VOICE PEDAGOGY: EMPOWERING RURAL LEARNERS THROUGH PODCAST-BASED CULTURAL EXCHANGE AND DIGITAL EQUITY IN THE DIGITAL ERA

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Abstract*: In today's Digital Era, equitable access to English proficiency and digital literacy remains a pressing challenge for students in rural Malaysian schools. This study introduces the VOICE Pedagogy (Voicing Our Identity through Culture and Exchange), a low-cost, podcast-based learning framework designed to enhance ESL speaking skills through experiential learning and intercultural storytelling. Grounded in Sociocultural and Experiential Learning theories, the model guides learners through four structured phases Voice (topic selection), Open (digital production), Interact (peer feedback), and Connect (reflection) to build CEFR-aligned speaking competence while strengthening cultural identity. A quasi-experimental pre-test and post-test design was implemented over eight weeks with 30 rural primary students at A1 proficiency level. Data from speaking assessments, questionnaires, and podcast artefacts revealed statistically significant improvement in speaking performance (d = 2.17), alongside high post-intervention mean scores for Technological Self-Efficacy (M = 4.15) and Intercultural Awareness (M = 4.55). Qualitative analysis further indicated greater confidence in communication and deeper appreciation of cultural heritage. The findings validate the VOICE Pedagogy as an innovative, sustainable, and scalable model for bridging linguistic and digital divides. By empowering students to become confident digital communicators and cultural mediators, the framework offers a transformative pathway toward equitable, future-ready education in the Digital Era.*

Keywords*: VOICE Pedagogy; Podcasting; Digital Divide; CEFR Speaking Performance; Intercultural Competence*

Introduction

The increasing ubiquity of digital technology has profoundly reshaped how people communicate, exchange culture, and learn—defining characteristics of the Digital Era. Educational systems worldwide are therefore rethinking how students develop the communicative and intercultural competencies required for meaningful participation in contemporary society. Within this landscape, English proficiency and digital literacy have become key determinants of social mobility and access to opportunities in the global economy (Ismail, 2025). Yet, digital transformation has also deepened existing inequalities, particularly in rural and resource-limited settings where access to digital tools, stable connectivity, and innovative learning opportunities remains uneven (Pandian et al., 2020; Honorious & Talin, 2024). These disparities underscore the urgent need for equitable, context-sensitive pedagogies that strengthen language learning while building learners' capacity to participate confidently in digital communication.

In Malaysia, this challenge remains salient among rural primary school learners. Despite ongoing initiatives, classroom practices may still be insufficient to bridge the gap between curriculum expectations and real-world communication demands, particularly for speaking. For low-proficiency rural learners, limited exposure to authentic English input and restricted opportunities to practise oral interaction can contribute to low confidence and reduced participation, which further constrains speaking development. This curricular–practice misalignment is especially relevant to the CEFR-aligned English curriculum (Ministry of Education Malaysia, 2018), where the goals of communicative competence increasingly intersect with digitally mediated communication.

Podcasting has been widely reported as a promising tool for language learning due to its potential to promote learner autonomy, encourage repeated speaking attempts, and facilitate purposeful communication for an audience (O'Bryan & Hegelheimer, 2007; Suseno & Darma, 2024). However, empirical evidence on podcasting as a low-cost, high-impact approach in rural Malaysian ESL classrooms remains limited (Ismail, 2025). Addressing this gap is important because rural implementations require designs that are feasible under constraints while still supporting linguistic competence, technological self-efficacy, and culturally grounded identity expression.

In response, this study introduces the **VOICE Pedagogy** (Voicing Our Identity through Culture and Exchange), a podcast-based framework designed to advance equitable and culturally responsive English language learning. The model comprises four experiential phases—*Voice, Open, Interact, and Connect*—structured to enhance CEFR-aligned speaking performance while fostering digital confidence and cultural appreciation (Honorious & Talin, 2024). Specifically, this study investigates VOICE Pedagogy's impact on speaking proficiency, learner confidence, and technological self-efficacy, as well as its role in cultivating identity and social agency among rural learners. By offering a sustainable and scalable model for technology-integrated speaking development, the study contributes practical evidence to support educational quality and social equity within Malaysia's diverse schooling landscape. The specific objectives and questions guiding this study are as follows:

Research Objectives

The overall goal of this study is to evaluate the effectiveness of the VOICE Pedagogy in bridging linguistic and digital divides among rural learners. Specifically, this study aims to:

- **O1:** Elevate CEFR-aligned speaking proficiency, focusing on fluency, interaction, and pronunciation.
- **O2:** Build learners' technological acceptance and promote sustained digital engagement through content creation.
- **O3:** Strengthen Cultural Identity and Intercultural Awareness, thereby cultivating learners' social agency and voice.

Research Questions
Based on the study objectives, the following research questions guide this investigation:
- **RQ1:** Does the implementation of the VOICE Pedagogy lead to a statistically significant improvement in rural primary students' speaking performance?
- **RQ2:** What is the effect of the VOICE Pedagogy on learners' technological perceptions?
- **RQ3:** How does the VOICE Pedagogy support the development of Cultural Identity and Intercultural Awareness among rural primary students?

Literature Review
The literature is synthesised across three interrelated aspects that inform the design and focus of this study: (i) theoretical foundation, (ii) podcasting, technology, and the digital divide, and (iii) cultural identity and intercultural communicative competence.

Theoretical Foundation: Sociocultural Theory and Experiential Learning
VOICE is grounded in Vygotsky's Sociocultural Theory (SCT), which conceptualises learning as a socially mediated process shaped by cultural tools, interaction, and collaboration. Within this lens, speaking development is strengthened when learners receive structured scaffolding and opportunities for meaningful interaction that support performance beyond their current ability. In technology-mediated settings, podcasting can operate as a mediational tool that enables rehearsal, feedback, and collaborative meaning-making, which may contribute to improved speaking performance when implemented with intentional pedagogical structure (Rosell-Aguilar, 2015). These social learning processes are reinforced by Kolb's (1984) Experiential Learning Theory, which emphasises knowledge construction through cycles of experience, reflection, conceptualisation, and experimentation. Through planning, recording, editing, and sharing speech, learners shift from passive receivers to active producers of meaning—a process aligned with evidence on active participation and production-oriented tasks in language development (Suseno & Darma, 2024). Together, SCT and experiential learning position podcast-based production as a pedagogically coherent approach for speaking development, particularly when activities are designed to ensure guided interaction and reflective improvement rather than mere tool usage.

Podcasting, Technology, and the Digital Divide
The VOICE Pedagogy responds to Malaysia's digital divide (Pandian et al., 2020), which extends beyond device access to differences in exposure quality, digital competence development, and pedagogical readiness in rural schools (Ismail, 2025). Technology integration initiatives may therefore unintentionally widen inequity if rural learners are not supported to participate meaningfully in digital communication. Podcasting is strategically positioned as a low-cost and accessible form of Mobile Assisted Language Learning (MALL) because it can be implemented using basic devices and low-data workflows while still enabling authentic communication and repeated oral practice (O'Bryan & Hegelheimer, 2007; Aprianto, 2024). However, research on technology tools alone is insufficient unless learners' psychological readiness and confidence are also addressed. Technological Self-Efficacy is particularly

relevant because it is associated with persistence, reduced technology-related anxiety, and greater willingness to engage in digital learning tasks (Honorious & Talin, 2024). Thus, a podcast-based approach that explicitly supports gradual skill-building and successful task completion may contribute not only to language learning but also to narrowing the digital competency gap among rural learners.

Cultural Identity and Intercultural Communicative Competence

A distinctive contribution of this study lies in its focus on cultural identity and intercultural exchange, aligning with national aspirations to preserve heritage while promoting diversity (Ministry of Education Malaysia, 2018). Intercultural Communicative Competence (ICC) involves the ability to communicate effectively and appropriately across cultural contexts, including interpreting, relating, and mediating cultural meanings (Byram, 1997).

Podcasting supports this development by functioning as a multimodal medium for cultural storytelling—integrating voice, narrative structure, and sound elements that allow learners to represent local experiences and values meaningfully (Alshibly & Al-Ghafri, 2024). When learners articulate cultural knowledge for an audience, they engage in cultural mediation rather than language practice alone, which can strengthen identity expression, intercultural awareness, and social agency. For rural learners in particular, culturally grounded tasks may serve as an equity-oriented strategy by positioning local knowledge as legitimate academic content, thereby supporting both learner voice and participation.

Synthesis and Research Gap

Although prior research supports podcasting as beneficial for language learning and engagement, empirical evidence remains limited on podcasting as a low-cost, high-impact intervention within rural Malaysian primary ESL classrooms, especially under CEFR-aligned expectations and resource constraints (Ismail, 2025). Moreover, existing studies often examine language outcomes without fully integrating socio-digital dimensions such as technological self-efficacy and intercultural to identity development. This gap indicates a need for a structured framework that operationalises podcasting as (i) an interaction- and reflection-driven learning cycle for speaking development, (ii) a feasible approach for rural digital participation, and (iii) a culturally responsive platform for identity and intercultural exchange. Accordingly, the present study introduces VOICE as a structured, theory-informed pedagogy and examines its impact on speaking performance, learner confidence, technological self-efficacy, and intercultural/identity-related outcomes among rural learners.

Methodology

Research Design and Context

This study adopted a **quasi-experimental**, single-group pre-test–post-test design to evaluate the efficacy of the VOICE intervention. While this design does not permit strong causal inference, it was **practically appropriate** for a rural school setting and was complemented by post-intervention survey data and thematic content analysis of student-produced podcasts to address the study's attitudinal and identity-related aims.
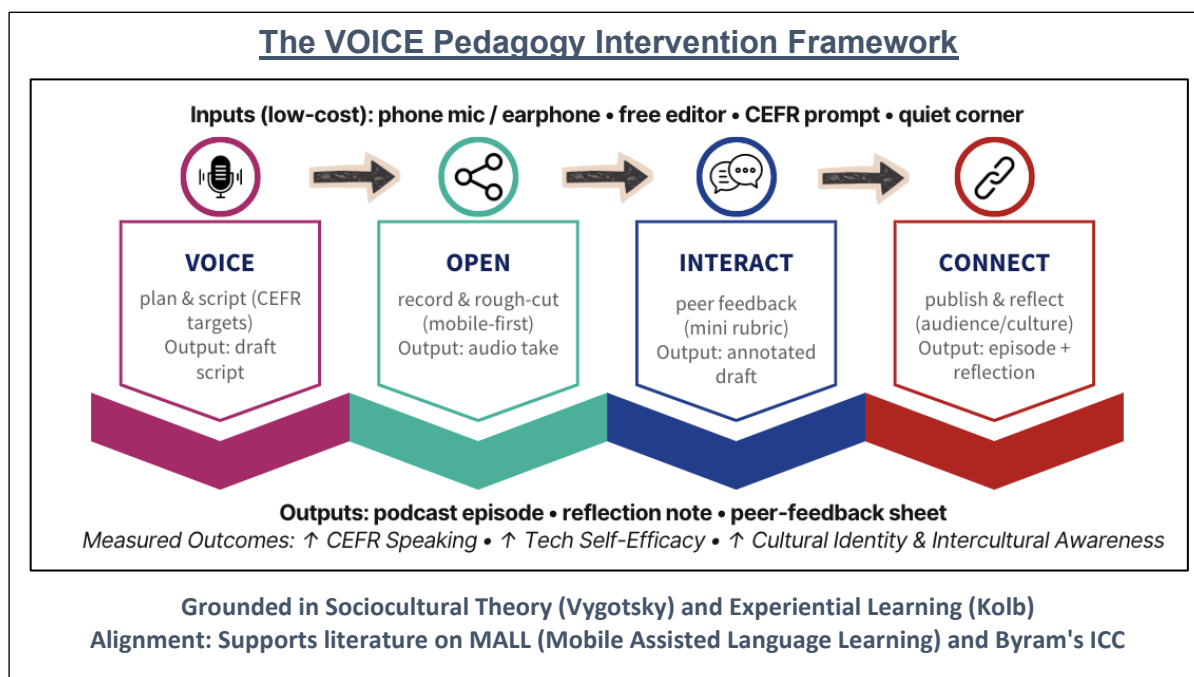
Participants and Setting

The research was conducted at a rural primary school in Sabah, Malaysia, chosen specifically to investigate an intervention for the **Digital Divide** (Pandian et al., 2020). The participants were a sample of **30 primary school students** (Year 4, aged 10) who were pre-assessed as

having limited digital exposure and demonstrating challenges in confident English communication. All participants were categorised at the **A1 proficiency level** in English according to the CEFR-aligned curriculum framework (Ministry of Education Malaysia, 2018). The selected sample size and setting provide evidence of feasibility for a low-cost, technology-mediated pedagogy in a resource-scarce context.

The VOICE Pedagogy Intervention and Procedures

The core intervention was the **VOICE Pedagogy (Voicing Our Identity through Culture and Exchange)**, a student-centred, experiential framework implemented over an **eight-week period**. The pedagogy utilises a low-cost podcasting intervention, leveraging students' and teacher's personal mobile devices and accessible audio editing software to ensure sustainability and minimise the infrastructure requirement. The intervention procedures are organized into four sequential phases, designed to scaffold language acquisition and cultural expression: **Voice** (students select a personal or cultural topic for expression), **Open** (students execute the digital production—recording and editing), **Interact** (podcasts are shared for structured, peer-to-peer feedback), and **Connect** (reflection, revision, and final submission). This cyclical structure reinforces linguistic and technological skills simultaneously. The conceptual framework of this intervention is visually summarised in Figure 1.

The VOICE Pedagogy Intervention Framework

Inputs (low-cost): phone mic / earphone • free editor • CEFR prompt • quiet corner

VOICE — plan & script (CEFR targets) / Output: draft script

OPEN — record & rough-cut (mobile-first) / Output: audio take

INTERACT — peer feedback (mini rubric) / Output: annotated draft

CONNECT — publish & reflect (audience/culture) / Output: episode + reflection

Outputs: podcast episode • reflection note • peer-feedback sheet
Measured Outcomes: ↑ CEFR Speaking • ↑ Tech Self-Efficacy • ↑ Cultural Identity & Intercultural Awareness

Grounded in Sociocultural Theory (Vygotsky) and Experiential Learning (Kolb)
Alignment: Supports literature on MALL (Mobile Assisted Language Learning) and Byram's ICC

Figure 1: The VOICE Pedagogy Conceptual Framework

Data Collection and Analysis Instruments

Three primary instruments were utilised for data collection. First, a standardised **Speaking Performance Test** was administered as both a pre-test and a post-test, using a rubric adapted from the CEFR framework. Second, a **Student Perception Survey**, utilising a 5-point Likert scale, was administered post-intervention to gather descriptive data on **Technological Self-Efficacy** and **Intercultural Awareness**. Finally, a **thematic content analysis** was applied to the transcripts and audio content of the student-produced podcasts. Quantitative results were analysed using paired-samples t-tests and descriptive statistics. Triangulation examined (i) speaking gains, (ii) survey shifts, and (iii) thematic evidence from artefacts and reflections to assess convergence, complementarity, or expansion (Creswell & Plano Clark, 2018).

Reliability and Validity

To ensure the scientific rigor of the quantitative instruments, specific measures were taken. The **Speaking Performance Test** employed a rubric adapted from the national CEFR-aligned curriculum framework (Ministry of Education Malaysia, 2018), establishing strong **face and content validity**. To confirm **inter-rater reliability**, all speaking samples were scored independently by the primary researcher and a second qualified English language specialist, with the resulting scores analysed using **Cohen's Kappa (κ)**. For the Student Perception Survey, the internal consistency of the constructs (Technological Self-Efficacy and Intercultural Awareness) was established using **Cronbach's Alpha (α)** which ranged from **0.78 to 0.89**, indicating acceptable to excellent internal consistency.

Results

The results are presented in three analyses as follows.

Speaking Performance: Paired-Sample T-Test Analysis

Quantitative analysis revealed a **statistically significant and substantial improvement** in students' speaking performance across all measured dimensions after the intervention. As shown in **Table 1**, the total speaking score increased significantly from pre-test (M = 8.93, SD = 2.45) to post-test (M = 14.47, SD = 3.10), $t(29)$ = 11.87, **$p < .001$**. The effect size was **very large** (Cohen's d = 2.17), indicating a robust practical significance. Notably, the largest gains were observed in Fluency (d = 1.49) and Interaction (d = 1.41). Inter-rater reliability for the speaking scores, assessed via Intraclass Correlation Coefficient (ICC), was excellent (ICC = .91).

Table 1: Paired-Samples T-Test Results for CEFR-Aligned Speaking Performance (N=30)

Variable	Pre-Test M (SD)	Post-Test M (SD)	Mean Difference [95% CI]	t(29)	p-value	Cohen's d [95% CI]
Total Score	8.93 (2.45)	14.47 (3.10)	5.53 [4.56, 6.50]	11.87	< .001	2.17 [1.59, 2.75]
Range	1.80 (0.71)	2.87 (0.82)	1.07 [0.75, 1.39]	6.76	< .001	1.23 [0.76, 1.70]
Accuracy	1.90 (0.61)	2.70 (0.75)	0.80 [0.51, 1.09]	5.58	< .001	1.02 [0.57, 1.47]
Fluency	1.63 (0.81)	3.10 (0.88)	1.47 [1.11, 1.83]	8.18	< .001	1.49 [0.98, 2.00]
Interaction	1.53 (0.73)	2.80 (0.85)	1.27 [0.94, 1.60]	7.70	< .001	1.41 [0.91, 1.91]
Pronunciation	2.07 (0.74)	3.00 (0.74)	0.93 [0.64, 1.22]	6.45	< .001	1.18 [0.72, 1.64]

Note: M = Mean; SD = Standard Deviation; CI = Confidence Interval. Degrees of freedom (df) = 29 for all t-tests.

Student Perceptions: Descriptive Statistics

Descriptive statistics were calculated from the post-intervention survey to quantify student perceptions across four key paralinguistic domains: Engagement, Technological Self-Efficacy, Perceived Usefulness and Intercultural Awareness. This data was collected on a 5-point Likert scale to reflect the participants' subjective experience and confidence levels after engaging with the podcasting activities following the eight-week intervention. The mean scores and standard

deviations for these constructs are summarised in **Table 2**. The results show that students reported highest mean scores in all domains particularly in **Technological Self-Efficacy** ($M = 4.15$) and **Intercultural Awareness and Identity** ($M = 4.55$), indicating strong positive reception and outcomes in these areas following the implementation of the **VOICE Pedagogy**. All subscales demonstrated good to excellent reliability ($\alpha > .78$).

Table 2: Descriptive Statistics and Reliability for Student Perception Survey Subscales (N = 30)

Construct	No. of Items	Cronbach's α	Mean (M)	Standard Deviation (SD)
1. Engagement	4	.85	4.40	0.52
2. Technological Self-Efficacy	4	.78	4.15	0.67
3. Perceived Usefulness	4	.82	4.32	0.58
4. Intercultural Awareness	4	.89	4.55	0.48

Note: Responses were on a 5-point Likert scale (1=Strongly Disagree, 5=Strongly Agree).

To further illustrate, findings from the VOICE intervention show that students reported strong technological confidence across all measured domains, especially in their ability to use mobile devices for class activities (*Item 5*), record their own voices comfortably for the podcast project (*Item 6*), and utilise audio-editing applications to complete assigned tasks (*Item 7*); collectively, these positive descriptive results indicate that the VOICE Pedagogy effectively fostered technological confidence and directly addressed RQ2.

Qualitative Content Analysis

A thematic content analysis was conducted on the transcripts and audio content of the 30 final student-produced podcasts and their reflective journal entries. This analysis was performed to identify recurring themes related to the cultural exchange and digital creation process. The key findings revealed three dominant, interrelated themes: **Cultural Narrative as Digital Content** (the students' engagement with local traditions), **Increased Social Agency** (their confidence in representing their identity to an external audience), and **Practical Application of Digital Literacy** (their reported ease in using the low-cost digital tools). These qualitative themes provide contextual evidence for the quantitative findings and are explored in detail in the Discussion section.

Table 3: Emergent Themes from Qualitative Data Analysis

Theme	Description / Key Finding	Representative Data Excerpt
1. Cultural Narrative as Digital Content	Students successfully translated their local knowledge and traditions, such as cultural stories, language, and customs, into digital assets (podcasts).	*" I think the other school friends never ate hinava before... I explained how we make it."* (P23)
2. Increased Social Agency	Students demonstrated heightened confidence and empowerment in using their personal voice to represent their identity, community, and culture to an external audience.	*"My grandmother helped me with my script. She told me the story of how they celebrated Kaamatan in my kampung.."* (P08)
3. Practical Application of Digital Literacy	Students reported increased ease and competence in utilizing the low-cost mobile devices and audio editing tools to execute the podcast production phase.	*"It was hard before...but then it is easy now, I know how to record and edit the audios in Capcut and put sound effects..."* (P15)

Discussion

The evaluation of the VOICE Pedagogy as a low-cost podcasting intervention has yielded robust, convergent quantitative–qualitative evidence indicating a multidimensional effect on rural primary students. This effect included very large gains in speaking performance, along with increased technological self-efficacy and heightened intercultural awareness, all addressed systematically below.

RQ1: How does VOICE affect speaking performance?

The substantial improvement, confirmed by the **very large effect size** ($d = 2.17$), suggests that the intervention triggered a fundamental shift from teacher-dependent recitation to authentic, self-directed oral practice. From a **Sociocultural Theory** perspective, podcast tasks mediated by cultural tools (mobile devices, editing apps) and scaffolded peer interaction likely moved learners through the ZPD toward internalisation (Vygotsky, 1978). This aligns with evidence that podcasting affords meaningful, reflective communication (Rosell-Aguilar, 2015). The iterative *do–reflect–revise–share* cycle maps onto **Experiential Learning** (Kolb, 1984), with active participation functioning as a proximal driver of oral proficiency (Suseno & Darma, 2024). These processes plausibly bolstered self-efficacy via repeated mastery experiences (Bandura, 1997), consistent with creation-based tasks enhancing motivation and dampening anxiety (Bolliger, Supanakorn, & Boggs, 2010).

RQ2: How does VOICE engage the digital divide?

High **Technological Self-Efficacy** ($M = 4.15$) and the qualitative theme *Practical Application of Digital Literacy* indicate movement from digital consumption to digital authorship. By leveraging freely available, low-bandwidth tools, VOICE positions personally owned devices as central learning instruments, consistent with **MALL principles** (O'Bryan & Hegelheimer, 2007). This resonates with studies showing that sustainable, mobile-first designs promote inclusion in constrained settings (Aprianto, 2024) and reduce technology-related anxiety while building confidence (Honorious & Talin, 2024). In Malaysia's context, these outcomes address the multidimensional digital divide: access, exposure, and pedagogical readiness as identified in rural schooling (Pandian et al., 2020; Ismail, 2025).

RQ3: How does VOICE support cultural identity and ICC?

Elevated ratings for **Intercultural Awareness and Identity** ($M = 4.55$) and themes such as *Cultural Narrative as Digital Content* and *Increased Social Agency* suggest that VOICE functions as a platform for cultural mediation and identity affirmation. Learners enacted **Byram's (1997) Intercultural Communicative Competence** by interpreting and relating local heritage for broader audiences i.e., through multimodal storytelling (Alshibly & Al-Ghafri, 2024). These outcomes align with the Ministry of Education Malaysia's aim to develop globally competent yet culturally grounded learners (Ministry of Education Malaysia, 2018), reframing technology integration from access to voice.

Implications for practice and policy.

For classroom practice, VOICE offers a scalable, resource-sensitive blueprint for CEFR-aligned speaking development: prioritise task design (authentic audience, feedback cycles), lightweight audio workflows, and learner reflection over expensive hardware. For policy, the model complements national digital education priorities by institutionalising authorship i.e., a capability that builds durable self-efficacy, social capital, and community engagement in rural contexts. Interpretations are offered within the scope of a short-duration, quasi-experimental implementation; formal limitations appear in the Conclusion.

Conclusion

This study examined the VOICE Pedagogy, a low-cost, podcast-based approach, implemented specifically to address linguistic and digital-divide challenges among rural primary learners. Convergent quantitative and qualitative evidence showed **substantial gains in speaking performance**, evidenced by a very large effect size ($d = 2.17$), alongside increases in **Technological Self-Efficacy** and **Intercultural Awareness/Identity**. This effect was underpinned by qualitative themes like **Cultural Narrative as Digital Content** and **Increased Social Agency**, demonstrating the project's success in identity affirmation and cultural mediation. Furthermore, this low-cost, mobile-first design specifically addresses the endemic **access, exposure, and pedagogical readiness components of the digital divide** in rural education, successfully moving students from passive consumption to active authorship. Interpreted through Sociocultural and Experiential Learning theories, and operationalised via MALL principles, the findings indicate that learner-authored, iterative podcasting can transform traditional oral practice into authentic communication while developing critical digital creator skills. For resource-constrained schools, VOICE provides a practical, scalable blueprint to integrate CEFR-aligned speaking development with essential 21st-century competencies in context-relevant ways.

However, these findings must be interpreted within the study's **limitations**. The **short-duration, quasi-experimental design** constrains causal inference and limits claims about the retention of skills. Furthermore, the **single-site rural sample** may restrict the generalisability of the findings, and the use of **self-report measures** (Technological Self-Efficacy, ICC) introduces the risk of common-method variance. Potential implementation variability, such as teacher effects or novelty/Hawthorne effects, and device/bandwidth heterogeneity could also have influenced the observed outcomes. Therefore, **future research** priorities are clearly defined to strengthen the evidence base and inform policy for scale-up. These include conducting **longitudinal, multi-site replication** across diverse regions and grade levels (with randomisation where feasible) and implementing **delayed post-tests** to assess skill maintenance and transferability. Additionally, future work should incorporate **behavioural/observational indicators** for ICC and speaking anxiety and run **cost-utility analyses** under varying bandwidth and device constraints to inform institutional scale-up.

Acknowledgment

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