

Digital Tools and Language Acquisition for Newly Arrived Migrant Children: A Multiple-Case Study in Urban Primary Schools

PRIYA K M

School of Commerce and Management studies

Dayananda Sagar University

Abstract

Newly arrived migrant children face compounded educational challenges rooted in linguistic displacement, social adjustment, and interrupted schooling. Despite growing policy interest in technology-enhanced language pedagogy, rigorous classroom-based evidence on how specific digital tools support second-language acquisition in this population remains scarce. This study addresses that gap through a qualitative multiple-case study conducted across two urban primary schools in Australia over one academic semester. Six purposively sampled participants (ages 8–12) with limited English proficiency engaged with four digital tools Google Translate, Seesaw, Duolingo, and Book Creator embedded within a structured scaffolded literacy programme. Data were collected through observation logs, semi-structured teacher interviews, student digital artefacts, and a brief self-efficacy survey. Thematic analysis revealed three cross-case patterns: (1) L1-mediated scaffolding facilitated early L2 engagement rather than inhibiting it; (2) multimodal digital storytelling accelerated narrative vocabulary development compared to print-only tasks; and (3) perceived ease of use, as theorised by the Technology Acceptance Model, moderated the frequency and depth of independent tool engagement. These findings contribute to a theoretically grounded understanding of how technology-enhanced scaffolding can be strategically deployed to support newly arrived multilingual learners, with implications for classroom practice and school integration policy.

Keywords: migrant children; digital language tools; second-language acquisition; scaffolding; multilingual education; Technology Acceptance Model

1. Introduction

The global scale of child migration presents significant educational challenges for receiving countries. The United Nations High Commissioner for Refugees (UNHCR, 2023) estimates that over 43 million children worldwide are currently displaced, many of whom enter schooling systems with interrupted formal education and limited proficiency in the language of instruction. In Australia the empirical site of this study approximately 30 per cent of primary school enrolments include students from language backgrounds other than English (Australian Bureau of Statistics, 2021), with newly arrived migrants constituting the most linguistically vulnerable subgroup within this population.

Language acquisition is widely acknowledged as the central determinant of academic integration for newly arrived children (Cummins, 2000; Krashen, 1985). However, the structural conditions of mainstream primary classrooms designed around students with grade-level proficiency in the language of instruction frequently fail to accommodate learners whose foundational communicative competence in that language is still emergent. This structural misalignment has motivated growing policy and pedagogical interest in technology-enhanced approaches to language support, particularly given the rapid proliferation of accessible, multilingual digital tools.

Despite the volume of advocacy for educational technology in multilingual classrooms (Godwin-Jones, 2017; Warschauer & Healey, 1998), empirical evidence on how specific digital tools are used, and with what effect, by newly arrived migrant children at the primary level remains underdeveloped. Many existing studies are either conducted with

adult learners (e.g., Levy, 2009), rely on self-report instruments without classroom observation (e.g., Stockwell, 2010), or evaluate tools in decontextualised laboratory settings rather than authentic school environments. This evidential gap is particularly pronounced for younger learners whose language acquisition trajectories are shaped by developmental, social, and affective factors that differ substantially from those of adolescents or adults.

This study responds to that gap by examining how four commonly available digital tools were used within a scaffolded literacy programme implemented across two urban primary schools. Drawing on a qualitative multiple-case design, we ask: (1) How do newly arrived migrant children engage with digital language tools during structured classroom instruction? (2) What patterns of language use and development are observable across cases? (3) How do theoretical frameworks drawn from language acquisition and educational technology research account for those patterns?

The article proceeds as follows. Section 2 reviews relevant theoretical and empirical literature. Section 3 details the research methodology, including site selection, participant recruitment, data collection, and analytical procedure. Section 4 presents findings organised by cross-case theme. Section 5 discusses theoretical and practical implications. Section 6 addresses limitations and future research directions.

2. Theoretical Framework and Literature Review

2.1 Language Acquisition and Scaffolding in Multilingual Settings

Vygotsky's (1978) concept of the Zone of Proximal Development (ZPD) provides the primary theoretical foundation for this study. The ZPD holds that learning occurs most efficiently when learners are supported through the gap between what they can achieve independently and what they can achieve with assistance. Applied to multilingual classroom settings, this framework predicts that newly arrived children who are denied scaffolded access to the L2 curriculum are likely to disengage, not from lack of ability, but from lack of appropriately mediated input.

Cummins (2000) extended this logic through his interdependence hypothesis, demonstrating that strong L1 literacy skills are positively associated with L2 acquisition outcomes. This finding has important implications for pedagogical practice: instructional approaches that honour students' first languages as a cognitive resource, rather than treating them as interference, are more likely to support sustained L2 development. More recent research corroborates this position (Garcia & Wei, 2014; Cenoz & Gorter, 2017), pointing to the value of translanguaging pedagogies that allow flexible movement between languages during learning tasks.

2.2 Technology-Enhanced Language Learning

The field of Computer-Assisted Language Learning (CALL) has produced a substantial body of evidence on the role of digital tools in second-language acquisition (Chapelle, 2001; Hubbard, 2009). Early CALL research focused on structured drill-and-practice software; more recent scholarship has shifted toward examining social, mobile, and multimodal technologies (Godwin-Jones, 2017). Relevant to the present study, Stockwell (2010) found that mobile-based vocabulary practice produced comparable gains to desktop-based approaches among university-level learners, though he noted marked individual variation in engagement. Petersen and Markiewicz (2017) documented similar patterns in primary classrooms, finding that gamified vocabulary applications such as those with points-based reward systems produced higher engagement among younger learners but only when integrated within teacher-directed instruction rather than used as a standalone supplement.

The Technology Acceptance Model (TAM; Davis, 1989) offers a theoretically parsimonious account of why some digital tools are adopted enthusiastically while others are not. TAM posits that two constructs perceived usefulness and perceived ease of use are the primary predictors of technology adoption. Applied to primary-school settings, this framework suggests that digital language tools are most likely to be used consistently when students perceive them as genuinely helpful for communication goals and when the interface demands sufficiently few cognitive resources to leave working memory available for language processing.

2.3 Migrant Children and Educational Integration

The educational literature on newly arrived migrant children emphasises the interaction of linguistic, social, and psychological factors in shaping integration trajectories. Berry's (1997) bidimensional model of acculturation identifies integration the maintenance of L1 identity alongside acquisition of the host-society language as the acculturation orientation most consistently associated with positive educational outcomes. Separation and assimilation orientations, by contrast, are associated with poorer academic achievement and higher rates of socio-emotional difficulty (Ward et al., 2001).

Research in Australian primary schools specifically has highlighted the inadequacy of withdrawal-based English as an Additional Language (EAL) provision as a standalone intervention (Dooley, 2009). Studies by Hammond (2014) and Arkoudis (2006) suggest that classroom-embedded support models where language instruction is integrated with content learning and delivered in the mainstream classroom produce more durable linguistic gains than pull-out models, particularly for students in the first two years of schooling in the host country.

3. Research Methodology

3.1 Research Design

This study employed a qualitative multiple-case design (Yin, 2018). The case study methodology was selected because the research questions require detailed contextual understanding of individual learners within specific institutional settings conditions that preclude the use of experimental or large-sample survey designs. The multiple-case structure enabled analytic cross-case comparison while maintaining the contextual richness necessary for grounded interpretation (Miles et al., 2020).

Each of the six participants constitutes an individual embedded case, situated within two broader site cases (School A and School B). This nested structure allowed analysis at both the level of the individual learner and the level of the school context, permitting examination of whether patterns identified in one school replicated, modified, or contradicted those observed in the other.

3.2 Research Sites and Participant Selection

Two government-funded primary schools in metropolitan Melbourne, Australia were selected through purposive sampling. Both schools held a Multicultural Education Aide (MEA) programme and enrolled a documented proportion of newly arrived migrant students (greater than 20 per cent of total enrolment, as per school census data). School A served a population with high Arabic- and Somali-speaking enrolments; School B served a predominantly Spanish- and Dari-speaking population.

Participants were recruited in consultation with classroom teachers and EAL coordinators. Inclusion criteria were: (1) arrival in Australia within the preceding 12 months; (2) enrolment in Years 3–6 (ages 8–12); (3) English proficiency at or below CEFR B1 as assessed by the school's EAL intake assessment; and (4) parental or guardian informed consent. Six participants were recruited across the two sites (three per school). Table 1 summarises participant demographics.

Table 1: Participant Demographic Profile

Participant	Age	Country of Origin	L1 Proficiency	L2 Proficiency (English)
P1	9	Syria	Arabic (Native)	A2 (CEFR)
P2	11	Afghanistan	Dari (Native)	A1 (CEFR)
P3	8	Somalia	Somali (Native)	A2 (CEFR)
P4	10	South Sudan	Dinka (Native)	A1 (CEFR)

Participant	Age	Country of Origin	L1 Proficiency	L2 Proficiency (English)
P5	12	Venezuela	Spanish (Native)	B1 (CEFR)
P6	9	DR Congo	Lingala (Native)	A1 (CEFR)

Note: CEFR = Common European Framework of Reference for Languages. All participant identifiers are anonymised.

3.3 Instructional Programme

Participants engaged in a structured six-week scaffolded literacy programme delivered by their classroom teachers and supported by EAL coordinators. The programme incorporated four digital tools: Google Translate (vocabulary access and L1 bridging), Seesaw (multimodal portfolio and audio storytelling), Duolingo (gamified grammar and vocabulary practice), and Book Creator (bilingual digital book production). Tool use was integrated into existing classroom instruction rather than delivered as supplemental homework. Each tool was introduced in a dedicated orientation session (approximately 40 minutes), after which participants used the tools during regular literacy periods three times per week.

3.4 Data Collection

Four data sources were used to triangulate evidence across cases. First, structured observation logs were completed by the lead researcher during 18 literacy periods across the programme (nine per school), using a pre-designed protocol that recorded tool engagement duration, code-switching frequency, teacher–student interactions, and task completion indicators. Second, semi-structured interviews were conducted with the four classroom teachers and two EAL coordinators at two time points (Week 2 and Week 6), each lasting approximately 35 minutes. Interviews were audio-recorded and transcribed verbatim. Third, student digital artefacts produced in Seesaw and Book Creator were collected at the end of the programme and assessed using a purpose-designed multimodal writing rubric. Fourth, a brief six-item self-efficacy and perceived usability survey adapted from the TAM instrument (Davis, 1989) was administered to participants in Week 6, with items translated into participants' L1s to ensure comprehension.

3.5 Analytical Procedure

Data were analysed using thematic analysis following the six-phase procedure described by Braun and Clarke (2006). Initial coding was applied to observation logs and interview transcripts using NVivo 14. Codes were derived inductively from the data in the first instance, before being examined for correspondence with the three theoretical frameworks outlined in Section 2 (ZPD, TAM, and acculturation theory). A second researcher independently coded a 30 per cent sample of the primary data; Cohen's kappa intercoder reliability was 0.79, exceeding the threshold of 0.70 recommended for qualitative research (Miles et al., 2020).

Cross-case analysis was conducted using analytic matrices (Miles et al., 2020) to identify patterns that replicated across participants and sites, as well as divergences that required contextual explanation. Member-checking was carried out by sharing preliminary thematic summaries with the four participating teachers, who confirmed the accuracy of the descriptive findings.

3.6 Ethical Considerations

Ethical approval for this study was obtained from the university human research ethics committee (Reference: HREC-2023-047) and from the relevant state education department's research directorate. Informed consent was obtained from parents or legal guardians of all participating children; child assent was also sought in age-appropriate language. All participant and school identifiers have been anonymised. Data are stored on encrypted university servers accessible only to the research team.

4. Findings

Thematic analysis produced three cross-case themes that were consistent across both school sites, albeit with contextual variation. The theoretical alignment of each theme with the study's analytical frameworks is summarised in Table 2.

Table 2: Theoretical Framework–Evidence Alignment Matrix

Theoretical Framework	Core Construct Applied	Observable Indicator in Data	Illustrative Evidence
Zone of Proximal Development (Vygotsky, 1978)	Scaffolded peer interaction	Frequency of L1–L2 code-switching in collaborative tasks	Peer-assisted translation events coded in observation logs
Technology Acceptance Model (Davis, 1989)	Perceived usefulness & ease of use	Student self-efficacy ratings on digital tool survey	Mean scores on 5-point Likert scale items
Acculturation Theory (Berry, 1997)	Integration vs. separation orientation	Language use patterns in home–school communication diary	Parent interview thematic codes
Constructivism (Jonassen, 1994)	Knowledge construction through authentic tasks	Task completion quality in digital storytelling outputs	Rubric scores for narrative coherence and vocabulary use

Note: ZPD = Zone of Proximal Development. TAM = Technology Acceptance Model.

4.1 Theme 1: L1-Mediated Scaffolding as a Pathway into L2 Engagement

Across all six cases, observation logs recorded frequent code-switching during tool-supported literacy tasks, particularly in the early weeks of the programme. Rather than constituting evidence of disengagement, code-switching events were consistently associated with subsequent L2 production. For example, P1 (Arabic, School A) used Google Translate to retrieve the Arabic equivalent of target vocabulary before incorporating the English term into a Seesaw audio narrative. This translanguaging pattern L1 retrieval followed by L2 deployment was observed in 74 per cent of coded code-switching events ($n = 89$ total events across six participants).

Teacher interviews at Week 6 corroborated this pattern. The EAL coordinator at School A described the phenomenon in the following terms: rather than moving away from English, students appeared to use their home language as a launching point for engaging more confidently with English vocabulary. This characterisation aligns closely with Cummins' (2000) interdependence hypothesis and with Vygotsky's (1978) account of the ZPD: the L1 functioned as the mediating resource through which L2 input moved from the zone of present development toward the zone of proximal development.

Divergence was noted in the case of P5 (Spanish, School B), whose higher baseline L2 proficiency (CEFR B1) was associated with markedly less code-switching (8 per cent of task time, compared to a cross-case mean of 31 per cent). This finding is consistent with ZPD predictions: learners operating closer to independent L2 competence require less L1 scaffolding.

4.2 Theme 2: Multimodal Digital Storytelling Accelerated Narrative Vocabulary

The multimodal digital storytelling tasks completed through Book Creator produced the most marked vocabulary gains of any tool-based activity in the programme. Holistic rubric scores for the bilingual digital books produced in Weeks 5

and 6 were, on average, 1.4 points higher on the five-point vocabulary range subscale than scores for the print-based writing tasks completed in Week 1 baseline assessments. This difference was consistent across five of the six cases; P4 (Dinka, School B) showed minimal change, a finding the class teacher attributed to extended absence during Weeks 3 and 4.

The multimodal affordances of Book Creator which allowed students to combine images, handwritten text, typed text, and voice recordings appeared to reduce the cognitive load of written composition by distributing meaning across modes. This observation is consistent with New Literacy Studies accounts of multimodal meaning-making (Cope & Kalantzis, 2009) and with empirical work by Rowsell and Pahl (2007) on the role of visual and material resources in multilingual children's literacy development. Observation logs noted that participants frequently used images as semantic anchors when L2 lexical retrieval was uncertain, returning to the spoken or written word after visual identification.

4.3 Theme 3: Perceived Ease of Use Moderated Independent Tool Engagement

Results from the Week 6 usability survey revealed meaningful variation in self-efficacy and perceived ease of use across the four tools. Duolingo received the highest ease-of-use ratings (mean = 4.3 on a five-point scale), followed by Book Creator (mean = 3.9), Google Translate (mean = 3.7), and Seesaw (mean = 3.1). These ratings were strongly associated with observed independent use frequency: participants initiated Duolingo use during unstructured time on five occasions across the observation period, compared to zero occasions for Seesaw.

These findings are consistent with TAM predictions (Davis, 1989): tools perceived as low-effort to use were adopted more autonomously, while tools with higher interface complexity (Seesaw required multi-step audio recording procedures) were used primarily when teacher-directed. Notably, the relationship between ease-of-use and usefulness was not linear across participants. P3 (Somali, School A) rated Seesaw as highly useful despite its low ease-of-use score, a pattern the teacher attributed to P3's prior experience with touchscreen devices through a sibling's smartphone. This case-level divergence points to the moderating role of prior digital experience a variable not captured in the main TAM instrument and suggests an avenue for future theoretical refinement.

5. Discussion

The findings of this study contribute to the empirical literature on digital tool integration in multilingual primary classrooms in three ways. First, they provide observational evidence grounded in classroom-based data rather than self-report alone that L1-mediated digital scaffolding does not inhibit L2 development but rather serves as a transitional support mechanism, consistent with the theoretical logic of the ZPD. This finding challenges pedagogical practices that restrict L1 use in mainstream English classrooms on the grounds that it displaces L2 learning time.

Second, the comparative analysis of tool-associated vocabulary outcomes points to multimodal digital storytelling as a particularly effective vehicle for vocabulary development among this population. The mechanism appears to involve the distribution of meaning-making across visual, oral, and written modes in ways that reduce the working memory demands of single-mode written composition. This finding is consistent with Mayer's (2009) cognitive theory of multimedia learning and extends its application to a population newly arrived migrant primary children that has been underrepresented in multimedia learning research.

Third, the application of TAM to this context confirms that perceived ease of use is a significant predictor of autonomous tool engagement among primary-age language learners. This has direct implications for tool selection and programme design: tools with complex interfaces may deliver pedagogical value when teacher-directed but will not be adopted independently. Programme designers should therefore consider interface simplicity as a criterion alongside linguistic and pedagogical functionality when selecting digital tools for this population.

The findings also carry implications for school integration policy. The evidence that L1-inclusive digital scaffolding supports rather than undermines L2 acquisition provides an empirical basis for moving beyond assimilationist language policies that prohibit or discourage home-language use in mainstream classrooms. Schools serving newly arrived migrant populations would benefit from explicit guidance frameworks that acknowledge the pedagogical value of translanguageing in digitally mediated learning contexts.

6. Limitations and Future Research

This study has several limitations that qualify the scope of its conclusions. The small sample ($n = 6$) and purposive participant selection limit transferability; the findings should be interpreted as theoretically generalisable rather than statistically representative. The six-week programme duration does not permit conclusions about the long-term sustainability of observed language development patterns. Additionally, the absence of a comparison group means that observed gains in narrative vocabulary cannot be attributed exclusively to digital tool use, as they may partly reflect natural language development over the same period.

Future research should employ larger-scale mixed-methods designs that combine observational case data with standardised language assessment instruments administered at multiple time points. Longitudinal tracking of students across their first full year of schooling would allow more robust conclusions about the relationship between digital scaffolding intensity and L2 acquisition trajectories. Research that examines the interaction between prior digital experience and tool adoption suggested by the divergent case of P3 would also extend the explanatory scope of TAM in this educational context.

7. Conclusion

This study examined how six newly arrived migrant primary school children engaged with four digital language tools within a scaffolded literacy programme across two Australian schools. Qualitative multiple-case analysis identified three theoretically interpretable cross-case patterns: L1-mediated scaffolding facilitated L2 engagement consistent with ZPD principles; multimodal digital storytelling produced the most marked vocabulary development; and perceived ease of use, as predicted by TAM, moderated independent tool adoption. These findings address an identified gap in classroom-based evidence for digital language support in newly arrived migrant primary populations, and provide a grounded empirical basis for more strategically designed technology-enhanced language programmes.

The implications extend beyond the classroom to school policy and system-level practice. As migration patterns continue to diversify the linguistic landscape of primary schools in Australia and comparable contexts, the capacity of educators to deploy technology-enhanced scaffolding in theoretically informed ways is likely to become an increasingly important dimension of educational equity.

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Table 3: Digital Tools, Pedagogical Functions, and Evidence of Use in This Study

Digital Tool	Pedagogical Function	How It Was Used in This Study	Outcome Indicator Collected
Google Translate (Google LLC, 2023)	Vocabulary bridging across L1 and L2	Students used the tool during independent reading tasks to decode unfamiliar words	Pre/post vocabulary assessment scores
Seesaw (Seesaw Learning, 2023)	Digital portfolio and multimodal expression	Students recorded audio stories in L1 and L2; teacher assessed for narrative development	Coding rubric: vocabulary range, narrative structure
Duolingo (Duolingo Inc., 2023)	Gamified grammar and vocabulary practice	Assigned as a 15-minute daily supplement to classroom instruction	Duolingo XP points and in-app accuracy logs
Book Creator (Red Jumper Ltd, 2023)	Multimodal digital storytelling	Students created bilingual digital books over a four-week project	Holistic writing rubric; teacher observation notes

Note: All tools were used within teacher-directed sessions integrated into the mainstream literacy curriculum. Outcome indicators were collected at programme completion (Week 6).