Main language-related finding	Main limitation
Cyck and De Anda (2021)	30 families	Naturalistic home recordings	Greater media exposure was associated with fewer child vocalisations and conversational turns	Observational design; causality could not be established
Ferjan Ramírez et al. (2022)	37 infants	Day-long audio recordings	Electronic-media exposure was associated with reduced parentese, conversational turns, and infant vocalisations	Small sample and correlational evidence
Tunkiel and Bus (2022)	14 children	Bilingual digital-story reading	Reading first in Polish did not produce a clear advantage in Norwegian vocabulary learning	Very small sample and no delayed assessment
Yang et al. (2022)	107 dyads	Bilingual discussion prompts during e-book reading	Prompts improved story comprehension and retelling but not English vocabulary beyond the comparison condition	Immediate outcomes only

Study	Sample	Design or technology	Main language-related finding	Main limitation
Bus et al. (2023)	41 children	Dutch-only versus multilingual digital books	Heritage-language availability did not independently increase home reading as expected	Limited sample and reliance on home implementation
He et al. (2025)	15 families	Bilingual conversational agent	The agent encouraged bilingual engagement, parent–child dialogue, and Spanish vocabulary learning	One-week intervention and no delayed unaided test

Note. Direct evidence refers to observational indicators or assessment-based measures of children’s language behaviour or performance, rather than parental perceptions alone.

The two naturalistic studies reached largely similar conclusions. Children with more passive or background media exposure had fewer opportunities to take part in expressive language. Still, neither study demonstrated a direct causal link. Family interaction patterns, parental availability, child characteristics, and household routines could have shaped both the amount of media exposure and the extent of conversational participation.

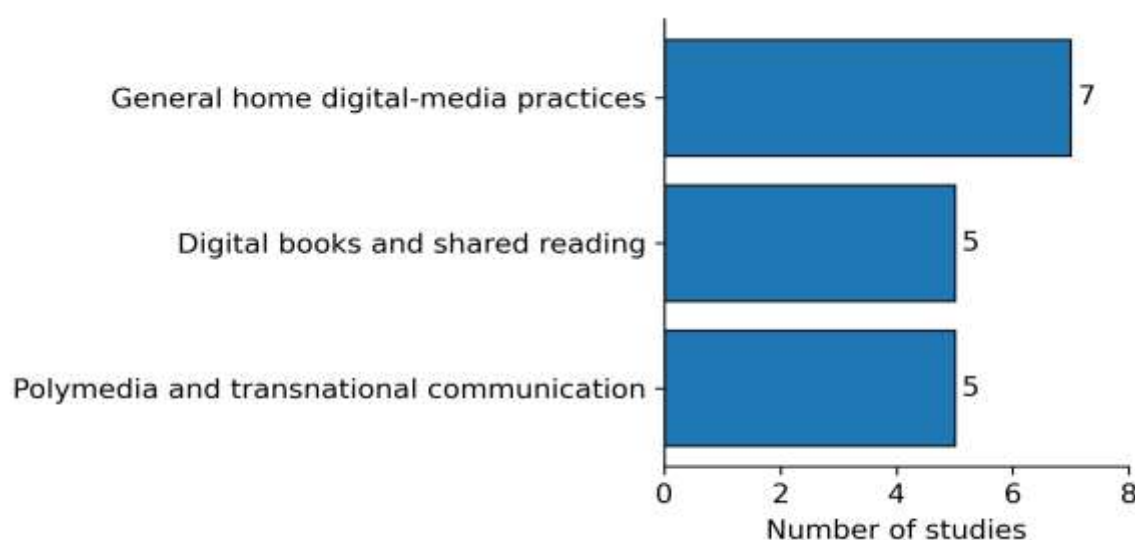
The four intervention studies offered more direct evidence, though their reach was constrained by small samples and brief treatment periods. Sample sizes ran from 14 children to 107 parent–child dyads. None conducted a delayed unaided post-test to determine whether gains in vocabulary, comprehension, or narrative ability persisted once the technological support was removed. The evidence therefore supports conclusions about immediate interactional opportunities more strongly than conclusions about sustained bilingual development.

4.3 Technology-Enhanced Practices and Parental Mediation

The first research question examined the digital practices used by bilingual families and the ways parents mediated children’s participation. Three broad clusters were identified: general home digital-media practices, digital shared reading, and polymedia or transnational communication. Their numerical distribution is presented in Figure 3.

Figure 2

Principal Technology Focus Across the Core Corpus



Note. Each study was assigned to one dominant technology cluster for descriptive reporting; studies could contribute to multiple mediation, outcome, and contextual themes.

4.3.1 General Home Digital-Media Practices

Seven studies, representing 41.2% of the corpus, investigated multiple forms of home media. These included television, online videos, tablets, streaming services, educational applications, music, digital games, e-books, and video calls.

The studies showed that bilingual families did not encounter equivalent digital environments in each language. In Singapore, Sun et al. (2022a) used data from 141 bilingual children to develop the QQ-MediaSEED questionnaire, which measured the quantity and quality of digital-media use, social participation, content design, and parental mediation. The results revealed differences between children's English and mother-tongue media environments. A related study of 162 English–Mandarin families found that digital materials became more common during the COVID-19 period, although English resources still outnumbered Mandarin resources. Resource distribution varied by socioeconomic status as well. Families with greater resources described richer conventional literacy environments, while families with fewer resources depended relatively more on digital materials. In Luxembourg, researchers assessed questionnaire responses from 209 multilingual families (Obojska & Vaiouli, 2025). Parents often utilized educational applications, videos, and online games for language and literacy development. Digital media was generally viewed as easy-to-use resources by parents who were concerned with how long children spend using screens, age-appropriate activities, and the quality of media. Researchers interviewed 34 Turkish–Australian parents of young children (Ozturk & Ohi, 2026). Close to three quarters of preschool-aged children were using tablets multiple times weekly. Children and parents sang with digital devices, called relatives, or watched videos online more frequently than reading e-books together. Five multilingual families living in Azerbaijan were longitudinally tracked for 15 months (Savadova & Gillen, 2026). Language brokering behaviour included parents turning to digital resources to promote their children's multilingual futures, while also limiting their children's access due to fears over their well-being and too much screen time. Both forms of mediation coexisted.

4.3.2 Digital Shared Reading

Five studies (29.4%) focused on digital books, interactive stories, multilingual e-books, or conversational agents delivered as part of electronic reading activities. Shared reading with digital enhancements offered the most transparent benefits when specific technology features prompted parent–child conversation.

Mifsud et al. (2021) observed four Maltese–English families interacting during digital-book reading. Parents and children spontaneously produced both English and Maltese while reading together. Verbal interaction included explanation, elicitation, making connections to experiences, child-directed speech, and instructional supports.

Yang et al. (2022) randomized 64 parent–child pairs to receive bilingual discussion prompts and 43 pairs to read the same story digitally without prompts. Children who received prompts showed significantly better story comprehension and retelling abilities than those who did not, while both groups had similar gains in English vocabulary. Prompts influenced deeper narrative processing more obviously than learning individual words.

Tunkiel and Bus (2022) did not observe a significant benefit of reading a digital story aloud in Polish prior to rereading it in Norwegian with 14 Polish–Norwegian bilingual children. Presentation of the material in

the home language alone did not enhance children's second-language learning without additional repetition, engagement, or scaffolding.

Bus et al. (2023) randomly assigned 41 bilingual students to receive Dutch-only or multilingual digital books to take home. Simply providing children with digital books in the heritage language did not significantly increase their home reading practice as expected. Access to the books was therefore not enough without caregiver involvement, buy-in, and inclusion into daily life.

He et al. (2025) piloted a bilingual conversation agent with 15 Spanish–English speaking families for one week. The technology promoted bilingual oral engagement, parent–child communication, and use of Spanish words. Rather than standing alone as independent instruction, its main benefit was facilitating co-engagement between family members.

4.3.3 Polymedia and Transnational Communication

Five studies, accounting for 29.4% of the corpus, examined messaging, social media, video calls, online communication with relatives, or interconnected combinations of platforms. These practices were associated more frequently with heritage-language use, family relationships, identity, and intergenerational participation than with standardised developmental outcomes.

Said (2021) examined two multilingual families in the United Kingdom and found that parents used digital technology to expand children's heritage-language environments and involve geographically distant relatives in everyday communication.

Palviainen and Räisä (2023) surveyed 1,002 children attending Swedish-medium schools in Finland. Texting was the most frequently reported family application practice. Languages other than Finnish and Swedish were used in 17% of the participating families, although children were less likely to write digitally in languages with limited educational support or unfamiliar writing systems.

Wang and Hamid (2024) interviewed 15 Chinese–Australian parents. Digital polymedia supported Chinese-language use, cultural affiliation, and family intimacy, but parents also reported children's resistance, unsuitable content, and concerns about excessive media engagement.

Romanowski (2025) examined digital communication involving three Polish–Australian fathers, each communicating with two school-age children through Messenger over three months. Code-switching supported clarification, humour, relational closeness, and continued Polish participation. Mixed-language communication therefore sometimes functioned as interactional scaffolding rather than evidence of complete heritage-language displacement.

4.4 Relationships with Child Language Development

The second research question addressed the relationship between parental mediation, technology-enhanced practices, and children's language outcomes. The evidence did not demonstrate a uniformly beneficial or detrimental technological effect. Instead, developmental opportunities varied according to whether digital activities promoted passive exposure or contingent interaction.

Passive and background media exposure was associated with fewer child vocalisations and conversational turns in the two naturalistic recording studies. In contrast, practices requiring children to answer questions, retell stories, communicate with relatives, or participate in shared reading produced more favourable opportunities for expressive language use.

Vocabulary results were inconsistent. The bilingual conversational-agent study reported positive Spanish vocabulary development, whereas bilingual discussion prompts did not produce vocabulary gains beyond the comparison condition. Reading a digital storybook first in Polish also did not boost children's Norwegian vocabulary significantly. These variations suggest vocabulary learning results from multiple exposures, opportunities for production, corrective feedback, previous proficiency levels, and whether the technology's features aligned with what researchers tested.

Improvements were more consistent for story comprehension and retelling. Conversational prompts helped children make sense of and retell stories in bilingual books, while joint digital reading asked children to explain and predict story events and relate them to personal experiences. However, studies only looked at short-term results.

Findings on literacy and biliteracy skills were more preliminary. Digital books, subtitles, family text messages, and app-mediated communication gave kids opportunities to read and write, but studies seldom directly evaluated children's literacy skills in both languages. Heritage- language maintenance was often implied by access to and self-reported use of technology, family involvement, and frequency of communication instead of longitudinal proof of proficiency.

4.5 Contextual Moderators and Research Gaps

Our third research question asked how technology-enhanced practices are conditioned or influenced. Child's age, bilingual skills and agency, socioeconomic status, parental ideology, language status and resource availability were a few of the conditions we identified.

Digital content commercially available often included more societal-language input than heritage language. This imbalance was particularly salient in the case of English–Mandarin families living in Singapore. Parents who supported languages with fewer commercially available resources also reported difficulty finding materials that were culturally appropriate, developmentally suitable, and interesting for their children.

Child preferences affected the home digital ecology: selection, acquiescence, negotiation, or refusal of parents' efforts. Heritage-language apps and programs were used inconsistently when children perceived them as old-fashioned, overly didactic, or irrelevant to their interests. Family members may mediate their children's language development more sustainably when enabling the child's desired language skills serves a pragmatic purpose in genres, platforms, or styles of communication that matter to children.

Parents and children differed in the resources they had at their disposal. Socioeconomic status influenced not only possession of technology devices but connectivity, subscriptions, hard-copy materials, time available to parents, and technological literacy. The so-called digital divide was demonstrated at multiple levels: possession of communication devices, quality of language content available, and families' ability to support children's productive use of technologies.

We found three gaps. Of our 17 studies, only half directly measured children's language behavior or proficiency; the rest were primarily focused on parents' reported practices, beliefs about mediation, strategies, or other experiences.

None of our four intervention- or technology-design studies followed children's progress beyond the initial study period. Together, they still leave us wondering whether vocabulary acquisition, story comprehension,

or improved narrative skill with digital support translates into children's ability to communicate effectively when the technological supports are removed.

Finally, In addition, the research corpus is focused on relatively few language groups and global regions. 16 of our 17 studies took place across Europe, Asia, North America, or Australia. One looked at bilingual Russian-German children but sampled from a transnational diaspora; we located no verified studies from Africa, South America, or the Arab region.

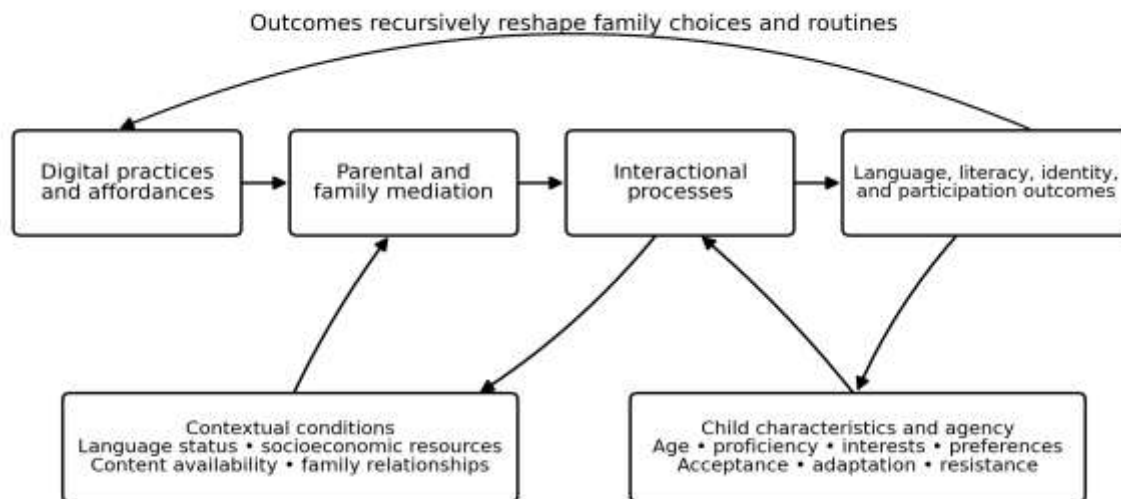
Similarly, family members' participation in children's digital experiences was not balanced. One study looked exclusively at father-child Medias; only a handful investigated grandparents, siblings, or extended family members as agents of children's digital language exposure. Finally, because 12 of our studies focused on young children, we know less about technology-enhanced learning and use among older children and adolescents.

4.6. Integrated Practice–Mediation–Context–Outcome Framework

Here we present an Integrated Practice–Mediation–Context–Outcome Framework that evolved from our analyses. It is represented visually in Figure 3, with selected examples of each component operationalised in Table 3. Contexts and parental decisions funnel down into home routines and practices. As noted earlier, practices and outcomes are recursive.

Figure 3

Recursive Practice–Mediation–Context–Outcome Framework



Note. Digital affordances are not treated as direct causes of development. Their effects are mediated through interactional processes and conditioned by language status, resources, family relationships, child proficiency, and agency. Outcomes recursively reshape subsequent choices and routines.

Table 3*Integrated Practice–Mediation–Outcome Synthesis*

Digital practice	Principal mediation strategies	Main developmental opportunities	Main risks or limitations
Digital shared reading	Co-reading, questioning, translation, explanation, prediction, feedback	Vocabulary exposure, comprehension, retelling, emergent literacy	Distracting features, insufficient repetition, short-term assessment
Streaming and online video	Content selection, co-viewing, discussion, repetition	Receptive input and cultural exposure	Passive use may displace conversation
Educational applications and games	Selection, instruction, monitoring, modelling	Vocabulary practice, engagement, early literacy	Uneven quality and limited evidence of independent transfer
Video calls	Organisation, prompting, translation, encouragement	Oral interaction, heritage-language use, family relationships	Participation depends on proficiency and relatives' responsiveness
Messaging and social media	Modelling, monitoring, code-switching, written feedback	Literacy practice, identity, transnational participation	Societal-language dominance and safety concerns
Conversational agents	Joint use, prompts, correction, discussion	Verbal engagement and short-term vocabulary learning	Small samples, brief interventions, no delayed testing
Multiple-platform polymedia	Flexible language management and platform selection	Heritage-language access, cultural affiliation, family intimacy	Parental uncertainty, child resistance, excessive use

Note. The table summarises recurring patterns rather than causal effects. Individual studies could contribute to more than one row.

In sum, the results suggest a practice–mediation–context–outcome model. Technology affords multilingual input, audiovisual scaffolding, repetition and retrieval practice, digital skills development, and contact with remote speakers. However, these affordances do not automatically lead to development. Much depends on how parents mediate technology use; the language(s) and quality of the content; children's proficiency and sense of agency; family dynamics; socioeconomic means; and each language's status in society.

When children actively discussed concepts, read with others, asked and answered questions, translated and explained language, and communicated with engaged speakers, they were provided richer opportunities for language development than by mere exposure. However, given the limited number of studies assessing direct outcomes, we cannot yet say which mediation practices lead to long-term gains for which language combinations and in what sociocultural contexts.

5. Discussion

5.1 Interaction-Generating and Interaction-Displacing Technology Use

Five studies focused on general home digital-media use; 8 described digitally supported shared book reading; and 4 explored polymedia practices or transnational communication. Overall, children gained opportunities to hear their heritage language as well as the dominant societal language. However, bilingual outcomes were not uniformly positive or linked directly to device usage. Developmental benefits instead depended on content quality, degree of adult engagement, child involvement, and placement within larger family routines.

We view this as indication that the important distinction is between interaction-displacing and interaction-generating digital use. Language-screen time created opportunities for children to interact with parents when caregivers asked about digital content, responded to children's questions or comments, translated unknown words or passages, retold stories with young children, or exchanged messages with supportive relatives. Language-screen time displaced interaction when it replaced dialogue, joint reading, or child-

directed conversation. Taylor et al.'s (2024) meta-analysis reaches a similar conclusion. The researchers reported a weak yet statistically significant positive correlation between adult-child digital co-use and learning outcomes, though they cautioned that small samples and study homogeneity limit generality.

The distinction might also explain why studies reported mixed effects on language outcomes. Passive exposure and background use gave children less opportunity to speak. Digital storybook reading and interactive communication pushed them toward comprehension, retelling, and verbal interaction. New evidence suggests that children's linguistic and pragmatic skills may be predicted more accurately by content quality and parental mediation tactics than by cumulative screen time (Toth et al., 2026). Conversely, one exploratory investigation linked greater digital-media exposure with poorer expressive-language skills among 237 Portuguese preschool children. This association held when children spent more screen time or failed to balance media activity with conversation (Monteiro et al., 2024).

Screens may be used competitively or collaboratively. For this reason, we do not endorse screen time as a meaningful variable of bilingual language development. Two children may spend the same time on tablets while encountering different languages and communicative opportunities. Screens alone while watching television programmes in the societal language. The other child could read caregivers could scaffold vocabulary and send messages to grandparents in the heritage language. Future research should therefore centre the mediated episode. What language was used? What was its purpose? Was the experience interactive? Who else was involved? How much time was spent? How did the digital experience connect to conversations and interactions offline?

Parental mediation served multiple purposes and took varied forms. Families navigated devices and selected media just as they made language choices, supervised children, explained words, modelled interaction, initiated conversations, enforced limits, checked backgrounds, and facilitated family chats. Mediation bridged the cognitive, cultural, and moral objectives associated with each of those activities. For bilingual families in particular, those choices bore explicit language implications.

Parental mediation can overlap with conceptualisations of family language policy. Traditionally, researchers have defined active mediation, co-use, supervision, and restriction as separate constructs. However, family decisions about mediation are embedded in family language policy. Parents select certain media in language-specific ways; others they avoid. They may coax children into messaging grandparents or translate app instructions. Each decision makes available specific languages for learning and communicating. Digital mediation, we propose, should be studied as an enactment of bilingual family language policy rather than treated as isolated technology management strategy.

Separate findings from Amman highlight similar concepts. Alkouri and Aldhafeeri (2026) surveyed parents of young children about their technology habits. Results suggested that most caregivers implemented passive mediation strategies, such as rules regarding digital-device usage and time limits. Few parents actively managed their children's engagement with digital content via co-viewing or discussion. As such, the authors urged greater emphasis on mediation instead of restriction. Though their study did not focus exclusively on bilingual families, it addresses bilingual development in important ways. Limiting screen time or device access does not equal mediating language learning.

Mutual trust and understanding between parent and child may also influence digital mediation. Positive parent-child relationships were associated with digital parental awareness in a recent study by Toran et al. (2024). Digital parental awareness included both appropriate technology usage and protection from digital-

risk behaviours. Digital negligence and negative parental modelling, by contrast, were linked to less favourable ones. This evidence suggests that parents' own technology practices influence the interactional environment in which children encounter language. The linguistic value of a digital activity may therefore be reduced when parents are physically present but distracted, unresponsive, or engaged with their own devices.

Our findings consequently challenge the classification of families as simply restrictive, permissive, or active. The same parent may restrict entertainment content, encourage a heritage-language video call, jointly read an electronic book, and permit independent use of an educational application. Mediation changes across activities, children's ages, language proficiencies, and immediate family circumstances. This fluidity corresponds with Sanjani et al.'s (2025) argument that plurilingual family language policies should be conceptualised along a continuum rather than through fixed and mutually exclusive categories.

5.3 Digital Shared Reading and Interactional Design

Digital shared reading generated the clearest evidence of immediate developmental benefits in the reviewed corpus. Bilingual prompts, parental questioning, translation, explanation, and conversational-agent support were associated with stronger engagement, story comprehension, retelling, or short-term vocabulary learning. However, making digital books available in two languages alone did not reliably increase how often children read or improve their vocabulary. These results also highlight the distinction between access alone versus purposeful engagement resulting in pedagogical value.

Additional research aligns with these conclusions. Taylor et al. (20 24) found that adult-child co-use was positively associated with learning from digital media, although effect sizes were small. Kalil et al. (20 26) recently ran a randomised trial lasting 11 months with 289 families from low-income communities. Providing a tablet with access to a dedicated digital library increased children's language abilities by 0.29 standard deviations. Benefits were significantly higher for kids with lower baseline language abilities. This device only allowed access to a reading application, which may have decreased distractions from other forms of media available on general-purpose tablets.

While this may seem contradictory to the conclusion earlier in this section that simple access is ineffective on its own, we would highlight the difference in how the interventions were designed. The researchers did not simply give families tablets; instead, children were given over 200 books on a device dedicated to reading for several months. Access in this study was a prolonged engagement with rich language rather than just the tablet itself. Future work should consider specifying the type of media accessed, what other platforms are available for use, what languages are available for the child, and the duration of the access period rather than grouping all types of "tablet access" or "app access" together.

Similarly, exposing children to new words is not the same as learning them. Jointly reading digital books and answering wh-questions can aid vocabulary acquisition if children learn and begin using new words actively. Exposure to novel vocabulary alone will not ensure kids remember those words. Much like learning to read, children must meet high-frequency words regularly in oral language before they can read them on a page (Wagner et al., 2006).

Integrating these media into children's daily routines requires support, which aligns with research on family literacy practices. Breeze and Halbach (20 24) outlined four major qualities of successful family-literacy programs: fostering family involvement, ensuring accessibility of materials and messages, being responsive to language differences, and promoting partnerships between families and educators. Translated

into terms of digital reading, these findings advocate for digital materials to be paired with strategies for caregivers to help them facilitate conversation about stories, relate narratives to their lived experiences, and motivate children to speak both languages through play and daily life.

5.4 Digital Homescapes, Transnational Literacy Practices, and Children's Agency

Children also used video chats, messaging apps, social media, and combinations of these platforms to learn from and meaningfully communicate with parents, extended family members, and friends. Time spent reading or browsing offered children a chance to ask questions, receive explanations, and broaden their understanding through digital reading.

All five studies focused on polymedia use found that children think about and use their heritage languages more often when they engage in transnational communication. Using a heritage language regularly with native speakers helped children develop larger vocabularies and become more skilled language users. Using digital media for transnational communication gave children more opportunities to use their heritage languages.

While we focused on two primary outcomes of polymedia use (heritage-language development and literacy learning), we observed multiple benefits of children's transnational digital communication. For children participating in our studies, transnational communication strengthened family relationships, increased their exposure to different dialects and cultures, and boosted their interest in continuing to learn and use their heritage languages.

Researchers have begun to describe these multi-dimensional spaces as digital homescapes. Yu and Curdt-Christiansen (2026) explored how Chinese-speaking immigrant families in Germany created digital home-language literacy environments through story machines, children's apps, smart speakers, instant messaging, and other digital tools. Their findings demonstrate that digital tools acquire meaning through their physical placement, family routines, parental ideologies, and children's preferences. Technology is therefore not an external intervention added to family life; it is part of the material and symbolic environment through which family languages are organised.

We argue that heritage-language maintenance should consequently be evaluated through more than exposure frequency. Digital communication may sustain relational motivation even when children's productive proficiency remains limited. A child who sends mixed-language voice messages to a grandparent may not demonstrate balanced bilingual proficiency, but the interaction can preserve an emotional reason to continue using the heritage language. Such practices may become foundations for later development, particularly when adults accommodate children's proficiency without abandoning the heritage language altogether.

Nevertheless, the reviewed studies generally inferred heritage-language maintenance from access, frequency of use, parental reports, or continued family communication. Few measured proficiency longitudinally. The evidence can therefore establish that technology creates opportunities for heritage-language participation, but it cannot yet determine whether these practices prevent attrition or produce sustained literacy over several years. Future research should distinguish among digital exposure, interaction frequency, language choice, measured proficiency, cultural identification, and long-term maintenance.

The results also demonstrate that children are not passive recipients of parental plans. They choose the platforms and programmes they want, push back against heritage-language materials they find unappealing, move between languages, and help determine whether family practices continue. Parental mediation is

therefore only partly effective when digital activities fail to match children's interests, identities, and developing competence.

Zhan (2025) supports this interpretation, arguing that multilingual children should be recognised as co-makers and co-managers of family language practices. Their literacy activities may include private writing, social communication, research, emotional expression, and teaching languages to parents or peers. Through digital literacy, children can also initiate practices that adults previously organised for the most part.

Borghetti et al. (2025) similarly found that children's stated language preferences shaped their parents' family-language practices, while social actors outside the family and ideological pressures sometimes prompted increased use of the majority language. This supports our conclusion that family language policy emerges through negotiation among parents, children, schools, communities, and media environments, rather than being imposed solely by adults.

Evidence from Saudi families who returned after living abroad points to a similar conclusion. Alzeer (2026) found that parents' commitment to bilingualism alone did not determine their children's language outcomes. What mattered was the interaction of school language, children's proficiency and agency, and Arabic's dominance after the families returned to Saudi Arabia. For the present review, this is especially significant: digital support at home functions within a broader institutional setting. Even intensive mediation by parents may not be enough when schools, peers, and public life consistently favor one language.

We therefore resist interpreting code-switching or children's preference for the societal language as automatic evidence of failed parenting. Strategic language mixing may support comprehension, maintain participation, and prevent communication from breaking down. However, flexible bilingual practice should not become an unexamined pathway through which the societal language continually replaces the heritage language. Longitudinal interactional research is required to distinguish code-switching that scaffolds heritage-language participation from code-switching that accompanies progressive language displacement.

5.5 Socioeconomic, Linguistic, and Developmental Inequalities

The reviewed evidence showed that technology-enhanced language practices were shaped by socioeconomic resources, parental digital literacy, available time, internet access, subscription costs, and the commercial visibility of each language. The digital divide should therefore be understood as a difference in the quality and mediability of digital resources, not merely in device ownership.

Families maintaining commercially dominant languages can generally access more electronic books, applications, subtitles, automated speech tools, and age-appropriate audiovisual materials. Parents supporting lower-resource languages may depend on informal videos, user-generated materials, or communication with relatives. Even when devices are available, families may still struggle to find high-quality content suited to children's proficiency and interests. The inequality that follows is not only technological; it is also linguistic, cultural, and pedagogical.

In their study of 1,894 Chinese adolescents, Lou et al. (2024) found that parental education, family circumstances, and mediation strategies were associated with adolescents' digital literacy. Active mediation and supervision had a positive association with digital literacy, suggesting that parental guidance can narrow resource-related differences, though it cannot remove them. The findings also indicate that mediation remains relevant beyond early childhood, when it is likely to become more negotiated and supportive of adolescents' autonomy.

Kalil et al. (2026) nevertheless found that thoughtfully designed home technology may narrow certain developmental inequalities. The digital-library intervention helped most when children began with weaker language skills. This suggests that digital provision can compensate for existing disadvantages when resources are curated, maintained, accessible, and tied to a specific developmental activity. Simply providing children with devices, without appropriate linguistic content or family supports, will likely not lead to similar outcomes. Importantly, the geographical distribution of studies included in the corpus further magnifies this concern. 16 out of 17 studies were conducted in European, Asian, North American or Australian contexts; no study originated from Africa, South America or Arab countries. Consequently, our evidence-base mostly reflects outcomes for families with relatively high levels of connectivity and institutional resources, and access to commercially-supported languages. To begin addressing this gap in Arab communities, Alkouri and Aldhafeeri' (20 26) study investigated language choice in Jordanian homes; much more research is needed in African, Arab, Indigenous, refugee, and resource-scarce multilingual contexts. Finally, the age-range of children included in this review limits its developmental scope: 12 out of 17 studies involved children under roughly age seven. During this period, young children depend on adults for mediators to engage in co-use (e.g., joint attention, repetition, and instant feedback). By contrast, adolescents and older children decide more on their own what platforms to use, with whom to communicate (and how privately), and what language(s) to use. Parental mediation is therefore likely to evolve from direct involvement to discussion, supervision, establishment of family rules around digital media, guidance around digital literacy, and support for autonomous decision-making. Some work with adolescent populations supports this hypothesis: Lou et al. (20 24) found that active mediation and supervision were both positively related to adolescents' digital literacy. By contrast, co-use did not show a similar positive trend when the different dimensions of mediation were investigated together. Zhao et al. (20 26) reached similar conclusions in their study of primary- and secondary-school students: the quality of parent-child relationships mediated the associations between parental mediation and use of digital devices. In other words, approaches to co-use that benefit young children cannot be assumed to work with older children and teens. Correlational research with bilingual adolescents is beginning to explore how parental mediation relates to children's language practices and daily lives (Crafter et al., 2020; Dawil et al., 2021). However, more longitudinal research is needed on how parental mediation and children's autonomy change during development. Studies could, for instance, investigate how responsibility for language choice evolves across childhood and adolescence—including decisions around content, safety, and how to maintain family relationships. Adolescents' private message exchanges, digital communities, video games, and creative practices may also provide important opportunities to use the heritage language in ways that differ from joint book-reading, for example.

5.6 Methodological Priorities for Future Research

The methodological conclusions themselves warrant caution. Only six out of 17 studies focused on children's language behavior or performance; others concentrated primarily on parental reports, beliefs, practices, or family experiences. All four intervention or technology-design studies were conducted over the short term, and none used a delayed unaided assessment. Therefore, the conclusions we can draw about digital practices are stronger than those about promoting lasting language development; the evidence is more persuasive when describing digital opportunities for interaction than when assessing long-term language development.

We need longitudinal studies that shadow families over time and that include multiple forms of evidence: objective logs of device usage, recordings of parent–child interaction, interviews with various family members, young children’s own accounts, and standardized assessments in both the heritage language and societal language. Also, we need to look at outcomes beyond children’s immediate performance while supported and include delayed unaided measures of vocabulary, narrative production, oral interaction, reading, and writing. Taylor et al. (20 24) similarly identified small sample sizes and a lack of methodological variety as critical limitations in the literature on adult–child digital co-use. Three-group designs would be particularly informative. Researchers could compare passive or independent digital exposure, parent-mediated digital use, and comparable non-digital interaction. Such designs would clarify whether observed benefits arise from the technology, adult scaffolding, increased exposure, or the combined activity. Researchers should also record intervention fidelity, including whether parents used prompts as intended, how often children accessed the resource, and which language was actually used. Greater consistency is also needed in operationalising parental mediation. Categories such as active mediation, co-use, restriction, monitoring, translation, and language management frequently overlap. We propose that studies report the observable behaviours occurring within each activity rather than assigning families to a single general mediation style. This approach would enable the field to identify which combinations of questioning, explanation, modelling, translation, feedback, and child choice are associated with particular outcomes.

5.7 Theoretical and Practical Implications

The review contributes a practice–mediation–context–outcome framework for explaining technology-enhanced home language development. We propose that the model should be understood as recursive rather than linear. Technology affords particular forms of input and interaction; parents mediate those affordances; children respond through participation, adaptation, or resistance; and these responses subsequently reshape parental choices and family routines.

Two constructs are especially important within this model. The first is interactional intensity, referring to the extent to which a digital activity elicits contingent, sustained, and cognitively meaningful communication. The second is linguistic alignment, referring to the correspondence among the language of the technology, the family’s language objectives, the child’s proficiency, and the language used during interaction. A highly interactive application may provide limited heritage-language benefit when its content and discussion occur mainly in the societal language. In contrast, exposure to HL content may not be productive if children are passively watching without comprehension or engagement. Implications for parents and educators. We conclude with some thoughts on how parents, educators, and technology creators can best support children’s bilingual language development through technology. Rather than recommending prescriptive rules about screen-time, families would benefit from guidance around the type of activities children engage in: selecting developmentally appropriate content in the languages children speak, asking open-ended questions, encouraging children to recall events rather than simply watching, connecting digitally based content to offline activities and concepts, and setting up authentic conversations with family members. Technology designers can support this process by embedding flexible bilingual supports, designing culturally sensitive content, creating streamlined interfaces with minimal distractions, and building features that invite adult participation rather than replacing it. Creators and policy makers should also focus attention on lower-resource languages, which are greatly underserved by existing

commercial products. In sum, we believe that technology will have its greatest impact when it supports the interactions through which children learn, use, and think about language. In the case of bilingualism, technology can help by expanding—not replacing—who can meaningfully participate across different languages, generations, and places.

5.8 Limitations of the Review

One limitation is the corpus' limited evidentiary basis. Although we bibliographically and substantively checked all 17 included core studies, the original search exports and screening archive were unavailable. Therefore, we cannot assess the sensitivity of our search nor prove it identified all eligible studies. Studies also varied on populations, language pairs, technologies, and outcome measures used, preventing a pooled estimate of effects. Another limitation is within the evidence. Studies typically focused on practices or parental perceptions rather than children's language development itself. The four interventions were short term, and none included delayed testing without assistance. The framework therefore points to plausible mechanisms and recurring associations, but it should not be read as a causal model. Its propositions still require prospective testing in more geographically and linguistically diverse contexts.

6. Conclusion

This integrative review examined how digital technologies, parental mediation, and contextual conditions intersect in bilingual family language development. Across 17 verified empirical studies, technology expanded access to heritage and societal languages through digital books, applications, audiovisual media, messaging, video calls, and transnational communication. Yet access alone was insufficient. The most favourable opportunities for vocabulary, narrative comprehension, oral participation, literacy, and heritage-language use occurred when digital activity generated contingent interaction through co-use, questioning, explanation, translation, modelling, feedback, and communication with responsive relatives. Passive or background exposure was more likely to displace conversational participation. The proposed practice–mediation–context–outcome framework therefore positions parental mediation as digital family language policy and treats child agency, language status, resource inequality, and content availability as constitutive rather than peripheral factors. Because direct developmental evidence remains limited and short term, future research should use longitudinal, multi-method designs with delayed unaided assessment in both languages. Technology is most educationally valuable when it strengthens human relationships, active language production, cultural belonging, and sustained participation across generations and locations.

Ethical Approval

Not applicable. This review analysed published research and involved no primary data collection from human participants or animals.

Data Availability

All evidence analysed in this review is contained in the cited publications. The characteristics and coding basis of the 17-study core corpus are reported in Appendix A.

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References

1. Alkouri, Z., & Aldhfeeri, F. J. (2026). Parental mediation of smart device use and its impact on language development in early childhood. *Scientific Reports*, 16, Article 8209. <https://doi.org/10.1038/s41598-026-38833-9>
2. Alzeer, S. N. (2026). Family language policies: Managing children's language development in sojourning Saudi families after returning to Saudi Arabia. *Journal of Multilingual and Multicultural Development*, 47(4), 2331–2345. <https://doi.org/10.1080/01434632.2025.2468777>
3. Bilgory-Fazakas, O., & Armon-Lotem, S. (2025). Resilient heritage language maintenance: The interplay of family, culture, and pragmatic choices. *Frontiers in Psychology*, 16, Article 1550704. <https://doi.org/10.3389/fpsyg.2025.1550704>
4. Borghetti, C., Cangelosi, M., & Bonifacci, P. (2025). Social and child-driven factors and actors influencing family language policy and heritage language maintenance. *Journal of Multilingual and Multicultural Development*. Advance online publication. <https://doi.org/10.1080/01434632.2025.2494647>
5. Bose, P., Gao, X., Starfield, S., Sun, S., & Ramdani, J. M. (2023). Conceptualisation of family and language practice in family language policy research on migrants: A systematic review. *Language Policy*, 22, 343–365. <https://doi.org/10.1007/s10993-023-09661-8>
6. Bratlie, S. S., Grøver, V., Lekhal, R., Chen, S., & Rydland, V. (2025). Home literacy environment, language use, and proficiency: Bilingual profiles in young learners. *Journal of Applied Developmental Psychology*, 96, Article 101728. <https://doi.org/10.1016/j.appdev.2024.101728>
7. Breeze, R., & Halbach, A. (2024). Families, language, and equal opportunities: Identifying good practices in family literacy projects. *Early Childhood Education Journal*, 52, 693–703. <https://doi.org/10.1007/s10643-023-01469-9>
8. Bus, A. G., Broekhof, K., & Vaessen, K. (2023). Free access to multilingual digital books: A tool to increase book reading? *Frontiers in Education*, 8, Article 1120204. <https://doi.org/10.3389/feduc.2023.1120204>
9. Curdt-Christiansen, X. L., Wei, L., & Hua, Z. (2023). Pride, prejudice and pragmatism: Family language policies in the UK. *Language Policy*, 22(4), 391–411. <https://doi.org/10.1007/s10993-023-09669-0>
10. Cycyk, L. M., & De Anda, S. (2021). Media exposure and language experience: Examining associations from home observations in Mexican immigrant families in the US. *Infant Behavior and Development*, 63, Article 101554. <https://doi.org/10.1016/j.infbeh.2021.101554>
11. Ferjan Ramírez, N., Hippe, D. S., & Lindekugel, K. (2022). Electronic media and social features of language input in bilingually raised Latinx infants. *Infant Behavior and Development*, 68, Article 101740. <https://doi.org/10.1016/j.infbeh.2022.101740>
12. Goodall, J., Flewitt, R., El Gemayel, S., Arnott, L., Dalziell, A., Gillen, J., Savadova, S., Timmins, S., Liu, M.-C., & Winter, K. (2025). Parental mediation of very young children's early experiences with digital media at home. *Educational Review*. Advance online publication. <https://doi.org/10.1080/00131911.2025.2579531>
13. Guskaroska, A., & Elliott, T. (2022). Heritage language maintenance through digital tools in young Macedonian children: An exploratory study. *Diaspora, Indigenous, and Minority Education*, 16(4), 227–233. <https://doi.org/10.1080/15595692.2021.1907329>

14. He, K., Cervera, K., Levine, J., Xu, Y., Collins, P., & Warschauer, M. (2025). Promoting parent–child shared reading with a bilingual conversational agent. *International Journal of Human–Computer Studies*, 199, Article 103489. <https://doi.org/10.1016/j.ijhcs.2025.103489>
15. Kalil, A., Liu, H., Mayer, S. E., Rury, D., & Shah, R. (2026). A digital library for parent–child shared reading improves language skills for young disadvantaged children. *European Economic Review*, 186, Article 105323. <https://doi.org/10.1016/j.euroecorev.2026.105323>
16. Krajka, J., & Gabryś-Sławińska, M. (2022). Heritage language long-distance acquisition in remote areas—Implementing telecollaboration in social media to increase exposure to Polish language and culture. *Roczniki Humanistyczne*, 70(10), 111–125. <https://doi.org/10.18290/rh227010.7>
17. Little, S. (2020). Social media and the use of technology in home language maintenance. In A. C. Schalley and S. A. Eisenclas (Eds.), *Handbook of home language maintenance and development: Social and affective factors* (pp. 257–273). De Gruyter Mouton. <https://doi.org/10.1515/9781501510175-013>
18. Lou, J., Wang, M., Xie, X., Wang, F., Zhou, X., Lu, J., & Zhu, H. (2024). The association between family socio-demographic factors, parental mediation and adolescents’ digital literacy: A cross-sectional study. *BMC Public Health*, 24, Article 2932. <https://doi.org/10.1186/s12889-024-20284-4>
19. Madigan, S., McArthur, B. A., Anhorn, C., Eirich, R., & Christakis, D. A. (2020). Associations between screen use and child language skills: A systematic review and meta-analysis. *JAMA Pediatrics*, 174(7), 665–675. <https://doi.org/10.1001/jamapediatrics.2020.0327>
20. Mifsud, C. L., Georgieva, R., & Kucirkova, N. (2021). Parent–child joint reading of digital books in bilingual families in Malta. *International Journal of Educational Research*, 109, Article 101844. <https://doi.org/10.1016/j.ijer.2021.101844>
21. Monteiro, R., Ferreira, S., Fernandes, S., & Rocha, N. (2024). Does digital media use contribute to decreased expressive language skills of pre-school-aged children? An exploratory study in Portuguese children. *Somatosensory & Motor Research*, 41(4), 176–182. <https://doi.org/10.1080/08990220.2023.2191702>
22. Obojska, M. A., & Vaiouli, P. (2025). Digital media as language and literacy learning spaces in multilingual families: Survey results from Luxembourg. *International Journal of Multilingualism*, 22(2), 303–321. <https://doi.org/10.1080/14790718.2023.2293706>
23. Ozturk, G., & Ohi, S. (2026). Home digital literacy practices of bilingual pre-school children in Australia. *Journal of Early Childhood Research*, 24(1), 3–19. <https://doi.org/10.1177/1476718X251363718>
24. Palviainen, Å., & Räisä, T. (2023). Digital communication as part of family language policy: The interplay of multimodality and language status in a Finnish context. *Language Policy*, 22(4), 433–455. <https://doi.org/10.1007/s10993-023-09666-3>
25. Romanowski, P. (2022). Paternal agency in heritage language maintenance in Australia: Polish fathers in action. *International Journal of Bilingual Education and Bilingualism*, 25(9), 3320–3332. <https://doi.org/10.1080/13670050.2022.2050994>
26. Romanowski, P. (2025). Digitally mediated code-switching in transnational families in Australia: Fathers and children. *New Media & Society*, 27(1), 297–318. <https://doi.org/10.1177/14614448231174518>

27. Said, F. F. S. (2021). 'Ba-SKY-aP with her each day at dinner': Technology as supporter in the learning and management of home languages. *Journal of Multilingual and Multicultural Development*, 42(8), 747–762. <https://doi.org/10.1080/01434632.2021.1924755>
28. Sanjani, M. I., Gusdian, R., Inayati, N., & Hatoss, A. (2025). Conceptualising a continuum of plurilingual family language policy: A systematic literature review. *Journal of Multilingual and Multicultural Development*. Advance online publication. <https://doi.org/10.1080/01434632.2025.2504121>
29. Savadova, S., & Gillen, J. (2026). The complexity of parental mediation of young children's digital media use in a multilingual context: An investigation in Azerbaijan. *Journal of Early Childhood Research*. Advance online publication. <https://doi.org/10.1177/1476718X261430486>
30. Shin, W., & Lwin, M. O. (2022). Parental mediation of children's digital media use in high digital penetration countries: Perspectives from Singapore and Australia. *Asian Journal of Communication*, 32(4), 309–326. <https://doi.org/10.1080/01292986.2022.2026992>
31. Sun, H., Lim, V., Low, J., & Kee, S. (2022a). The development of a parental questionnaire (QQ-MediaSEED) on bilingual children's quantity and quality of digital media use at home. *Acta Psychologica*, 229, Article 103668. <https://doi.org/10.1016/j.actpsy.2022.103668>
32. Sun, H., Roberts, A. C., & Bus, A. G. (2022b). Bilingual children's visual attention while reading digital picture books and story retelling. *Journal of Experimental Child Psychology*, 215, Article 105327. <https://doi.org/10.1016/j.jecp.2021.105327>
33. Sun, H., Tan, J., & Chen, W. (2023). COVID-19 and bilingual children's home language environment: Digital media, socioeconomic status, and language status. *Frontiers in Psychology*, 14, Article 1115108. <https://doi.org/10.3389/fpsyg.2023.1115108>
34. Taylor, G., Sala, G., Kolak, J., Gerhardstein, P., & Lingwood, J. (2024). Does adult-child co-use during digital media use improve children's learning aged 0–6 years? A systematic review with meta-analysis. *Educational Research Review*, 44, Article 100614. <https://doi.org/10.1016/j.edurev.2024.100614>
35. Thomas, J., & Harden, A. (2008). Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Medical Research Methodology*, 8, Article 45. <https://doi.org/10.1186/1471-2288-8-45>
36. Toran, M., Kulaksız, T., & Özden, B. (2024). The parent-child relationship in the digital era: The mediator role of digital parental awareness. *Children and Youth Services Review*, 161, Article 107617. <https://doi.org/10.1016/j.childyouth.2024.107617>
37. Toth, C., Osser, B., Osser, G., Bondar, L. I., Fazakas, R., Pascalau, N. A., Suci, R. N., Toderescu, C. D., & Dogaru, B. G. (2026). Screen time, digital content quality, and parental mediation as predictors of linguistic and pragmatic development: Implications for pediatric and preventive health. *Children*, 13(1), Article 157. <https://doi.org/10.3390/children13010157>
38. Tunkiel, K. A., & Bus, A. G. (2022). Digital picture books for young dual language learners: Effects of reading in the second language. *Frontiers in Education*, 7, Article 901060. <https://doi.org/10.3389/feduc.2022.901060>
39. Wang, L., & Hamid, M. O. (2024). The role of polymedia in heritage language maintenance: A family language policy perspective. *Journal of Multilingual and Multicultural Development*, 45(10), 4139–4153. <https://doi.org/10.1080/01434632.2022.2142233>

40. Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546–553. <https://doi.org/10.1111/j.1365-2648.2005.03621.x>
41. Yang, D., Xia, C., Collins, P., & Warschauer, M. (2022). The role of bilingual discussion prompts in shared e-book reading. *Computers & Education*, 190, Article 104622. <https://doi.org/10.1016/j.compedu.2022.104622>
42. Yu, Y., & Curdt-Christiansen, X. L. (2026). Children's Chinese language and literacy learning in digital homescapes: A study of transnational Chinese-speaking families in Germany. *Journal of Multilingual and Multicultural Development*. Advance online publication. <https://doi.org/10.1080/01434632.2026.2671975>
43. Zhan, Y. (2025). Children's agency in literacy-based language practices: Rethinking the field of family language policy. *Journal of Multilingual and Multicultural Development*. Advance online publication. <https://doi.org/10.1080/01434632.2025.2551123>
44. Zhao, M., Zhu, J., Xu, J., Wang, L., Luo, T., & Song, S. (2026). How parental mediation relates to digital device use in primary and secondary school students: Evidence for the statistical mediation of parent–child interaction quality. *Frontiers in Psychology*, 17, Article 1811092. <https://doi.org/10.3389/fpsyg.2026.1811092>

Appendix A

Table A1

Characteristics of the 17 Core Studies

Study	Context and sample	Design	Principal technology or practice	Principal contribution to the synthesis
Cyck & De Anda (2021)	United States; 30 Mexican immigrant families with toddlers	Naturalistic home recordings	General digital-media exposure	Greater exposure was associated with fewer child vocalisations and conversational turns; no causal inference.
Mifsud et al. (2021)	Malta; 4 Maltese–English families	Video observation, questionnaires, interviews	Parent–child digital-book reading	Joint reading supported bilingual engagement, explanation, discussion, and experiential connections.
Said (2021)	United Kingdom; 2 multilingual families	Family case study and interaction recordings	Digital media and transnational communication	Technology expanded heritage-language environments and participation by distant relatives.
Ferjan Ramírez et al. (2022)	United States; 37 bilingually raised Latinx infants	Day-long audio recordings	Electronic-media exposure	Exposure was associated with reduced parentese, conversational turns, and infant vocalisations.
Guskaroska & Elliott (2022)	Macedonian diaspora; 23 parents	Phenomenological survey and follow-up interviews	Digital tools for heritage-language maintenance	Parents reported strong motivation but insufficient time, exposure, and engaging resources.
Sun et al. (2022a)	Singapore; 141 bilingual children/families	Questionnaire-development study	Home digital-media ecology	QQ-MediaSEED captured quantity, quality, social participation, design, and parental mediation across languages.
Tunkiel & Bus (2022)	Norway; 14 Polish–Norwegian children	Pilot digital-reading intervention	L1/L2 sequencing in digital stories	Reading first in Polish did not clearly improve Norwegian vocabulary; no delayed assessment.
Yang et al. (2022)	China/United States; 107 parent–child dyads completing the study	Randomised controlled mixed-methods study	Bilingual e-book discussion prompts	Prompts improved comprehension and retelling but not vocabulary beyond the comparison condition.
Bus et al. (2023)	Netherlands; 41 bilingual children	Home digital-book intervention	Dutch-only versus multilingual books	Heritage-language availability alone did not increase reading as expected; vocabulary growth was similar.
Palviainen & Räisä (2023)	Finland; 1,002 children aged 9–12	Exploratory questionnaire survey	Family messaging and app-mediated communication	Texting was common, but lower-status languages and unfamiliar scripts constrained digital writing.
Sun et al. (2023)	Singapore; 162 English–Mandarin families	Cross-sectional survey	Digital and conventional home language resources	English materials were more abundant; socioeconomic and language status shaped access.
Wang & Hamid (2024)	Australia; 15 Chinese–Australian parents	Qualitative interviews	Polymedia and heritage-language maintenance	Digital media supported Chinese use, affiliation, and intimacy but also produced resistance and content concerns.
He et al. (2025)	United States; 15 Spanish–English Latine families	One-week home technology-design study	Bilingual conversational agent in e-books	The agent stimulated bilingual dialogue and Spanish vocabulary use; no delayed unaided test.
Obojska & Vaiouli (2025)	Luxembourg; 209 multilingual families	Survey	Digital language and literacy practices	Applications, videos, and games were accessible learning spaces moderated by resources and parental concerns.
Romanowski (2025)	Australia; 3 Polish-speaking fathers and 6 school-age children	Three-month digital interaction analysis	Messenger and code-switching	Code-switching supported clarification, humour, relational closeness, and continued Polish participation.
Ozturk & Ohi (2026)	Australia; 34 Turkish–Australian parents of preschoolers	Survey	Home digital-literacy practices	Joint singing, video viewing, and calls were more frequent than shared e-book reading; parents requested guidance.
Savadova & Gillen (2026)	Azerbaijan; 5 multilingual families followed for 15 months	Longitudinal qualitative study	Home digital-media mediation	Facilitative and restrictive strategies co-occurred as parents balanced multilingual aspirations and well-being.

Note. Core studies met the population, family-context, technology, and language-related eligibility criteria. Contextual studies cited elsewhere in the manuscript were not included in these descriptive counts.