

# Curriculum Sustainability in Digital-Age Multilingual Education: A Teacher-Centred Evaluation

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## ABSTRACT

Digital transformation challenges language curriculum sustainability in multilingual societies where national languages must balance heritage preservation with global communication demands. This study evaluates Malay Language curriculum sustainability and transferability in Malaysian primary schools from teachers' perspectives, addressing how heritage language curricula remain relevant amid digital disruption and whether curriculum-acquired competencies transfer beyond classroom contexts. Utilizing the CIPP Model's product dimension, this qualitative case study involved six teachers from five primary schools across diverse geographical contexts in Sarawak. Semi-structured interviews and systematic observations were analyzed through thematic analysis with rigorous quality assurance protocols. Findings reveal critical sustainability challenges including the "rojak language" phenomenon involving extensive code-mixing, technological infrastructure disparities creating educational equity concerns, and generational technology adoption divides. Only 70% of curriculum content was deemed sustainable, with infrastructure constraints particularly affecting rural schools. The curriculum demonstrated strong transferability potential through modular design yet revealed register confusion and economic transferability concerns reflecting tensions between heritage language education and English-dominated professional contexts. This research establishes empirical evidence for interconnected sustainability and transferability factors, contributing dynamic assessment frameworks for digital-age curriculum evaluation. Findings inform strategic interventions including infrastructure investment, comprehensive teacher professional development, and reconceptualized assessment frameworks evaluating multimodal communication competencies while maintaining linguistic diversity.

**Keywords:** curriculum sustainability, multilingual education, teacher perspectives, CIPP model, digital disruption, educational equity

## INTRODUCTION

Language curricula worldwide stand at a critical juncture where traditional pedagogical approaches intersect with demands for technological innovation, creating unprecedented challenges for multilingual educational systems globally. Multilingual societies from Singapore's trilingual framework to South Africa's eleven official languages and Canada's French immersion programs grapple with tensions between preserving cultural heritage and meeting contemporary communication demands (Gorter & Cenoz, 2017; Osawaru & Unachukwu, 2024). These complexities intensify particularly in postcolonial contexts where indigenous linguistic identities compete with inherited languages dominating professional domains. Recent research demonstrates that digital communication technologies have fundamentally transformed heritage language maintenance strategies, with families increasingly utilizing video calls, streaming platforms, and social media to create virtual linguistic environments (Torsh, 2025). Malaysia's educational system exemplifies these global complexities, where Malay

language curriculum must balance linguistic identity preservation with digital transformation adaptation (Othman et al., 2022).

Heritage language education systems across diverse contexts face remarkably similar challenges. Welsh-medium education battles English digital dominance, French immersion programs in Canada report declining enrollment as parents prioritize English-medium instruction for economic reasons, and Indigenous Māori education in New Zealand experiences language decline despite revitalization efforts. Recent classroom observations in Malaysia reveal growing disparities between prescribed curricular expectations and actual student language proficiencies, particularly among diverse learner populations navigating between vernacular home environments and formal academic settings (Lau, Lambri, & Kiting, 2020). Educators across multilingual societies report difficulties bridging traditional pedagogical frameworks with contemporary student learning patterns shaped by digital media exposure, with Hassan Ahmad (2015) documenting concerning trends where younger generations gravitate toward dominant global languages influenced by globalization forces.

The critical need for investigating curriculum sustainability and transferability emerges from converging factors threatening heritage language education globally. Digital communication platforms have fundamentally altered linguistic landscapes, with students spending significantly more time engaging dominant-language content through social media and gaming than formal heritage language instruction. This creates paradoxes where online platforms offer unprecedented flexibility through educational apps and transnational family communication (Torsh, 2025), yet simultaneously exacerbate anxiety through technological barriers and reduced non-verbal communication (Alharbi, 2025), while reinforcing dominant language hegemony when educational resources remain inaccessible for minority languages (Torsh, 2025). Economic imperatives increasingly position global languages as pathways to opportunity, creating pragmatic pressures undermining mother tongue education. Brown's (2024) examination reveals how hidden curricular elements promote unsustainable practices despite official sustainability commitments. Extensive code-mixing phenomena signal potential erosion of linguistic standards that curriculum developers neither anticipated nor adequately addressed (Adnan et al., 2018), creating educational crises requiring immediate empirical investigation.

Educational development plans across multilingual societies emphasize comprehensive literacy enhancement through integrating Higher Order Thinking Skills, contextual learning, and technology usage, as exemplified by Malaysia's Education Development Plan (PPPM) 2013-2025 (Kementerian Pendidikan Malaysia, 2013). The Ministry of Education acknowledges digital pedagogy's critical role in Bahasa Melayu instruction, emphasizing multimodal approaches combining text, audio, visual, and animation elements. However, significant implementation challenges persist including digital divides, varying teacher competencies, content appropriateness concerns, and infrastructure disparities between urban and rural schools (WadahDBP, 2025), particularly affecting code-mixing phenomena where students blend languages through social media platforms privileging brevity over formal structures (Kalai Selvan Arumugham, 2020).

Equally critical is transferability, examining whether curriculum-acquired competencies translate into real-world communication capabilities across multilingual societies. Contemporary students worldwide must navigate complex multilingual environments where pure language use rarely occurs, from Canadian French immersion graduates entering anglophone workplaces to Welsh speakers in English-dominated professional contexts. Current curricula emphasizing formal language structures may inadequately prepare students for hybrid communication contexts universally observed across multilingual educational systems. Evidence from employer feedback suggests that graduates struggle with professional writing, formal presentations, and cross-cultural communication, indicating significant transferability gaps between curriculum content and workplace requirements (Yahya & Yusof, 2017).

This research addresses fundamental gaps in understanding how heritage language curriculum implementation translates into sustainable and transferable learning outcomes from practitioners' perspectives across multilingual educational contexts globally. While policy documents worldwide articulate ambitious goals for language mastery and cultural preservation, limited systematic investigation exists regarding teachers' assessments of whether these objectives materialize meaningfully in diverse classroom settings. Previous studies primarily focused on immediate learning outcomes, overlooking critical questions about curriculum viability facing digital disruption and practical application beyond academic contexts (Chew & Zulhazmi Hamad, 2018; Nurul Hasna

Hassan et al., 2019). Recent qualitative research demonstrates that teachers actively modify prescribed curricula to address implementation gaps and contextual realities that official curriculum documents fail to anticipate (Reid & O'Leary, 2025). Mixed-methods research in Arab educational contexts has begun addressing these gaps by integrating Foreign Language Anxiety Theory with Digital Transformation Theory, revealing that traditional anxiety models inadequately account for digital-specific stressors (Alharbi, 2025). However, practitioner-centered evaluation approaches examining sustainability-transferability interconnections remain underdeveloped, particularly in multilingual heritage language contexts.

This study evaluates heritage language curriculum sustainability and transferability from teachers' perspectives in multilingual educational contexts, utilizing the CIPP Model's product dimension to provide comprehensive evaluation of these critical aspects. Through examining teacher experiences across diverse geographical contexts from urban centers to remote rural schools, this research illuminates the complex interplay between curriculum sustainability challenges and transferability potential in the digital age. The significance extends beyond immediate pedagogical concerns to address fundamental questions about heritage language education's future in increasingly digitalized and globalized educational landscapes, ultimately contributing to broader international discourse on maintaining linguistic diversity while preparing students for twenty-first-century communication demands across multilingual societies globally.

## **LITERATURE REVIEW**

### **The Theoretical Foundation of Curriculum Evaluation**

The landscape of curriculum evaluation has evolved significantly since the mid-20th century, producing diverse theoretical frameworks essential for understanding contemporary approaches to language curriculum assessment in multilingual settings. Tyler's (1949) objective-based evaluation model revolutionized educational assessment by establishing systematic approaches to measuring program effectiveness through predetermined learning objectives. Ornstein and Hunkins (2017) identify three fundamental components: precise determination of educational objectives, organization of learning experiences, and systematic evaluation of objective achievement. While Tyler's emphasis on measurable outcomes shaped global educational policies, including Malaysia's early curriculum frameworks, contemporary critics highlight significant limitations. Marsh and Willis (2007) argue that the model's linear progression oversimplifies complex learning processes and may overlook emergent opportunities while potentially reducing education to mechanical skill acquisition.

Alternative evaluation approaches emerged addressing these limitations. Robert Stake's (2004) responsive evaluation model introduced stakeholder-centered perspectives acknowledging educational programs' political and social dimensions, emphasizing contextual understanding and diverse stakeholder viewpoints particularly valuable in multicultural educational settings (Ornstein & Hunkins, 2017). However, Marsh and Willis (2007) note that absence of standardized criteria can complicate decision-making and program comparison across contexts. Provus's (1973) Discrepancy Model introduced systematic gap identification between intended and actual program implementation through five distinct stages (Worthen & Sanders, 1987). While Sowell (2000) emphasizes the model's diagnostic capability for targeted interventions, critics argue that its deficit-oriented approach may overlook program innovations and successful adaptations.

Daniel Stufflebeam's (1971) Context, Input, Process, Product (CIPP) model represents a comprehensive framework addressing multiple evaluation dimensions. Stufflebeam and Shinkfield (2007) conceptualize CIPP as improvement-oriented evaluation facilitating informed decision-making. The model's systematic attention to all program phases from needs assessment through impact evaluation makes it particularly suitable for complex language curriculum evaluation, with the Product dimension assessing both intended and unintended outcomes alongside short-term and long-term impacts. The CIPP model has been widely applied in evaluating language curriculum effectiveness across diverse national contexts. A comprehensive evaluation of Turkey's first-grade Turkish Language Curriculum using convergent parallel mixed methods with 112 primary teachers revealed that while the curriculum demonstrated contextual relevance, cultural alignment, and flexible structure, implementation challenges including infrastructure inequalities, insufficient adaptation for disadvantaged students, and time constraints remained persistent concerns (Aybek & Oğuz, 2025). This finding parallels

challenges documented in Malaysian educational contexts, where geographical disparities and resource inequalities similarly impact curriculum sustainability.

## **The Malaysian Language Education Context**

The evolution of Malay Language curriculum reflects Malaysia's nation-building efforts and changing educational philosophies. The progression from Old Primary School Curriculum (KLSR) through Integrated Primary School Curriculum (KBSR) to current Primary School Standard Curriculum (KSSR) represents fundamental shifts in conceptualizing language education's national development role (Hassan Ahmad, 2015). KBSR's 1983 implementation marked paradigmatic shift toward integrated approaches emphasizing communication competence over grammatical accuracy, while 2011 KSSR introduced 21st-century skills, higher-order thinking, and digital literacy with comprehensive reforms including modular approaches and integrated assessment strategies (Kementerian Pendidikan Malaysia, 2022). Current implementation faces multifaceted challenges threatening sustainability and effectiveness. The Malaysia Education Development Plan (PPPM) 2013-2025 acknowledges gaps between policy aspirations and classroom realities, particularly where Malay is not primary home language. The digital divide emerges as critical, with urban schools implementing technology-enhanced strategies while rural schools particularly in Sarawak's interior struggle with basic connectivity, threatening long-term sustainability as digital literacy becomes essential. Recent research in Kapit and Song districts, Sarawak, involving 105 primary school Malay language teachers confirms that while AI technology demonstrates moderate effectiveness (mean 2.76/5.0) in enhancing literacy instruction, implementation remains constrained by inadequate infrastructure particularly affecting indigenous Iban students in rural schools (Kana et al., 2025).

## **Curriculum Sustainability: Theoretical Perspectives and Empirical Evidence**

Curriculum sustainability extends beyond longevity to encompass adaptability, relevance, and resilience in changing educational landscapes. Contemporary conceptualizations recognize sustainability as multidimensional, involving pedagogical, technological, cultural, and economic factors (Hassan Ahmad, 2015). Kalai Selvan Arumugham (2020) argues that digital-age sustainability requires continuous technological adaptation while maintaining pedagogical integrity. Rapid technological change creates temporal misalignments between curriculum cycles and technology evolution, with Adnan et al. (2018) documenting content obsolescence within single implementation cycles. Similar patterns emerge across international contexts, where infrastructure inequalities constrain technology effectiveness despite interactive learning potential, creating two-tier systems widening gaps between policy expectations and implementation realities. These challenges manifest from Turkey to rural Sarawak to Indonesia's Independent Curriculum, where teachers report insufficient training, limited resources, and difficulties transitioning to student-centered approaches (Aybek & Oğuz, 2025; Kana et al., 2025; Husnaini, 2025).

The "rojak language" phenomenon represents both natural multilingual evolution and potential threat to curriculum standards. Chew and Zulhazmi Hamad (2018) observe generational divides where younger teachers accept language mixing as natural adaptation, while senior teachers express concerns about declining standards, affecting implementation consistency and sustainability. For indigenous students whose mother tongue dominates daily communication, Malay language acquisition poses compounded challenges. Iban students in rural Sarawak and Kadazan-Dusun students in Sabah struggle particularly with grammar structures and vocabulary acquisition despite technological interventions, facing limited pedagogical readiness, inadequate infrastructure, and weak integration of cultural content (Kana et al., 2025; Kusmayadi et al., 2025). Traditional cultural content faces relevance challenges among students immersed in global popular culture, while rural schools face ongoing infrastructure challenges creating cascading effects across diverse socioeconomic contexts.

## **Curriculum Transferability: From Classroom to Community**

Transferability refers to applying learned knowledge beyond immediate learning environments, encompassing effective communication across contexts, audience adaptation, and skill integration in real-world problem-solving. Contemporary research recognizes that transferability requires explicit instruction rather than automatic transfer, with Nurul Hasna Hassan et al. (2019) finding students excel in structured exercises but struggle with

authentic communication application. Curriculum reforms emphasizing competency-based learning reveal similar implementation gaps where students demonstrate improved classroom engagement and critical thinking but continue struggling with autonomous skill application, indicating that explicit scaffolding strategies rather than assumptions of automatic transfer determine transferability success (Husnaini, 2025). Digital transformation has fundamentally altered transferability requirements, with students navigating complex multimodal environments requiring competencies extending beyond traditional language skills. Professional transferability represents the ultimate curriculum test, with Yahya and Yusof (2017) documenting specific failures including inability to write professional reports and conduct formal presentations, suggesting misalignment between curriculum content and workplace demands.

### **Teacher Perspectives: Voices from the Frontline**

Teachers occupy unique positions as mediators between curriculum intentions and classroom realities, providing crucial insights into implementation challenges and effectiveness factors (Fullan, 2020). Reid and O'Leary's (2025) qualitative study across diverse preschool contexts demonstrates that educators function as critical curriculum evaluators, continuously assessing relevance, quality, and appropriateness for specific teaching contexts. Their roles extend beyond content delivery to curriculum interpretation and local adaptation, with teachers consistently modifying prescribed curricula to align with student developmental levels, cultural backgrounds, and available resources, revealing significant gaps between curriculum developers' assumptions and actual classroom realities.

Contemporary teachers face unprecedented challenges including technology integration, higher-order thinking emphasis, and differentiated instruction demands requiring sophisticated pedagogical skills. Nurul Huda and Anuar (2022) found teachers particularly struggle balancing multiple curriculum demands with increased administrative responsibilities. Comparative evidence from Indonesia's curriculum reform demonstrates that teachers face increased burdens from preparing customized learning modules, conducting differentiated assessments, and managing student-centered activities, with senior educators particularly challenged by digital learning platform requirements (Husnaini, 2025). Heritage language maintenance constitutes gendered domestic labor overwhelmingly undertaken by mothers, often remaining invisible and undervalued by institutions including schools (Torsh, 2025). In educational contexts, female educators similarly bear primary responsibility for navigating heritage language preservation tensions and addressing curriculum sustainability challenges emerging from limited institutional support.

Significant gaps remain in curriculum implementation research. Previous studies typically examined sustainability and transferability in isolation, overlooking their interconnected nature and combined impact on curriculum effectiveness. Additionally, rapid digital transformation has outstripped research capacity, leaving educators without evidence-based guidance for balancing heritage preservation with technological adaptation. This study addresses these gaps by examining sustainability and transferability as interconnected dimensions, providing empirical evidence from diverse geographical contexts, and developing theoretical insights relevant to digital-age language education.

## **METHODOLOGY**

This study employed a qualitative case study design to evaluate heritage language curriculum sustainability and transferability from teachers' perspectives in multilingual educational contexts. The qualitative approach captures complex curriculum implementation phenomena and detailed insights into educators' experiences navigating heritage language instruction amid digital disruption (Creswell & Poth, 2018). Case study methodology examines real-life contexts where curriculum boundaries and implementation environments intersect, providing insights transferable to multilingual educational settings globally (Yin, 2018). The theoretical framework applies Stufflebeam's (2003) CIPP Model Product dimension to assess curriculum outcomes regarding sustainability and transferability. This systematic approach enables comparative analysis across diverse educational contexts while maintaining methodological rigor for international research applications.

## Research Setting and Participants

This study was conducted across five primary schools in Miri Division, Sarawak, Malaysia, a multilingual region reflecting global heritage language challenges. Schools represented diverse implementation contexts including two urban schools with comprehensive infrastructure, one semi-urban school with moderate resources, and two remote P3 schools with limited infrastructure, mirroring urban-rural disparities common in multilingual societies worldwide. Six Malay Language specialist teachers participated through purposeful sampling, representing all school contexts with gender balance and varied experience levels. All participants held bachelor's degrees with Malay Language specialization, with several possessing master's degrees and specialized training. This diverse sampling ensures comprehensive perspectives on curriculum sustainability and transferability across different geographical and resource contexts, providing insights relevant to heritage language education in similar multilingual educational settings globally.

## Data Collection Procedures

Data collection employed two complementary methods ensuring comprehensive curriculum evaluation. Semi-structured interviews featuring 34 questions across six thematic categories served as primary method, with 60-90 minute sessions audio-recorded and transcribed. Systematic classroom observations through trained curriculum coordinators using structured checklists encompassed four dimensions including student interest impact, curriculum objectives achievement, sustainability indicators, and transferability evidence. Observers documented teaching strategies, student engagement patterns, and technology integration practices, providing triangulation data supporting interview findings and enhancing research credibility across diverse school contexts.

## Data Analysis Framework

Data analysis employed thematic analysis using NVivo 15 software, following the Interactive Model by Miles, Huberman, and Saldana (2014). Three coding stages including open coding, axial coding, and selective coding generated four major sustainability themes and three transferability themes. Quality assurance strategies ensured methodological rigor through member checking, peer debriefing, audit trails, and data triangulation. Inter-rater reliability achieved substantial agreement (Cohen's Kappa = 0.74), exceeding threshold standards (Alharbi, 2025). Multi-level ethical approval was obtained from EPRD, Sarawak State Education Department, and participating schools, with confidentiality ensured through pseudonym assignment (R1-R6) and password-protected storage. This framework ensures identified themes represent genuine empirical patterns, providing trustworthy findings applicable to diverse multilingual educational contexts (Alharbi, 2025).

## RESULTS AND FINDINGS

### Sustainability of Malay Language Curriculum

#### Long-term Prospects and Challenges

The analysis of teachers' perspectives on curriculum sustainability revealed profound concerns about the long-term viability of Malay Language education in primary schools. A senior teacher expressed critical apprehension: "If we don't have certain measures, the position of Malay Language will be threatened. One reason is the influence of English in Malay Language. Malay Language has already been mixed" (R2). This sentiment reflects widespread anxiety about linguistic contamination and erosion of language standards that current curriculum frameworks appear unable to address effectively.

The phenomenon of "rojak language," referring to extensive code-mixing between Malay, English, and other languages, emerged as a primary threat to curriculum sustainability. Teachers consistently reported that students' exposure to mixed-language content through digital media fundamentally undermines formal language instruction. A rural school teacher observed: "The influence of IT, the influence of gadgets, because most children from young have been given these gadgets, so they communicate more with those devices, and in them mostly English and Indonesian. Children memorize Indonesian terms and English more, so it's difficult for us to

structure proper Malay" (R2). This digital-mediated language mixing creates cascading challenges, as students struggle to differentiate between formal and informal registers, ultimately compromising their ability to master standard Malay Language structures.

This sustainability challenge illuminates broader patterns affecting multilingual education systems internationally. The "rojak language" phenomenon represents extensive code-mixing accelerated by digital platforms, mirroring similar challenges including "Hinglish" in Indian educational contexts, "Spanglish" in U.S. Hispanic communities, and "Singlish" in Singapore's multilingual landscape. This convergence with Hassan Ahmad's (2015) documentation of linguistic contamination suggests that digital-mediated linguistic hybridization constitutes a universal challenge requiring coordinated international research and policy responses. The findings reveal that technological disruption creates unprecedented challenges for formal language instruction across multilingual societies globally, with implications extending to heritage language programs in Indigenous communities, minority language education in European contexts, and postcolonial language policies across Africa and Asia.

Geographical disparities significantly impact sustainability prospects across different school contexts. An experienced teacher explained: "For challenges, we look at geographical factors where students in urban areas, suburban areas, and interior areas are quite different because they have very different existing knowledge. For example, if we include passages about monorail, urban students might know but suburban and interior students don't know what a monorail is" (R4). These disparities extend beyond vocabulary gaps to encompass broader experiential and cultural differences that standardized curricula cannot adequately address.

Teachers proposed various strategies for ensuring long-term curriculum sustainability. One respondent emphasized foundational skill development focusing on basics for lower-level students before progression (R1), while another stressed flexibility and cultural responsiveness enabling every student to achieve objectives while following socio-cultural aspects and location contexts (R5). These adaptive modifications mirror patterns documented across diverse educational contexts, where practitioners consistently modify prescribed curricula to address resource limitations, student diversity, and contextual inappropriateness (Reid & O'Leary, 2025).

The data revealed that only 70% of current curriculum content was considered sustainable by teachers, with one respondent noting substantial weaknesses in current students' Malay Language mastery (R1). This 70% sustainability assessment establishes a critical benchmark for international comparative analysis of curriculum viability in multilingual educational systems, extending beyond Adnan et al.'s (2018) documentation of curriculum obsolescence by providing empirical evidence of implementation-level sustainability challenges that likely exist across heritage language programs globally. Research specifically examining Iban students, Sarawak's largest indigenous group, confirms that mother tongue dominance creates significant barriers to Malay language literacy development, with students struggling with vocabulary comprehension and communicating confidently despite AI-enhanced interventions (Kana et al., 2025).

## Technological Flexibility and Digital Integration

Technology integration into Malay Language curriculum revealed complex opportunities and constraints impacting sustainability. Digital heritage language strategies offer multiple affordances including increased language input through streaming platforms, expanded interlocutor networks via video calling, and written practice through social media (Torsh, 2025). However, these affordances vary significantly by language status and resource availability. Teachers demonstrated divergent perspectives from enthusiastic embrace to skeptical concerns. A younger teacher expressed optimism: "Yes, very flexible because nowadays most teaching and learning already uses technology" (R4), while a senior educator highlighted practical limitations: "It's lacking. If they want this to be effective, they need to arrange first the WiFi and internet infrastructure" (R2). In the Malaysian context, Malay occupies an intermediate position with official support yet faces competition from English's digital dominance and global resource availability (Torsh, 2025).

Infrastructure emerged as the primary barrier to technological sustainability, particularly affecting rural and interior schools. Quantitative evidence from Kapit and Song districts confirms these patterns, with 105 Malay language teachers reporting that unstable internet connectivity, inadequate technological infrastructure, and

limited access to AI-compatible devices significantly constrain digital integration despite demonstrated capacity to increase student engagement (Kana et al., 2025). The absence of reliable internet connectivity in P3 schools creates a two-tier system where urban schools advance with digital integration while rural schools remain dependent on traditional methods. Infrastructure disparities as primary sustainability barriers represent a global educational equity challenge that extends Kalai Selvan Arumugham's (2020) work on curriculum implementation to international contexts.

Teacher competency in technology integration presented another sustainability challenge. While younger teachers generally demonstrated greater comfort with digital tools, they sometimes lacked pedagogical knowledge to integrate technology meaningfully. Conversely, senior teachers possessed deep pedagogical expertise but struggled with technical aspects. Statistical analysis reveals no significant correlation between teaching experience and perceived impact of AI technology ( $r=0.154$ ,  $p<0.117$ ), suggesting that professional development needs transcend experience levels (Kana et al., 2025). This generational divide reflects broader patterns where technological familiarity does not automatically translate to effective pedagogical integration, and digital self-efficacy rather than mere technical skill determines implementation success (Alharbi, 2025).

## **Update Requirements and Adaptation Needs**

Teachers unanimously agreed that substantial curriculum updates are necessary to maintain relevance and effectiveness. Content relevance emerged as a critical concern, with teachers emphasizing the need for materials reflecting contemporary student experiences. One teacher articulated: "Among aspects that need updating is content because content needs to be adjusted according to that era. Maybe current content is still suitable, but looking at 10 years ahead, that content needs to be changed and reformulated" (R4). This temporal dimension highlights the challenge of developing curriculum frameworks that remain relevant across extended implementation periods while maintaining coherent learning progressions.

The complexity level of current curriculum content, particularly for early primary students, was identified as requiring urgent revision. A teacher emphasized: "In my opinion, we must prioritize skills that are really basic skills, for example Year 1 and Year 2 shouldn't be too difficult like finding implied and explicit ideas. I think that's quite difficult for them" (R3). Socioeconomic sensitivity in curriculum design emerged as another crucial requirement. One teacher explained: "Content needs to be suitable for all levels. I mean all economic statuses because if we make it suitable only for urban communities who have everything, but when we bring it to interior areas that lack everything, weak internet lines, still using river routes, mountain paths, how can interior students keep pace with urban students when they use the same materials?" (R2).

## **Transferability of Malay Language Curriculum**

### **Real-world Application in Daily Life**

The curriculum's transferability to real-world contexts demonstrated both promising potential and significant implementation gaps. Teachers reported that the modular and thematic structure enables students to explore linguistic and cultural experiences beyond their immediate geographical boundaries. A teacher from a remote school explained: "The current curriculum is more modular and thematic. So, students who aren't in that situation can still know, for example, dances in Sabah even though they're in Sarawak, but they can know what exists not only around them but also in the outside world" (R6).

Digital communication platforms emerged as crucial transferability contexts where curriculum learning meets contemporary communication practices. Teachers recognized that students primarily communicate through WhatsApp, Facebook, TikTok, and Instagram, requiring different linguistic competencies than traditional formal writing. One teacher noted: "For application, for example, they write on Facebook and now on TikTok, even in comments they should use proper language" (R5). Digital family language policy research demonstrates that platforms such as WhatsApp and social media serve dual functions including informal communication using mixed-language registers and opportunities for heritage language practice with strategic parental support (Torsh, 2025).

Concerns about economic and professional transferability revealed fundamental questions about the curriculum's long-term value proposition. One teacher articulated: "For Malay Language, mastery is important in our country so it can be used to improve economy or in their careers. But it cannot focus on just one aspect" (R1). The economic transferability concerns expressed by teachers echo but significantly complicate findings from Lau, Lambri, and Kiting (2020) regarding non-native speakers' struggles with Malay Language application. This reflects broader anxieties about Malay Language's perceived limited economic utility compared to English, potentially undermining student motivation and curriculum transferability to professional contexts.

### **Communication in Authentic Situations**

The analysis of communication transferability revealed significant generational and contextual variations in how students apply curriculum learning to authentic situations. Teachers observed a marked preference for English communication among students, particularly in urban schools. A senior teacher expressed concern: "In real situations, if we look at this school, students prefer to communicate in English. So maybe another reason is how they communicate at home. Do they use Malay at school? Do we emphasize it or not?" (R1).

Generational differences among teachers influenced their assessment of communication transferability. Younger teachers demonstrated greater optimism about students' ability to apply curriculum learning. One observed: "For improvement in real situation communication, I see students can communicate well when this curriculum is implemented with current elements" (R4). In contrast, senior teachers expressed more critical perspectives, with one stating: "I see it's lacking" (R2). The communication transferability variations between formal and informal contexts extend Nurul Hasna Hassan et al.'s (2019) findings regarding Higher Order Thinking Skills integration challenges while connecting to broader international discussions about register competence in multilingual education.

### **Cultural Heritage Understanding and Preservation**

The curriculum's role in transmitting cultural knowledge demonstrated both significant potential and implementation challenges. Teachers acknowledged that current curriculum successfully exposes students to diverse Malaysian cultures. One teacher emphasized: "It helps students understand every culture because we teach various cultures from Sabah, Sarawak, and Peninsular Malaysia. Malay heritage also exists because I know in Year 2 and Year 3 curriculum, many cultures are exposed to students that previously students didn't know" (R3).

The introduction of traditional art forms proved particularly effective in generating student interest, especially in rural areas. A teacher explained: "Because I feel they have a feeling of wanting to know. They have never heard examples of pantun, seloka that they have never heard and were not exposed to compared to students in urban schools" (R6). Cultural transferability emerged as a complex phenomenon that both supports and challenges findings from previous international research. While the curriculum successfully exposes students to diverse Malaysian cultures, confirming educational policy goals outlined in the Malaysia Education Development Plan 2013-2025 (Kementerian Pendidikan Malaysia, 2013), the depth and authenticity of this exposure vary significantly across implementation contexts.

### **Cross-cutting Themes and Interconnections**

#### **The Sustainability-Transferability Nexus**

Analysis revealed profound interconnections between sustainability and transferability dimensions that previous sections explored separately. Teachers consistently indicated that curriculum elements demonstrating strong real-world transferability also showed greater sustainability potential, while components with limited practical application faced sustainability challenges. This reciprocal relationship suggests that addressing sustainability and transferability as isolated dimensions may be fundamentally flawed, requiring instead integrated approaches that recognize their mutual dependence.

Infrastructure limitations simultaneously undermined both sustainability and transferability. Schools lacking reliable internet connectivity could neither sustain technology-integrated curriculum nor prepare students for digital communication contexts where language transferability increasingly matters. One teacher articulated:

"How can interior students keep pace with urban students when they use the same materials?" (R2). This observation reveals how infrastructure gaps create compound disadvantages, threatening both immediate curriculum viability and long-term student preparedness for contemporary communication demands.

### **Contextual Variations and Equity Implications**

The study revealed significant contextual variations in how sustainability and transferability manifest across different school settings, raising critical equity concerns. Urban schools demonstrated greater capacity for curriculum sustainability through superior infrastructure, yet faced unique transferability challenges as students questioned Malay Language relevance in English-dominated urban environments. Rural schools showed stronger cultural transferability through community connections but struggled with sustainability due to resource limitations.

These contextual variations create differentiated educational experiences that potentially exacerbate existing inequalities. Students in well-resourced urban schools develop different linguistic competencies than rural peers, not due to ability differences but because of systematic disparities in curriculum implementation conditions. One teacher observed: "Students in urban, suburban, and interior areas are quite different because they have very different existing knowledge" (R4). Interior schools serving indigenous populations faced compound disadvantages including limited infrastructure, socioeconomic constraints, linguistic diversity, and cultural differences from mainstream curriculum assumptions.

### **Interpreting Findings in Global Multilingual Education Perspective**

#### **Sustainability Challenges Across International Contexts**

The sustainability challenges identified in this Malaysian study illuminate broader patterns affecting multilingual education systems internationally. The "rojak language" phenomenon represents extensive code-mixing accelerated by digital platforms, mirroring similar challenges observed worldwide. This convergence with Hassan Ahmad's (2015) documentation of linguistic contamination suggests that digital-mediated linguistic hybridization constitutes a universal challenge requiring coordinated international research and policy responses rather than isolated national solutions.

The 70% sustainability assessment provided by teachers establishes a critical benchmark for international comparative analysis of curriculum viability in multilingual educational systems. This threshold extends beyond Adnan et al.'s (2018) documentation of curriculum obsolescence by providing empirical evidence of implementation-level sustainability challenges that likely exist across heritage language programs globally. Unlike previous studies that evaluated sustainability through policy analysis or achievement metrics, this teacher-centered methodology reveals practical sustainability barriers often invisible to macro-level evaluations. The finding that 30% of curriculum content lacks sustainability suggests fundamental reconceptualization of how heritage language curricula maintain relevance amid rapid societal transformation, a challenge equally relevant to Welsh-medium education in the United Kingdom, Māori language programs in New Zealand, and Indigenous language revitalization efforts across North America.

Infrastructure disparities as primary sustainability barriers represent a global educational equity challenge that extends Kalai Selvan Arumugham's (2020) work on curriculum implementation to international contexts. The emerging two-tier system between urban and rural schools represents not temporary implementation gaps but potentially permanent sustainability fractures that standardized curriculum approaches worldwide struggle to bridge. The generational divide in technology adoption among teachers presents universal sustainability implications. While Yahya and Yusof (2017) noted differential technology comfort levels among Malaysian teachers, they did not explore how this divide threatens curriculum sustainability through inconsistent implementation patterns observable across international educational contexts.

#### **Reconceptualizing Transferability in Digital Communication Contexts**

Understanding transferability challenges requires examining their interconnection with sustainability dimensions, as curriculum elements demonstrating poor real-world application simultaneously face

sustainability threats. The reciprocal relationship between these dimensions means that curricula lacking practical transferability struggle to maintain relevance and institutional support, while unsustainable curriculum frameworks cannot provide consistent foundation for developing transferable competencies. This interconnected nature necessitates simultaneous analysis rather than treating sustainability and transferability as isolated evaluation dimensions. Teachers' observations reveal that curriculum components failing to demonstrate clear real-world utility face declining student motivation and parental support, directly threatening long-term sustainability. Conversely, curricula struggling with rapid content obsolescence and infrastructure constraints cannot systematically develop students' transferable communication competencies essential for authentic multilingual contexts. This mutual dependency suggests that effective curriculum interventions must address both dimensions concurrently to achieve meaningful improvement in heritage language education outcomes.

The transferability challenges identified illuminate broader patterns affecting heritage language curricula internationally, extending significantly beyond those documented by Chew and Zulhazmi Hamad (2018), who focused primarily on formal academic transfer within national contexts. Contemporary multilingual educational research reveals that digital transformation creates unprecedented demands for multimodal, multilingual, and multi-platform communication competencies that traditional heritage language curricula worldwide never anticipated. The present findings reveal that students' primary communication through WhatsApp, TikTok, and Instagram requires sophisticated digital literacies including emoji interpretation, hashtag creation, visual-textual integration, and cross-cultural digital competencies that formal Malay Language instruction inadequately addresses. These findings resonate with global patterns where heritage language programs, from Indigenous language revitalization in North America to minority language education in Europe, struggle to demonstrate practical relevance in increasingly digitized communication landscapes.

The economic transferability concerns expressed by teachers echo but significantly complicate findings from Lau, Lambri, and Kiting (2020) regarding non-native speakers' struggles with Malay Language application. While Lau et al. focused on immediate linguistic challenges within Malaysian contexts, this study reveals deeper anxieties about heritage language economic utility in globally English-dominated professional landscapes, a concern equally relevant to French immersion graduates in Canada, Welsh speakers in the United Kingdom, and Indigenous language learners across various international contexts. Teachers' observations that students perceive limited career advantages from heritage language proficiency suggest transferability challenges extending beyond skill development to encompass motivation, perceived value, and economic positioning within globalized professional markets.

Cultural transferability emerged as a complex phenomenon that both supports and challenges findings from previous international research on multilingual education. While the curriculum successfully exposes students to diverse Malaysian cultures, confirming educational policy goals outlined in the Malaysia Education Development Plan 2013-2025 (Kementerian Pendidikan Malaysia, 2013), the depth and authenticity of this exposure vary significantly across implementation contexts. Unlike policy documents worldwide that assume uniform cultural transmission, this study reveals how school context, teacher background, and community characteristics fundamentally shape cultural transferability outcomes across diverse geographical and socioeconomic settings. Rural schools' success in maintaining cultural connections despite resource limitations suggests that transferability depends more on pedagogical approach and community integration than standardized curriculum content alone.

The communication transferability variations between formal and informal contexts extend Nurul Hasna Hassan et al.'s (2019) findings regarding Higher Order Thinking Skills integration challenges while connecting to broader international discussions about register competence in multilingual education. Student's documented inability to navigate appropriately between formal academic discourse and informal peer communication suggests that current heritage language curricula internationally inadequately address sociolinguistic competencies essential for authentic multilingual communication in contemporary digital environments. This finding fundamentally challenges curriculum assumptions prevalent across international heritage language education that mastering standard language forms automatically enables appropriate contextual application. Instead, the evidence suggests need for explicit instruction in pragmatic competencies, digital communication literacies, and sociolinguistic awareness that prepares heritage language learners for complex multilingual communication contexts they encounter beyond classroom settings.

## CONCLUSION

This study reveals that heritage language curriculum sustainability and transferability are deeply interconnected, requiring holistic approaches rather than isolated interventions. The research challenges prevailing assumptions about standardized curriculum development, demonstrating how uniform approaches can inadvertently perpetuate educational inequities in multilingual societies. Digital transformation emerges as both a threat to traditional language education and an opportunity for reimagining curriculum relevance. The findings expose limitations in traditional CIPP Model applications, suggesting the need for dynamic evaluation frameworks that capture the complexity of contemporary curriculum implementation. Teachers' creative adaptations despite resource constraints demonstrate remarkable professional resilience that curriculum frameworks should cultivate rather than constrain through rigid standardization. The differentiated experiences across urban, rural, and remote schools highlight how standardized approaches, despite good intentions, can exacerbate educational disparities affecting multilingual communities worldwide.

Educational authorities must implement comprehensive policy reforms addressing curriculum sustainability through differentiated frameworks that establish core competencies while permitting regional adaptations. Infrastructure development in underserved schools requires prioritization as a critical equity matter, with targeted investment addressing connectivity gaps to ensure equitable digital access. The economic transferability concerns identified necessitate policy interventions extending beyond curriculum revision to encompass broader language planning and economic development strategies. Malaysian higher education policy increasingly recognizes artificial intelligence's potential for Bahasa Melayu sustainability, implementing national digital corpus development and university-industry collaborations. For heritage language education internationally, developing clear professional pathways where multilingual competencies provide economic advantages becomes essential. Assessment reform emerges as crucial for aligning educational evaluation with contemporary communication realities, requiring frameworks that evaluate authentic multimodal communication competencies while maintaining academic rigor.

Teacher education institutions must fundamentally revise preservice preparation by integrating technological and pedagogical competencies from the outset. Programs should address navigation between heritage preservation and contemporary communication demands, include comprehensive preparation for resource-constrained environments, and emphasize collaborative competencies for community engagement. Effective heritage language curriculum implementation requires strengthened family-school partnerships recognizing parents as co-educators in language maintenance efforts. Schools can support these efforts through guidance on selecting quality heritage language digital resources and structured opportunities for family involvement. However, such partnerships must acknowledge the gendered nature of language maintenance work, ensuring responsibilities do not fall disproportionately on mothers or families with greater socioeconomic resources.

Future research must address critical gaps through longitudinal studies tracking sustainability patterns across multiple implementation cycles and comparative research revealing how regional variations influence curriculum effectiveness. While this study's focus on teacher perspectives provides essential practitioner insights, future investigations should include additional stakeholder voices. Student surveys could reveal whether curriculum content meets their actual communicative needs and transfers to real-world contexts. Parent interviews would illuminate family language practices and home support patterns, particularly tensions between formal Malay education and English-dominated professional aspirations. Policy document analysis would systematically examine whether curriculum design intentions align with implementation realities. These complementary perspectives would strengthen findings through triangulation. For instance, parent insights could clarify whether the "rojak language" phenomenon stems from school-based challenges or broader socio-cultural shifts. Future research should also examine AI-integrated language learning models that could address digital-age challenges identified in this study, potentially offering adaptive solutions responsive to diverse learner contexts and infrastructure realities. Ultimately, sustainable and transferable heritage language curricula require coordinated efforts across infrastructure development, teacher professional development, curriculum flexibility, assessment reform, and community engagement. The future of multilingual education depends on dynamic engagement with changing realities while preserving cultural and linguistic identity.

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## Authors' Contributions

The authors confirm their contributions to this paper as follows: study conception and research design: Muhammad Hafizuddin Abu Kassim; supervision and conceptual guidance: Shahazwan Mat Yusoff; data collection: Muhammad Hafizuddin Abu Kassim, Nur Azlin Norizan; data analysis and interpretation: Muhammad Hafizuddin Abu Kassim, Nur Azlin Norizan; manuscript preparation: Muhammad Hafizuddin Abu Kassim; critical review and final approval: Shahazwan Mat Yusoff. All authors reviewed the results and approved the final version of the manuscript.