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Developing 'Melali' Interactive Multimedia With Balinese Cultural Values For Contextual Language Learning Among Elementary School Students

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Abstract

Balinese language education at the elementary school level faces significant challenges due to the lack of contextual visual media and declining student interest in their mother tongue. This study aims to design and develop "MELALI," an interactive multimedia tool as an innovative Balinese language learning medium that integrates local cultural values. Employing the Multimedia Development Life Cycle (MDLC) method, this research highlights novelty in the visual representation of characters and environments relevant to Balinese cultural identity for first-grade students at SD Negeri 3 Kukuh. The study involved 24 first-grade students as participants. Data were collected through observations, interviews, and field trials using a pre-test and post-test design. Quantitative descriptive analysis was used to measure feasibility, while comparative analysis was employed to evaluate student learning outcomes . The results indicate that the "MELALI" multimedia is highly feasible based on material expert validation (96%) and media expert validation (88%). Empirically, the use of this medium was associated with an increase in average scores from 49.1 to 90.8. These findings suggest that integrating cultural values into interactive multimedia technology has the potential to serve as an effective catalyst for preserving local languages and improving the quality of contextual learning in the digital era.

1. INTRODUCTION

Balinese language instruction within the local content curriculum holds a strategic role as both a pillar of cultural preservation and an instrument for identity formation among Bali's younger generation. At the primary school level, the introduction of regional languages serves not only as a communication tool but also as a medium for transmitting the values of local wisdom embedded within the linguistic structure (Setiawan et al., 2025). However, in this digital era, preservation efforts face significant challenges due to the dominance of Indonesian and foreign languages in children's daily media consumption. In the Balinese context, this phenomenon is evidenced by

the shrinking domain of mother tongue usage in family environments, where many Balinese parents now prioritize Indonesian to ensure their children's academic and social mobility. This shift is further exacerbated by the digital habits of Generation Alpha in Bali, who are more frequently exposed to global YouTube content and mobile games than to traditional Balinese oral traditions. This trend potentially severs the transmission of the mother tongue if not managed through adaptive learning methods that resonate with the digital lifestyles of modern Balinese children (Fahira et al., 2023).

Factual conditions at SD Negeri 3 Kukuh, Tabanan, Bali, reveal a significant gap between curriculum expectations and students' actual abilities. Semi-structured interviews conducted with the first-grade teacher, I Gusti Agung Paramita Dewi, S.Pd., identified that students frequently experience linguistic disorientation, often intermixing Balinese and Indonesian diction inappropriately. A primary constraint is the over-reliance on the "TEMA" textbook, which lacks the visual depth and explanatory material necessary to engage lower-grade students. Consequently, this text-heavy resource fails to stimulate independent exploration in children who are cognitively dependent on visual stimuli (Khusna & Septikasari, 2025).

The urgency of this research is underscored by a pre-test conducted with 24 first-grade students at SD Negeri 3 Kukuh, which yielded an average score of 49.1,well below the Minimum Mastery Criterion (KKM) of 70. This gap highlights the students' cognitive barriers in processing abstract linguistic information. As children aged 6–7 are in the concrete operational stage, they require tangible visual representations to comprehend complex concepts (Windawati & Koeswanti, 2021). However, the current "TEMA" textbook,which is practice-oriented and lacks sufficient illustration,imposes an excessive cognitive load, making Balinese language materials difficult to grasp. Without adaptive media intervention, this linguistic disorientation risks an irreversible erosion of communicative competence in the mother tongue among Bali's younger generation (Mustika, 2018).

Theoretically, various attempts to integrate technology into language learning have been documented, such as Android-based applications for foreign language vocabulary(Basith, 2023), interactive media for IUPAC nomenclature (Kartini & Setiawan, 2019), and basic English learning media for fifth graders (Natalia & Setiawan, 2020). While these studies effectively demonstrate the technical viability of mobile platforms, they remain largely focused on generic instructional mechanics and globalized content. A critical gap persists: current literature lacks interactive media that bridges cognitive developmental needs with local cultural authenticity. Most existing applications utilize standardized assets that fail to resonate with the specific cultural identity of Balinese students.

The originality of this study, therefore, lies in its departure from purely functional multimedia toward a synthesis of local cultural aesthetics and Android-based technology. Unlike previous research that prioritizes technical gameplay, this study introduces novelty through the visual authenticity of Balinese traditional attire and contextual environments as primary pedagogical instruments. By emphasizing these specific local aesthetic elements, the "MELALI" application serves as a differentiator that fosters emotional proximity and strengthens cultural identity,aspects often neglected in general digital learning media.

This research aims to design and develop "MELALI" (Melajah Lingkungan Basa Bali), an interactive learning multimedia application. The selection of interactive multimedia is based on its ability to integrate Dual Coding Theory, which synchronizes verbal and visual channels to strengthen memory retention (Maulidina et al., 2018). Unlike static media, the interactive characteristics of the Android platform offer autonomous navigation control, enabling self-paced learning suitable for the cognitive development of first graders. The application addresses the learning challenges at SD Negeri 3 Kukuh through three strategic advantages: the presentation of

concrete visualizations through characters in traditional Balinese attire to bridge the gap with students' daily reality ; a multi-sensory approach using integrated audio narration to assist developing functional reading skills and pronunciation accuracy (Nani Rosanti, Mu'amar, 2022); and an interactivity aspect that creates a "fun learning" ecosystem to enhance intrinsic motivation. Thus, "MELALI" serves as a pedagogical bridge aligning authentic local wisdom with the digital preferences of Generation Alpha (Khusna & Septikasari, 2025).

By transforming abstract textbook material into tangible visual experiences, "MELALI" serves as a strategic stimulus to help students visualize environmental objects that are otherwise difficult to comprehend through static print (Sahronih et al., 2022). The integration of precise Balinese audio narration provides essential auditory guidance, allowing for consistent pronunciation practice independent of the teacher's constant presence. Pedagogically, this digital transition is designed to mitigate learning fatigue by adopting "fun learning" principles while maintaining the rigorous standards of Balinese local content. Ultimately, this adaptive environment is expected to stimulate student curiosity and ensure the achievement of Minimum Mastery Criteria (KKM) through a more contextualized learning process (Siregar et al., 2024). This study thus contributes a practical model for digital cultural preservation that aligns educational technology with the specific cognitive and linguistic needs of early childhood education in Bali.

The significance of this research encompasses both practical and theoretical aspects. Practically, this multimedia is expected to serve as a digital instructional tool that assists teachers in delivering material despite limited physical facilities. Theoretically, this research contributes to the development of multimedia instructional design that prioritizes local wisdom as a primary appeal. The scope of this research focuses on environmental vocabulary, including the names of animals, objects, fruits, plants, and public places, with the hope of creating a long-term impact on strengthening the Balinese language foundation for Generation Alpha.

2. METHODS AND THEORY

2.1 Research Design

This study employs a Research and Development (R&D) approach by implementing the Multimedia Development Life Cycle (MDLC) model, specifically the Luther version. This model was selected for its structured stages,ranging from concept definition to distribution,which facilitate continuous evaluation throughout the development process. (Patricia et al., 2026).

2.2 Research Subjects and Location

The research was conducted at SD Negeri 3 Kukuh, Tabanan, Bali. The participants were selected using a **purposive sampling** technique based on the following criteria:

1) End-Users: 24 first-grade students to evaluate the media's effectiveness in a real-world classroom setting.
2) Subject Matter Expert (SME): A Balinese language teacher with over five years of pedagogical experience to ensure curricular alignment.
3) Media Experts: Two specialists in Information Technology and Visual Communication Design, selected based on their expertise in UI/UX and educational software development, to validate technical integrity.

2.3 Instruments and Data Collection Techniques

To ensure methodological rigor, data were collected through several instruments:

1) Qualitative Instruments: Semi-structured interviews and classroom observations were conducted to identify learning constraints.

2) Quantitative Instruments: Pre-test and post-test evaluations, consisting of 10 validated multiple-choice questions, were used to measure learning outcomes.
3) Validation Instruments: Feasibility questionnaires using a Likert Scale (1–5) were administered to experts to measure the product's validity across material and media dimensions

2.4 Development Procedures (MDLC)

The development stages of the "MELALI" multimedia application involve the following technical details:

1) *Concept*: Concept: Defining the objective to enhance the understanding of environmental vocabulary in the Balinese language through an Android-based platform, specifically targeting lower-grade students.
2) Design: Creating the design scheme, menu flows (flowcharts), and the application's user interface (UI) visualization.

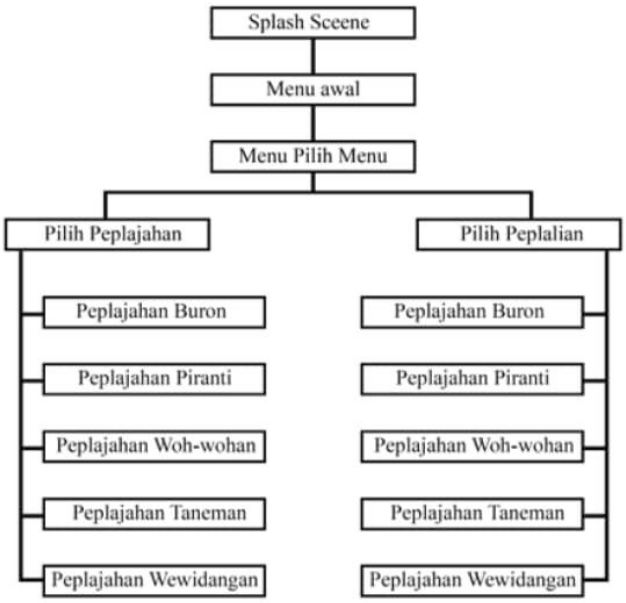

Figure 1. User Interface (UI) Flowchart of the 'MELALI' Application
(Source: Narayana, 2024)

3) *Material Collecting*: Gathering Balinese environmental visual assets, designing contextual characters in traditional attire, and recording voice-over audio for the learning materials and games.

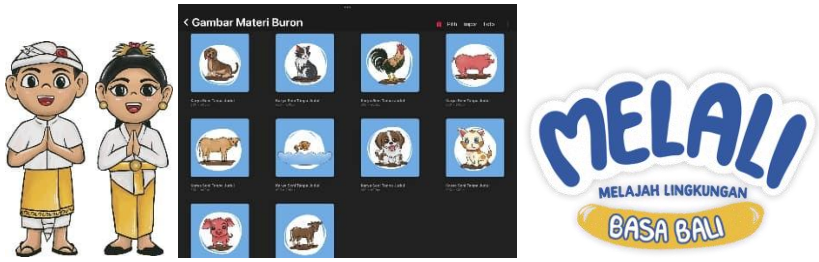

Figure 2. Visual Assets of the 'MELALI' Application
(Source: Narayana, 2024)

4) *Assembly*: Integrating all elements (text, images, animation, and audio) using Construct 2 software, supported by Adobe Photoshop, Procreate, and Adobe After Effects.

Figure 3. Design and Development Process of the 'MELALI' Application
(Source: Narayana, 2024)

5) *Testing*: Conducting functionality testing (moving tests) to ensure button responsiveness and animation fluidity, followed by validity testing by experts and field trials.
6) *Distribution*: Packaging the product into APK (Android Package Kit) format, which is then uploaded to Google Drive to ensure broader accessibility.

2.5 Data Analysis

Data analysis is conducted through two methods; 1) Quantitative Descriptive Analysis: Used to calculate the percentage of media feasibility based on questionnaire scores using the following percentage formula:

$$\text{Feasibility Percentage} = \left(\frac{\text{Total Score}}{\text{Maximum Score}}\right) \times 100\%$$

2) Comparative Analysis: Comparing the mean scores of the students' pre-test and post-test to determine the effectiveness of the media in improving learning outcomes.

3. RESULTS AND DISCUSSION

3.1 Results

This section presents the empirical data derived from the design process, expert validation, and field trials to evaluate the feasibility and effectiveness of the "MELALI" application.

3.1.1 Design Outcomes of the "MELALI" Multimedia Application

The final product is an Android-based interactive multimedia application specifically designed for early childhood cognitive structures. The content is categorized into five environmental themes: animals (*beburon*), objects (*piranti*), fruits (*woh-wohan*), plants (*tetanduran*), and places (*wewidangan*). To strengthen cultural relevance, the main characters utilize a contextual visual style featuring traditional Balinese attire, which serves as a visual anchor for students' cultural identity.

Figure 4. User Interface (UI) Design of the 'MELALI' Application
(Source: Narayana, 2024)

3.1.2 Expert Validation Results

Feasibility testing involved a rigorous validation process by subject matter and media experts. The subject matter expert assigned a score of 96%, while the media expert provided 88%, both categorizing the application as "Highly Feasible". Beyond the scores, an analytical review of the qualitative feedback led to critical refinements. Adjustments were made to the diction of environmental vocabulary to align with local dialects, ensuring the material remained accessible to first-grade students. Additionally, synchronization between audio narration and animation transitions was optimized to prevent cognitive overload, directly addressing the technical requirements for effective multi-sensory learning.

3.1.3 Efektivitas Pembelajaran (Pre-test dan Post-test)

The field trial was conducted with 24 first-grade students at SD Negeri 3 Kukuh. The comparative data of learning outcomes before and after the implementation of the media are presented in the following table:

Table 1. Comparison of Pre-test and Post-test Results
(Source: Narayana, 2024)

No	Pertanyaan	Jawaban Benar		Presentase Benar	
		Pre-test	*Post-test*	*Pre-test*	*Post-test*
1	Bahasa Bali dari pisau adalah?	15	22	62.50%	91,9%
2	Bahasa Bali dari anak sapi adalah	11	20	45.83%	83,3%
3	Bahasa Bali dari buah pisang adalah?	15	22	62.50%	91,9%
4	Bahasa Bali dari sawah adalah?	8	23	33.33%	95,8%
5	Bahasa Bali dari gambar berikut adalah:	13	19	54.17%	79.1%
6	Bahasa Bali dari gambar berikut adalah:	14	21	58.33%	87.5%
7	Bahasa Bali dari gambar berikut adalah:	10	19	41.67%	79.1%
8	Bahasa Bali dari gambar berikut adalah:	14	21	58.33%	87.5%
9	I bapa meli …… aukud	10	22	41.67%	91,9%
10	I meme meli buah ring …… beringkit	8	20	33.33%	83,3%

The data indicates a significant average score increase of 41.7 points, rising from 49.1 to 90.8. Most notably, the post-intervention results show a 100% success rate in meeting the Minimum Mastery Criterion (KKM) of 70, compared to the initial pre-test where most students failed to reach this threshold. This upward trend across all 10 indicators suggests that the media successfully mitigated the students' initial "linguistic disorientation".

3.1.4 User Response

The results of the user response questionnaires distributed to the students showed an average score of 94.5%. Indicators of usability and visual appeal received the highest appreciation from the child respondents.

3.2 Discussion

This section interprets the research findings and links them with established theories and prior studies.

3.2.1 Interpretation of Improved Learning Outcomes

The dramatic improvement in scores proves that interactive multimedia acts as a vital bridge for students in the concrete operational stage. While conventional textbooks rely on abstract text, "MELALI" provides the tangible visual stimuli necessary for children aged 6–7 to process language. Furthermore, the integration of audio voice-overs addresses a critical pedagogical gap: the accurate pronunciation of Balinese vocabulary, which is often eroded by the dominance of Indonesian in daily media. (Aditama, 2020).

3.2.2 Comparison with Prior Studies

These findings align with the research by (Kartini & Setiawan, 2019), which argues that multi-sensory engagement enhances memory retention. However, this study extends that premise by

demonstrating that cultural specificity,not just general interactivity,is a key driver of engagement. While previous media for foreign languages or science focused on technical mechanics , "MELALI" proves that using contextual characters in traditional attire fosters a unique emotional proximity that accelerates the learning of mother tongues.

3.2.3 Theoretical and Practical Implications

Theoretically, this research validates that multimedia design for children should prioritize "fun learning" without sacrificing academic rigor. Practically, it offers a scalable solution for Balinese teachers to overcome the visual limitations of standard government-issued textbooks. It reaffirms that Android technology, when grounded in local wisdom, is an effective instrument for cultural preservation in the digital era. .

3.2.4 Limitations and Suggestions for Future Research

Despite the positive outcomes, the study's scope was limited to environmental vocabulary (Lesson 6) and a single-school sample. Future research should implement inferential statistical testing (such as N-Gain or T-tests) on a larger, multi-school population to further validate generalizability. Additionally, integrating advanced gamification or AI-driven pronunciation feedback could maintain long-term motivation for Generation Alpha.

4. CONCLUSION

This research has successfully developed and implemented the "MELALI" interactive multimedia application for Balinese language environmental recognition at SD Negeri 3 Kukuh. Data analysis indicates a significant improvement in student understanding, with average scores increasing from 49.1 to 90.8. These results suggest that integrating contextual visual elements, such as characters in traditional Balinese attire and synchronized audio narration, effectively addresses the cognitive barriers and visual limitations inherent in conventional textbooks. The study contributes a practical model for an educational tool that functions as a digital instrument for cultural preservation relevant to Generation Alpha. Practically, "MELALI" offers an engaging alternative for independent learning and supports teachers in delivering visually complex material. While limited to one lesson unit, these findings provide a foundation for future development. Future research should expand the content scope and explore advanced features, such as gamification or AI integration, to further evaluate long-term student engagement. Ultimately, this study demonstrates that localized technological innovation can serve as a viable catalyst for improving Balinese language education in the digital era.

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