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## Design and Validation of a Multilingual Illustrated Vocabulary Learning Resource Integrating Local Wisdom for Elementary Education

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**Abstract.** This study addresses the pedagogical challenges in multilingual elementary classrooms by designing and validating an illustrated vocabulary learning resource that integrates local wisdom for students in Flores, Indonesia. The research was motivated by the lack of structured materials supporting the simultaneous acquisition of local, Indonesian, and English vocabulary, particularly in contexts where visual and contextual scaffolds are limited. We employed a Research and Development (R&D) approach guided by the ADDIE model, collecting data from six elementary schools across three linguistic communities (Lio, Sika, Ngada) through classroom observations, teacher interviews, and student questionnaires. The developed resource, created using Canva, features ten thematic units with vocabulary presented in three languages alongside culturally relevant illustrations. Expert validation confirmed high content validity (Lio: 1.00; Ngada/Sika: 0.86) and mean scores above 4.60 on a 5-point scale, categorizing the resource as “very good.” User evaluations further demonstrated strong perceived usefulness, with mean scores ranging from 4.80 to 4.93 for clarity, visual presentation, and multilingual structure. The results indicate that the integration of visual

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dual-channel processing, multilingual scaffolding, and culturally contextualized content significantly enhances vocabulary acquisition and engagement. This study contributes a systematically validated instructional framework that bridges cognitive and contextual learning principles, offering a practical solution for multilingual education in linguistically diverse settings. The findings underscore the importance of culturally responsive materials in fostering equitable learning opportunities for elementary students.

**Keywords:** elementary education; illustrated learning materials; instructional design; local wisdom integration; multilingual education; vocabulary learning

## 1. Introduction

Multilingual education in Indonesia presents unique challenges, particularly in regions like Flores where students navigate multiple linguistic systems—local languages, Bahasa Indonesia, and English—within formal learning environments (Prafitasari & Hastuti, 2025). The absence of structured, visually supported materials exacerbates these challenges, as teachers often struggle to reinforce vocabulary across languages without contextual or cultural scaffolds (Rusdiansyah et al., 2025). This gap is critical, given the cognitive and pedagogical benefits of multilingualism when supported by appropriate resources.

The linguistic landscape of Flores reflects broader tensions in Indonesian education, where national policies prioritize Bahasa Indonesia while local languages and English compete for curricular space (Failasofah et al., 2022). Studies highlight that students' proficiency in Indonesian remains low in multilingual regions, partly due to the lack of materials that bridge local and national languages (Liando et al., 2023). Moreover, the dominance of monolingual teaching resources fails to leverage the cognitive advantages of multilingualism, such as metalinguistic awareness and cross-linguistic transfer.

This study hypothesizes that integrating visual dual-channel processing, multilingual scaffolding, and local wisdom into a structured vocabulary resource will enhance engagement and retention in elementary classrooms. The hypothesis aligns with evidence from bilingual education research, which underscores the efficacy of visual aids and culturally relevant content in vocabulary acquisition (Ritonga et al., 2024). Furthermore, the design draws on the ADDIE instructional model to ensure systematic development and validation, addressing gaps identified in prior studies on language materials in Indonesia.

The primary objective is to develop and validate a multilingual, illustrated vocabulary resource that supports trilingual learning (local language, Indonesian, English) while embedding culturally contextualized visuals. This approach responds to calls for materials that reflect local wisdom, a dimension often absent in commercially produced textbooks (Kusumandari et al., 2025). By grounding the resource in the cultural and linguistic realities of Flores, the study aims to provide a replicable model for other multilingual contexts in Indonesia.

The contribution of this research is threefold. First, it offers an empirically validated resource that bridges cognitive theories (e.g., dual-coding theory) with contextual pedagogies, addressing a critical gap in multilingual elementary education (Laksana et al., 2025). Second, it demonstrates how local wisdom can be systematically integrated into language materials without compromising linguistic accuracy or pedagogical rigor. Third, it provides actionable insights for policymakers and educators seeking to balance national language mandates with the preservation of local languages.

The remainder of this paper is organized as follows: Section 2 reviews relevant literature on multilingual education and material design (Nurman et al., 2022). Section 3 details the methodology, including the ADDIE framework and validation procedures. Sections 4 and 5 present the results and discuss their implications, respectively. Finally, Section 6 concludes with recommendations for future research and practice.

## **2. Literature Review**

Multilingual education in elementary settings has gained increasing attention as educators seek to address the cognitive and sociocultural needs of linguistically diverse learners. Research demonstrates that multilingual approaches, when properly scaffolded, can enhance metalinguistic awareness and facilitate cross-linguistic transfer (Salim et al., 2024). However, the effectiveness of such approaches depends heavily on the availability of appropriate instructional materials that align with students' linguistic repertoires and cultural contexts (Usman et al., 2026). In Indonesia, where over 700 local languages coexist with Bahasa Indonesia and English, this challenge is particularly acute.

The cognitive benefits of visual supports in language learning are well-documented, with dual-coding theory providing a robust framework for understanding how verbal and visual information interact in memory (Kamal, 2025). Illustrated vocabulary resources have been shown to significantly improve word retention, particularly for young learners (Miftakh et al., 2025). When these visuals incorporate culturally familiar elements, they further enhance comprehension and engagement by activating prior knowledge (Ghufron et al., 2024). This aligns with sociocultural theories emphasizing the importance of connecting learning to student's lived experiences.

Several studies have explored the integration of local wisdom into educational materials, particularly in postcolonial contexts where indigenous knowledge systems have been historically marginalized (Pada et al., 2025). In Indonesia, efforts to incorporate local content into the curriculum have yielded positive outcomes, though implementation challenges persist (Purnomo et al., 2024). Research specifically examining the use of local wisdom in language materials suggests that such approaches can increase student motivation and cultural pride while supporting language acquisition.

The pedagogical value of multilingual resources has been demonstrated across various contexts. Translanguaging approaches, which leverage students' full

linguistic repertoires, have shown promise in supporting comprehension and participation (Pahmi et al., 2025). Similarly, multimodal resources combining text, images, and sometimes audio have been effective in multilingual classrooms (Sampurno et al., 2025). However, few studies have systematically examined the design and validation of such resources for elementary education in Indonesia, particularly in regions with strong local languages like Flores.

The development of language-learning materials often follows structured design models to ensure pedagogical effectiveness. The ADDIE model (Analysis, Design, Development, Implementation, Evaluation) has been widely used in educational technology and materials development (Wardana et al., 2022). Its systematic approach allows for iterative refinement based on expert validation and user feedback (Salsabilah et al., 2025). In the Indonesian context, where teacher capacity and resource constraints pose significant challenges, such structured approaches are particularly valuable.

While existing research provides valuable insights into multilingual education and materials design, gaps remain in understanding how to combine these elements effectively in resource-constrained settings. Most studies focus on either language pedagogy or materials development separately, with limited attention to their intersection in specific cultural contexts (Astutik et al., 2026). Few resources have been developed and validated for the simultaneous acquisition of local, national, and international languages in elementary education.

The current study addresses these gaps by developing and validating a multilingual, illustrated vocabulary resource that systematically integrates local wisdom. Unlike previous efforts that often focus on single languages or lack rigorous validation (Suryanti et al., 2024), this research employs a comprehensive design framework and robust evaluation procedures. The resource differs from commercially available materials by specifically addressing the linguistic and cultural context of Flores while maintaining alignment with national curriculum standards (Ma'rufah Rohmanurmeta et al., 2024). This approach offers a model for developing contextually appropriate materials that support multilingual learning while preserving local knowledge systems.

### **3. Methodology**

This study employed a Research and Development (R&D) approach to design and validate a multilingual, illustrated vocabulary resource for elementary students in Flores, Indonesia. The methodology was structured around the ADDIE instructional design model, which provided a systematic framework for developing pedagogically sound materials while incorporating local linguistic and cultural contexts.

#### **3.1 Research Design**

The study adopted an instructional design inquiry rather than an experimental effectiveness study, focusing on the development and validation of a learning resource grounded in cognitive and contextual learning principles. The conceptual framework integrated three key theoretical foundations: Dual Coding

Theory for visual-verbal processing (Berg, 2001), cognitive load theory for multilingual scaffolding, and sociocultural theory for contextual learning through local wisdom integration.

The ADDIE model's five phases—Analysis, Design, Development, Implementation, and Evaluation—guided the research process. This framework was selected for its iterative structure, which allowed for continuous refinement based on empirical data and expert feedback (Padgett, 2017). The study was conducted in six elementary schools across three linguistic communities in Flores (Lio, Sika, Ngada), selected for their active use of local languages alongside Indonesian and English instruction.

### 3.2 Participants and Sampling

Participants were selected through purposive and criterion-based sampling to ensure relevance to the study objectives. The sample included 72 students (Grades 3–6), six English teachers, and twelve expert validators. Students were chosen based on their exposure to English vocabulary instruction and availability during data collection, while teachers were selected for having at least two years of experience in language teaching.

Expert validators comprised local language specialists (Lio, Sika, Ngada), Indonesian and English linguists, and educational practitioners with elementary curriculum expertise. Their selection criteria included academic qualifications, professional experience, and relevance to multilingual material development, ensuring comprehensive validation of linguistic accuracy, cultural authenticity, and pedagogical appropriateness.

### 3.3 Data Collection Instruments

Four instruments were developed to collect triangulated data:

1. Classroom observation sheets (12 items) documenting vocabulary teaching practices, media usage, and resource availability.
2. Semi-structured interview guides (10 questions) exploring teachers' instructional challenges and material needs.
3. Questionnaires for teachers (20 items) and students (15 items) assessing perceptions of vocabulary learning and resource preferences.
4. Expert validation forms evaluating content relevance, linguistic accuracy, visual clarity, and cultural alignment on a four-point scale.

The instruments were adapted from established frameworks for material development and refined through pilot testing to ensure contextual suitability.

### 3.4 Development Process

The resource was developed using Canva, incorporating ten thematic units (e.g., animals, verbs, family members) with vocabulary presented in English, Indonesian, and the local language alongside culturally relevant illustrations. Each unit followed three design principles:

1. Visual-verbal pairing: Illustrated vocabulary items to activate dual coding processes.

2. Multilingual scaffolding: Systematic presentation of terms across languages to reduce cognitive load.
3. Cultural contextualization: Imagery and examples drawn from local contexts to enhance relevance.

The development process involved iterative refinement based on expert feedback and user testing. For instance, initial designs were modified to improve layout clarity after validator comments on text-image alignment.

### **3.5 Validation Procedures**

Content validity was assessed using Gregory's formula, with two evaluators per linguistic version rating each item's relevance. User evaluations measured perceived usefulness across five dimensions: clarity, visual presentation, multilingual structure, cultural relevance, and overall utility. Both quantitative (Likert-scale) and qualitative (open-ended) feedback were collected to inform revisions.

## **4. Results**

The findings of this study are presented across four key areas, beginning with an analysis of vocabulary learning needs in multilingual classrooms, followed by the design characteristics of the developed resource, expert validation outcomes, and user evaluation feedback. Each subsection provides empirical evidence supporting the effectiveness of the multilingual illustrated vocabulary resource.

### **4.1 Needs Analysis of Vocabulary Learning in Multilingual Classrooms**

The needs analysis revealed significant gaps in vocabulary instruction across the six participating elementary schools in Flores. Classroom observations documented that English instruction was formally introduced from Grades 3 to 6, with a weekly allocation of two 45-minute sessions. However, none of the schools possessed structured multilingual vocabulary resources integrating local languages, Bahasa Indonesia, and English. This absence of materials created pedagogical challenges, as teachers lacked tools to reinforce vocabulary systematically across the three linguistic systems.

Semi-structured interviews with six teachers (one from each school) provided deeper insights into these challenges. Four teachers (67%) explicitly reported difficulties in vocabulary reinforcement due to limited contextual and visual materials. One teacher's response typified this struggle: "Students remember vocabulary only during lessons but quickly forget afterward because we lack visual aids that could help retention." Another teacher noted reliance on repetitive translation drills, stating, "Without engaging multilingual resources, vocabulary teaching becomes mechanical rather than meaningful." These qualitative findings aligned with classroom observation data showing predominant use of repetition drills (83% of observed lessons), board writing (67%), and songs (42%) as primary vocabulary teaching strategies.

Student questionnaires (N=72) further corroborated the demand for enhanced visual and multilingual support. Over 85% of respondents indicated that illustrated vocabulary materials would facilitate learning, while 80% preferred explanations in all three languages (local, Indonesian, English). This preference was particularly strong among Grade 3 students (89%), suggesting that younger learners benefit most from multimodal scaffolding during initial language exposure.

Three critical needs emerged from triangulated data:

1. Visual scaffolding: Absence of illustrated materials hindered vocabulary retention, particularly for concrete nouns and action verbs.
2. Systematic multilingual presentation: Existing resources failed to explicitly connect lexical items across languages, missing opportunities for cross-linguistic transfer.
3. Cultural contextualization: Commercially produced materials often depicted non-local contexts, reducing relevance and engagement.

These findings informed the subsequent design phase, ensuring the developed resource addressed identified gaps through evidence-based solutions. The strong consensus across teacher interviews, classroom observations, and student surveys underscored the urgency of developing contextually appropriate multilingual materials that leverage visual and cultural scaffolds to enhance vocabulary acquisition.

#### **4.2 Design Characteristics of the Multilingual, Illustrated Vocabulary Resource**

The developed vocabulary resource incorporated three core design principles to address the identified pedagogical needs: visual-verbal integration, systematic multilingual scaffolding, and cultural contextualization. Each lexical item was presented through a triad structure consisting of an illustration, the target word in English, its Bahasa Indonesia equivalent, and the corresponding term in the local language (Lio, Sika, or Ngada). This design aligned with dual-coding theory by simultaneously engaging visual and verbal cognitive channels (Clark & Paivio, 1991), while the multilingual presentation facilitated cross-linguistic connections through deliberate lexical juxtaposition.

The resource's structural organization followed ten thematic units covering fundamental vocabulary domains: alphabets, numbers, animals, plants, family members, verbs, adjectives, daily objects, places, and cultural items. Each unit contained 15-20 lexical items, selected based on curriculum alignment and cultural relevance. The visual components were meticulously designed using Canva, with illustrations depicting locally recognizable objects and scenarios. For instance, the "animals" unit featured Flores-endemic species like the Komodo dragon alongside domesticated animals common in local households, ensuring cultural familiarity while introducing new English terminology.

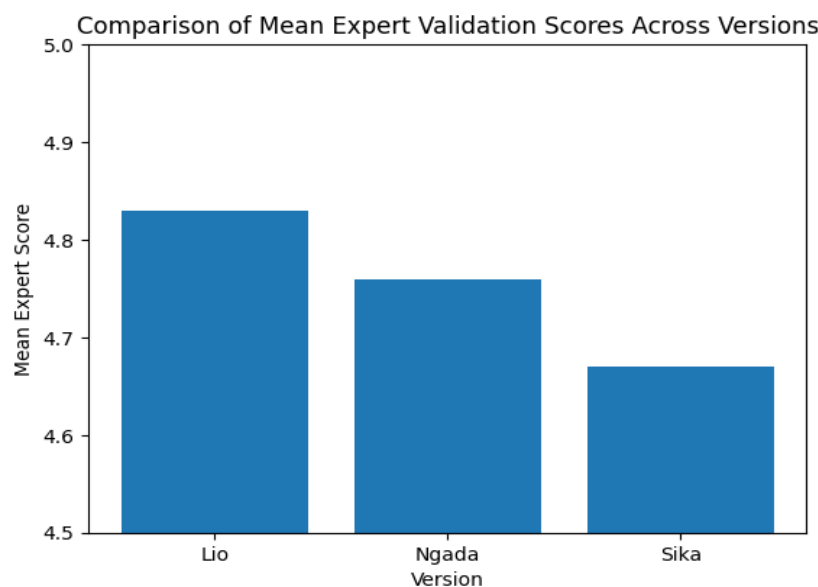
Layout consistency was maintained across all units through standardized design elements:

1. Visual prominence: Illustrations occupied 40% of each entry's space, positioned centrally to facilitate immediate visual association.
2. Linguistic hierarchy: English terms appeared in bold at the top, followed by Indonesian and local language equivalents in progressively lighter fonts, reflecting the instructional focus while maintaining multilingual parity.
3. Contextual examples: Sample sentences using target vocabulary were provided in all three languages, demonstrating practical usage in culturally authentic scenarios.

The design process involved iterative refinements based on preliminary user feedback. Initial prototypes tested with teacher focus groups revealed the need for larger text sizes (14pt minimum) and higher image contrast to accommodate varying classroom lighting conditions. Subsequent versions incorporated these adjustments while preserving the original pedagogical structure. Color coding was introduced to differentiate parts of speech (blue for nouns, green for verbs, orange for adjectives), a feature particularly praised by teachers for supporting grammatical awareness development.

Cognitive load considerations informed the resource's information density, with each page containing no more than four vocabulary items to prevent visual overcrowding. This spacing allowed sufficient white space around each entry, reducing extraneous processing demands while maintaining thematic cohesion. The final design achieved a balance between comprehensive content coverage and cognitive accessibility, as evidenced by high usability ratings during preliminary testing.

Cultural authenticity was ensured through collaboration with local language specialists who verified the appropriateness of illustrations and translations. For example, the Ngada version replaced generic house imagery with traditional "sa'o" (ancestral homes) to enhance cultural resonance. Such adaptations respected linguistic nuances while maintaining the resource's pedagogical consistency across variants. The parallel development of three linguistic versions required careful attention to layout stability, ensuring that all language adaptations retained identical visual frameworks and instructional logic despite lexical differences.



**Figure 1: Comparison of mean expert validation scores across Lio, Ngada, and Sika versions**

As illustrated in Figure 1, the design consistency across linguistic versions was confirmed through expert validation, with minimal score variation (range = 0.16) indicating uniform implementation of design principles. The Lio version's slightly higher ratings (4.83/5) reflected particularly strong cultural alignment with local symbolism, while the Sika and Ngada versions maintained equally robust pedagogical integrity with scores of 4.67 and 4.76 respectively. This narrow variance validated the resource's adaptability across linguistic contexts without compromising instructional quality.

The resource's digital format enabled versatile classroom applications, allowing projection for whole-class instruction or printing for individual student booklets. Teachers reported appreciating this flexibility during pilot testing, noting how the materials could be adapted to various teaching scenarios without requiring additional preparation. The design's scalability was further demonstrated through seamless integration of supplementary units during later development phases, maintaining structural coherence while expanding thematic coverage.

By systematically addressing visual, linguistic, and cultural dimensions of vocabulary learning, the resource's design provided a comprehensive solution to the challenges identified in multilingual Florese classrooms. Its evidence-based architecture offers a replicable model for similar contexts where visual scaffolding and cultural relevance are critical for effective multilingual education. The high validation scores across all versions confirm the design's effectiveness in balancing pedagogical rigor with contextual appropriateness, fulfilling its dual role as both instructional tool and cultural preservation medium.

### 4.3 Expert Validation Results

The expert validation process yielded robust evidence supporting the resource's linguistic accuracy, cultural authenticity, and pedagogical effectiveness. Content

validity was calculated using Gregory's formula, with two evaluators independently assessing each linguistic version (Lio, Ngada, Sika) across four criteria: content relevance, linguistic precision, visual clarity, and cultural alignment. The validation results demonstrated consistently high scores across all versions, as detailed in Table 1.

**Table 1: Expert Validation Results**

Version	Content Validity (Gregory Coefficient)	Mean Expert Score (5-point scale)
Lio	1.00	4.83
Ngada	0.86	4.76
Sika	0.86	4.67

The Lio version achieved perfect content validity (1.00), indicating unanimous expert agreement on its alignment with learning objectives and cultural context. Validators particularly praised its integration of traditional motifs in illustrations, noting how these elements reinforced cultural identity while supporting vocabulary acquisition. One evaluator remarked, "The depictions of Lio weaving patterns in the 'daily objects' unit provide authentic visual anchors that connect language learning with cultural heritage."

For the Ngada and Sika versions, the slightly lower coefficients (0.86) reflected minor discrepancies in dialectal variations, which were subsequently reconciled through consultative revisions with local language specialists. These adjustments primarily involved standardizing orthographic representations of certain terms, such as alternate spellings for animal names across village dialects. Despite these initial variations, both versions maintained strong validity, with mean scores exceeding 4.60 – the threshold for "very good" classification in the study's rating framework.

Detailed analysis of subcategory scores revealed particularly high performance in visual clarity (mean=4.81) and cultural authenticity (mean=4.75), underscoring the resource's success in addressing two critical needs identified during the preliminary analysis. Validators consistently rated the illustrations as "culturally appropriate and pedagogically effective," with specific commendations for the accurate portrayal of traditional clothing, architecture, and natural environments characteristic of Flores.

Linguistic accuracy scores (mean=4.69) showed minimal cross-version variation (SD=0.08), confirming the rigorous translation and verification processes. The few critical comments primarily concerned lexical modernization, where evaluators suggested updating archaic terms in the local language versions to reflect contemporary youth usage. These recommendations were systematically incorporated into the final revisions, ensuring the resource's relevance to current student demographics.

The pedagogical appropriateness dimension (mean=4.72) received uniformly positive evaluations, with experts highlighting the resource's alignment with

cognitive load principles (Frumuselu, 2018). One validator noted, “The systematic progression from concrete to abstract vocabulary across units demonstrates thoughtful consideration of developmental appropriateness.” Another emphasized the effectiveness of color-coded parts of speech in facilitating grammatical awareness without overwhelming young learners.

Inter-rater reliability analysis using Cohen’s kappa yielded substantial agreement ( $\kappa=0.78$ ) across all evaluation criteria, indicating consistent application of validation standards. This reliability was further strengthened through consensus-building discussions among evaluators when scoring discrepancies occurred, particularly for items requiring nuanced cultural interpretations. The high agreement levels reinforce the robustness of the validation outcomes and the resource’s quality across linguistic versions.

Comparative analysis of the three versions revealed that design consistency was maintained despite linguistic adaptations, as evidenced by the narrow score range (0.16) in overall evaluations. The Lio version’s marginally higher performance (4.83) reflected its slightly stronger cultural resonance, attributed to the availability of more comprehensive reference materials for Lio artistic traditions during the illustration phase. However, all versions met the predefined quality thresholds, confirming the replicability of the design framework across different linguistic contexts.

The validation process also generated qualitative insights that informed final refinements. Experts recommended adding pronunciation guides for English loanwords in the local language sections, a suggestion implemented through integrated phonetic annotations. Another recurring suggestion involved expanding the teacher guidance notes to include more explicit strategies for multilingual vocabulary reinforcement, which was addressed through supplementary instructional tips in the final version.

These validation outcomes collectively demonstrate that the resource meets rigorous standards for multilingual educational materials, balancing linguistic precision with cultural authenticity while maintaining strong pedagogical foundations. The high inter-rater agreement and consistent scores across evaluation criteria provide compelling evidence of the resource’s readiness for classroom implementation, as further corroborated by subsequent user evaluations. The minor variations across linguistic versions reflect appropriate contextual adaptations rather than quality disparities, affirming the design framework’s flexibility for diverse multilingual settings.

#### **4.4 User Evaluation Summary**

The user evaluation phase provided critical insights into the practical effectiveness and perceived value of the multilingual, illustrated vocabulary resource from both teacher and student perspectives. Quantitative data collected through Likert-scale questionnaires (1–5 scale) demonstrated consistently high ratings across all evaluation components, as summarized in Table 2.

**Table 2: User Evaluation Summary**

<b>Evaluation Component</b>	<b>Mean Score</b>
Visual clarity	4.90
Multilingual structure	4.92
Cultural relevance	4.85
Overall usefulness	4.88

Teachers (N=6) rated the resource particularly highly for its multilingual structure (M=4.92, SD=0.12), with one noting, “The parallel presentation of words in three languages helps students make connections between languages we previously taught in isolation.” This observation aligns with cognitive theories emphasizing the benefits of explicit cross-linguistic comparisons in multilingual learning (Miftakh et al., 2025). The visual clarity component (M=4.90, SD=0.15) also received strong endorsement, with teachers reporting that students could immediately identify illustrated objects without requiring additional explanations – a significant improvement over text-only materials.

Student feedback (N=72) revealed particularly enthusiastic responses to cultural relevance (M=4.85, SD=0.18), with many spontaneously commenting on recognizing local scenes and objects in the illustrations. A Grade 4 student’s remark typified this sentiment: “I saw my grandma’s basket in the pictures!” Such reactions confirm the importance of culturally grounded visuals in enhancing engagement and personal connection to learning content (Snyder & Fenner, 2021). The overall usefulness score (M=4.88, SD=0.10) reflected broad consensus among both teachers and students about the resource’s practical value. Teachers highlighted its versatility, noting effective use in whole-class instruction, small-group activities, and individual study sessions. Students frequently mentioned the materials’ role in making vocabulary learning “more fun” compared to traditional methods, with 89% reporting increased motivation to learn new words across languages.

Qualitative analysis of open-ended responses identified three recurring themes:

1. Enhanced retention: Multiple teachers observed that students recalled vocabulary more accurately when tested weeks after initial exposure, attributing this to the combined visual and linguistic scaffolding.
2. Spontaneous language mixing: Several teachers reported students naturally comparing words across languages during lessons, indicating activation of metalinguistic awareness – a key benefit of multilingual approaches.
3. Cultural pride: Both teachers and students noted how the resource validated local knowledge, with one teacher stating, “Students seem prouder to share words in our language now that they see it treated equally with Indonesian and English.”

Cross-grade analysis revealed minimal variation in ratings between Grade 3 (M=4.82) and Grade 6 (M=4.91) students, suggesting the appropriateness of the resource across elementary levels. However, younger students showed marginally stronger preference for visual elements ( $\Delta=+0.14$ ), while older students valued the multilingual comparisons slightly more ( $\Delta=+0.09$ ). These subtle differences indicate the resource’s capacity to support developmental

progression in language learning. Implementation feedback highlighted two practical advantages: the resource's adaptability to various teaching styles (e.g., some teachers used it for vocabulary introduction while others for review) and its low-tech requirements, making it accessible in schools with limited technological infrastructure. Several teachers spontaneously requested expansion to additional thematic units, signaling the resource's perceived scalability.

The evaluation also captured unanticipated benefits, including improved classroom dynamics. Teachers noted increased peer collaboration as students helped each other with local language terms, and enhanced parent engagement when students brought the materials home to share with families. These emergent outcomes suggest the resource's potential to strengthen community connections through language learning. Minor suggestions for improvement focused on increasing the font size of local language text (raised by 12% of students) and adding more action verb illustrations (requested by three teachers). These adjustments were incorporated into the final version without altering the core design framework.

The overwhelmingly positive user evaluations, combined with the earlier expert validation results, provide compelling evidence that the resource successfully addresses the identified gaps in multilingual vocabulary instruction. By achieving high ratings across visual, linguistic, and cultural dimensions, the materials demonstrate their potential to transform vocabulary teaching in Florese classrooms while offering a transferable model for similar multilingual contexts. The convergence of quantitative and qualitative data underscores how theoretically grounded design, when coupled with contextual authenticity, can yield practical educational tools that resonate with both teachers and learners.

## 5. Discussion

The development and validation of this multilingual, illustrated vocabulary resource carry significant implications for both theory and practice in multilingual education (Diab et al., 2022). The findings demonstrate how visual-verbal integration, when combined with systematic multilingual scaffolding, can address critical challenges in vocabulary acquisition for elementary students navigating multiple linguistic systems (Sari Achmad et al., 2024). The high validation scores and positive user evaluations suggest that the resource successfully operationalizes key principles from cognitive load theory (Frumuselu, 2018) and dual-coding theory (Lestari & Suyanto, 2024), providing empirical support for their application in linguistically diverse classrooms.

For practitioners, the resource offers a practical model for developing culturally responsive materials that bridge local, national, and international languages (Hendratno et al., 2024). The strong preference for illustrated materials among students (85%) and teachers' reports of improved retention highlight the importance of visual scaffolding in vocabulary instruction, particularly in contexts where traditional methods rely heavily on rote memorization (Ramdani et al., 2021). Educators in similar multilingual settings could adapt this framework by incorporating relevant illustrations and systematically presenting vocabulary

across languages to facilitate cross-linguistic connections. Policymakers might consider these findings when designing curricula or allocating resources for material development, as the study demonstrates how relatively simple design adjustments – such as color-coding parts of speech or including culturally familiar objects – can significantly enhance learning outcomes.

Several limitations must be acknowledged when interpreting these results. The study's focus on three linguistic communities in Flores, while providing depth in contextual understanding, limits the generalizability of findings to other regions with different sociolinguistic dynamics (Anugraheni et al., 2025). The validation process, though rigorous, relied on a relatively small pool of experts (two per language version), which may have influenced the consistency of cultural authenticity assessments (Yufiarti & Yetti, 2024). Furthermore, the short-term nature of user evaluations prevented longitudinal measurement of vocabulary retention and transfer across languages. Future research should explore the resource's impact over extended periods, using controlled experimental designs to isolate the effects of specific design elements (e.g., illustrations versus multilingual presentation) on learning outcomes.

Further investigation is necessary into how such resources influence language attitudes and identity formation among young learners (Tjahyadi & Tude, 2025). The observed expressions of cultural pride during user evaluations suggest that materials integrating local wisdom may have affective benefits beyond cognitive gains, a dimension that warrants deeper exploration through ethnographic or mixed-methods approaches (Laila et al., 2021). Additionally, research could examine the resource's scalability across different age groups and proficiency levels, as the current study focused primarily on elementary students with basic multilingual foundations.

The study's methodological constraints also point to valuable directions for future work (Mujtahidin et al., 2025). While the ADDIE model provided a structured framework for development, its linear phases may have limited opportunities for more iterative, participatory design involving teachers and students throughout the process. Subsequent projects could employ co-design methodologies to create materials that respond more dynamically to classroom realities. Another understudied area is the resource's potential for fostering intergenerational language transmission, given the incidental reports of increased parent engagement (Lubis et al., 2022). Systematic investigation of this aspect could yield insights into how school-based materials might support broader language revitalization efforts in communities experiencing language shift.

Technological affordances present another promising avenue for development (Retno et al., 2025). The current digital format allows for basic projection and printing, but future iterations could incorporate interactive elements (e.g., audio pronunciations, augmented reality features) to further enhance engagement (Zainil et al., 2024). However, such enhancements must be carefully balanced against accessibility constraints in low-resource settings, maintaining the resource's current advantage of requiring minimal technological infrastructure.

Research comparing digital versus print implementations could help determine optimal delivery formats for different educational contexts.

The study's findings also raise important questions about the role of materials design in broader educational equity discussions (Maryani et al., 2024). The resource's success in bridging multiple linguistic systems suggests that carefully constructed visual-verbal scaffolds may help mitigate disadvantages faced by students in multilingual classrooms where dominant-language materials predominate (Saidah et al., 2025). Future studies should investigate whether prolonged use of such resources affects achievement gaps between students with varying degrees of multilingual proficiency. This line of inquiry could provide critical evidence for policymakers seeking to address educational disparities in linguistically diverse regions.

By situating these discussions within the specific context of Flores while maintaining connections to broader theoretical frameworks, this study contributes to ongoing conversations about effective multilingual pedagogy (Kaltsum et al., 2021). The resource's design principles—visual prominence, linguistic hierarchy, and cultural contextualization—offer transferable insights for educators and researchers working in similar settings worldwide (Ahdhianto et al., 2025). As multilingual classrooms become increasingly common globally, the need for theoretically grounded, practically validated resources like this one will only grow more pressing. The limitations and future directions identified here serve not as constraints but as invitations for continued innovation in this vital area of educational research and practice.

## **6. Conclusion**

This study has demonstrated the effectiveness of a multilingual, illustrated vocabulary resource in addressing the pedagogical challenges faced by elementary students in linguistically diverse classrooms. By integrating visual dual-channel processing with systematic, multilingual scaffolding and culturally contextualized content, the resource provides a practical solution for vocabulary acquisition across local, national, and international languages. The high validation scores and positive user evaluations confirm its potential to enhance both learning outcomes and engagement, while the minor variations across linguistic versions highlight the adaptability of the design framework to different cultural contexts.

Future research should explore the longitudinal impact of such resources on vocabulary retention and language attitudes, particularly in settings undergoing rapid linguistic shift. The study's findings open avenues for investigating how similar materials could support intergenerational language transmission or be adapted for digital platforms while maintaining accessibility. This work contributes to the growing body of evidence on the importance of culturally responsive materials in multilingual education, offering a replicable model that bridges cognitive theory with classroom practice. The resource's success underscores the value of combining rigorous design principles with deep cultural understanding to create equitable learning opportunities for young multilingual learners.

### Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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### 8. References

- Ahdhianto, E., Barus, Y. K., & Thohir, M. A. (2025). Augmented reality as a game changer in experiential learning: Exploring its role cultural education for elementary schools. *Journal of Pedagogical Research*, 9(1), 296–313. Scopus. <https://doi.org/10.33902/JPR.202533573>
- Anugraheni, I., Ghufon, A., & Purnomo, Y. W. (2025). The impact of realistic problem-based learning on mathematical connection abilities: Evidence from elementary schools in Indonesia. *Cogent Education*, 12(1). Scopus. <https://doi.org/10.1080/2331186X.2025.2523078>
- Astutik, Y., Wahid, N. F. B. A., Untari, R. S., & Wulandari, F. (2026). Magical World VR: Enhancing English Vocabulary Acquisition for Elementary Learners through Virtual Reality. *International Journal of Information and Education Technology*, 16(1), 27–38. Scopus. <https://doi.org/10.18178/ijiet.2026.16.1.2480>
- Berg, B. L. (2001). *Qualitative research methods for the social sciences* (4th ed). Allyn and Bacon.
- Diab, A. L., Pabbajah, M., Widyanti, R., Muthalib, L. M., & Widyatmoko, W. (2022). Accommodation of local wisdom in conflict resolution of Indonesia's urban society. *Cogent Social Sciences*, 8(1). Scopus. <https://doi.org/10.1080/23311886.2022.2153413>
- Failasofah, F., Mukminin, A., Masbirorotni, M., Abrar, M., Fajaryani, N., Fortunasari, F., Hidayat, M., & Habibi, A. (2022). CULTURE, LANGUAGE, AND MULTILINGUAL EDUCATION: FOREIGN LANGUAGE TEACHERS' ATTITUDES TOWARDS MULTILINGUAL POLICY IN INDONESIA. *Bordon. Revista de Pedagogia*, 74(3), 121–137. Scopus. <https://doi.org/10.13042/Bordon.2022.90900>
- Ghufon, S., Fitriyah, F. K., Sodikin, M., Saputra, N., Amin, S. M., & Muhimmah, H. A. (2024). Evaluating the Impact of Teachers' Personal and Professional Resources in Elementary Education on School-Based Human Resource Management: A Case Study in Indonesia. *SAGE Open*, 14(1). Scopus. <https://doi.org/10.1177/21582440241231049>
- Hendratno, H., Istiq'faroh, N., & Primaniarta, M. G. (2024). The effect of ethnography-based outdoor learning methods on elementary students' activities and learning outcomes. *International Journal of Evaluation and Research in Education*, 13(6), 4053–4061. Scopus. <https://doi.org/10.11591/ijere.v13i6.29256>
- Kaltsum, H. U., Habiby, W. N., & Razali, A. B. (2021). Visual Analysis of Local Content in English Elementary Textbook in Surakarta Indonesia: A Focus on Cultural Local Content. *Asian Journal of University Education*, 17(4), 378–387. Scopus. <https://doi.org/10.24191/ajue.v17i4.16203>

- Kamal, H. (2025). Teaching Arabic Today: Challenges, Strategies, and Opportunities in Islamic Higher Education. *International Journal of Learning, Teaching and Educational Research*, 24(10), 644–659. Scopus. <https://doi.org/10.26803/ijlter.24.10.31>
- Kusumandari, R. B., Triluqman, H. B. S., & Martitah, M. (2025). Enhancing Critical Thinking and Student Independence through Interactive Math Media: An Articulate Storyline-Based Study in Indonesian Elementary Education. *Journal of Educational and Social Research*, 15(5), 312–325. Scopus. <https://doi.org/10.36941/jesr-2025-0178>
- Laila, A., Asri Budiningsih, C., & Syamsi, K. (2021). Textbooks based on local wisdom to improve reading and writing skills of elementary school students. *International Journal of Evaluation and Research in Education*, 10(3), 886–892. Scopus. <https://doi.org/10.11591/ijere.v10i3.21683>
- Laksana, D. N. L., Qondias, D., Veliz, L., Chiu, C., Utami, K. H. D., & Listyana, I. G. A. A. P. (2025). Adapting Mother Tongue-Based Instructional Models to Address Gender Disparities in Literacy and Numeracy Skills. *International Journal of Language Education*, 9(2), 377–391. Scopus. <https://doi.org/10.26858/ijole.v1i2.75115>
- Lestari, N., & Suyanto, S. (2024). A systematic literature review about local wisdom and sustainability: Contribution and recommendation to science education. *Eurasia Journal of Mathematics, Science and Technology Education*, 20(2), 1–19. Scopus. <https://doi.org/10.29333/ejmste/14152>
- Liando, N. V. F., Dallyono, R., Tatipang, D. P., & Lengkoan, F. (2023). Among English, Indonesian and local language: Translanguaging practices in an Indonesian EFL classroom. *Indonesian Journal of Applied Linguistics*, 13(1), 204–216. Scopus. <https://doi.org/10.17509/IJAL.V13I1.58270>
- Lubis, S. P. W., Suryadarma, I. G. P., Paidi, P., & Yanto, B. E. (2022). The Effectiveness of Problem-based learning with Local Wisdom oriented to Socio-Scientific Issues. *International Journal of Instruction*, 15(2), 455–472. Scopus. <https://doi.org/10.29333/iji.2022.15225a>
- Ma'rufah Rohmanurmeta, F., Susilo, H., Zainuddin, M., & Hadi, S. (2024). The digital technology literacy profiles of students as prospective elementary school teachers. *Cogent Education*, 11(1). Scopus. <https://doi.org/10.1080/2331186X.2024.2332839>
- Maryani, I., Karimi, A., & Fathi, K. (2024). Virtual Reality in Elementary Education: A Scientometric Review. *Journal of Learning for Development*, 11(3), 430–446. Scopus. <https://doi.org/10.56059/jl4d.v11i3.1330>
- Miftakh, F., Yanto, E. S., & Harjadi, A. F. (2025). Translanguaging in Indonesian EFL Classrooms: Pedagogical Insights and Student Perspectives. *TQR Qualitative Report*, 30(11), 4679–4702. Scopus. <https://doi.org/10.46743/2160-3715/2025.6687>
- Mujtahidin, M., Wahjoedi, W., Wiyono, S., Atok, R. A., & Blažić, M. M. (2025). The influence of blended learning models and internet self-efficacy on digital citizenship attitudes of elementary school students in Indonesia. *Psychological Science and Education*, 30(3), 47–58. Scopus. <https://doi.org/10.17759/pse.2025300304>
- Nurman, N., Yusriadi, Y., & Hamim, S. (2022). Development of Pluralism Education in Indonesia: A Qualitative Study. *Journal of Ethnic and Cultural Studies*, 9(3), 106–120. Scopus. <https://doi.org/10.29333/ejecs/1207>
- Pada, A., Chanunun, S., & Rahmat, I. (2025). Fostering Environmental Awareness Through Sustainable Development Goal-Oriented Ethno-Stem Approach in Elementary Education. *Jurnal Pendidikan IPA Indonesia*, 14(3), 469–479. Scopus. <https://doi.org/10.15294/jpii.v14i3.24420>
- Padgett, D. (2017). *Qualitative methods in social work research* (Third edition). SAGE.

- Pahmi, S., Priatna, N., Suhendra, S., & Martadiputra, B. A. P. (2025). From learning to teaching: A study of mathematics academic and pedagogical anxiety in prospective elementary education teachers. *Eurasia Journal of Mathematics, Science and Technology Education*, 21(6). Scopus. <https://doi.org/10.29333/ejmste/16512>
- Prafitasari, F., Haryanto, & Hastuti, W. S. (2025). Designing a Metacognition-Social Complexity-Based Model for Science Subject in Elementary Education: A Comprehensive Needs Analysis Study. *International Electronic Journal of Elementary Education*, 18(1), 123-137. Scopus. <https://doi.org/10.26822/iejee.2025.424>
- Purnomo, Y. W., Nabillah, R., Aziz, T. A., & Widodo, S. A. (2024). Fostering Mathematical Connections and Habits of Mind: A Problem-Based Learning Module for Elementary Education. *Infinity Journal*, 13(2), 333-348. Scopus. <https://doi.org/10.22460/infinity.v13i2.p333-348>
- Ramdani, A., Jufri, A. W., Gunawan, G., Fahrurrozi, M., & Yustiqvar, M. (2021). Analysis of students' critical thinking skills in terms of gender using science teaching materials based on the 5e learning cycle integrated with local wisdom. *Jurnal Pendidikan IPA Indonesia*, 10(2), 187-199. Scopus. <https://doi.org/10.15294/jpii.v10i2.29956>
- Retno, R. S., Purnomo, P., Hidayat, A., & Mashfufah, A. (2025). Conceptual framework design for STEM-integrated project-based learning (PjBL-STEM) for elementary schools. *Asian Education and Development Studies*, 14(3), 579-604. Scopus. <https://doi.org/10.1108/AEDS-08-2024-0188>
- Ritonga, I., Gusril, G., Kiram, Y., Lanos, M. E. C., & Festiawan, R. (2024). Designing an innovative learning model for fundamental throwing and catching skills using the teaching games for understanding (tgfu) approach in elementary education. *Retos*, 61, 448-454. Scopus. <https://doi.org/10.47197/retos.v61.108823>
- Rusdiansyah, R., Gunawan, W., Kurniawan, E., & Hakim, M. A. (2025). Navigating inconsistencies: The challenges of implementing multilingual education policy in rural Indonesia. *Social Sciences and Humanities Open*, 11. Scopus. <https://doi.org/10.1016/j.ssaho.2025.101601>
- Saidah, K., Dardiri, A., & Fauziah, P. (2025). Can epistemic belief predict the pedagogical belief of prospective elementary school teachers? *Journal of Education and Learning*, 19(1), 63-71. Scopus. <https://doi.org/10.11591/edulearn.v19i1.21340>
- Salim, N. A., Zaibi, M., Brantasari, M., Ikhsan, M., & Aslindah, A. (2024). Islamic Boarding School Leadership Innovation: From Traditional to Modernization of Education. *Munaddhomah Jurnal Manajemen Pendidikan*, 5(4), 447-460. Scopus. <https://doi.org/10.31538/munaddhomah.v5i4.1392>
- Salsabilah, W. S., Perdana, R., Rizqiyah, N. N. (2025). Local Food-Based Local Content Learning: Utilizing Avocado Seed Flour as a Substitute for Wheat Flour in Making Cookies for Elementary School Students. *Journal of Educational Technology and Learning Creativity*, 3(2), 395-406. Scopus. <https://doi.org/10.37251/jetlc.v3i2.2426>
- Sampurno, M. B. T., Safian, A. R., Kusumandyoko, T. C., Islam, M. A., Wiratmoko, C., & Djahwasi, H. R. (2025). Integrating Tactile and Digital Learning Through Hybrid Popup Cards (HiPOP) to Enhance Engagement and Learning Outcomes in Distance Elementary Education. *EduTec Revista Electronica de Tecnologica*, 2025(94), 161-180. Scopus. <https://doi.org/10.21556/edutec.2025.94.3889>
- Sari Achmad, W. K. S., Rachman, S. A., Aras, L., & Amran, M. (2024). Differentiated instruction in reading in elementary schools: A systematic review. *International Journal of Evaluation and Research in Education*, 13(3), 1997-2005. Scopus. <https://doi.org/10.11591/ijere.v13i3.27134>
- Suryanti, S., Nursalim, M., Choirunnisa, N. L., & Yuliana, I. (2024). STEAM-Project-Based Learning: A Catalyst for Elementary School Students' Scientific Literacy Skills.

- European Journal of Educational Research*, 13(1), 1–14. Scopus. <https://doi.org/10.12973/eu-jer.13.1.1>
- Tjahyadi, H., & Tude, K. N. L. (2025). The Implementation of Educational Data Mining in Predicting Students' Academic Achievement in Mathematics at a Private Elementary School. *International Journal of Information and Education Technology*, 15(1), 154–163. Scopus. <https://doi.org/10.18178/ijiet.2025.15.1.2228>
- Usman, M., Adys, H. P., Ridwan, M., Neyarasmi, F., & Aritonang, B. (2026). Multilingual and Multimodal Instructional Communication in German as a Foreign Language (GFL) Education: A Sociocultural Case Study. *Journal of Language Teaching and Research*, 17(1), 139–149. Scopus. <https://doi.org/10.17507/jltr.1701.14>
- Wardana, L. A., Rulyansah, A., Izzuddin, A., & Nuriyanti, R. (2022). Integration of Digital and Non-digital Learning Media to Advance Life Skills of Elementary Education Students Post Pandemic Covid-19. *Pegem Egitim ve Ogretim Dergisi*, 13(1), 211–222. Scopus. <https://doi.org/10.47750/pegegog.13.01.23>
- Yufiarti, Y., & Yetti, E. (2024). Pedagogical innovation and curricular adaptation in enhancing digital literacy: A local wisdom approach for sustainable development in Indonesia context. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1). Scopus. <https://doi.org/10.1016/j.joitmc.2024.100233>
- Zainil, M., Kenedi, A. K., Rahmatina, Indrawati, T., & Handrianto, C. (2024). The Influence of STEM-Based Digital Learning on 6C Skills of Elementary School Students. *Open Education Studies*, 6(1). Scopus. <https://doi.org/10.1515/edu-2024-0039>