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MULTIMEDIA DIGITAL DICTIONARY FLIPBOOK FOR INTERNATIONAL KINDERGARTEN STUDENTS TO LEARN AND ENHANCE THE ACQUISITION OF MALAY LANGUAGE

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ABSTRACT

Malay Language serves as the foundational medium for communication and education in Malaysia. All students, including international students, are required to learn Malay as part of their educational experience. However, international kindergarten students often face challenges in acquiring Malay as a second language due to limited attention spans and a lack of engagement with traditional teaching methods. This study aims to design and develop a multimedia-based digital dictionary flipbook specifically tailored for international kindergarten students to support vocabulary acquisition in Malay. The flipbook integrates various multimedia elements such as including text, audio, images, animated videos, and interactive quizzes which useful in creating an engaging and effective learning experience. Guided by the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation), the development process ensured alignment with learners' needs. For the evaluation phase, it was conducted in two parts: formative and summative assessments. Formative evaluation involved expert reviews to gather feedback for refining the application during its development meanwhile summative evaluation conducted post-development, aimed to collect user responses through an interview and observation with international kindergarten students from UUM International School. The participants consisted of nine international students aged between 4 and 6 years, from countries including Algeria and the PhilippinesFindings indicate that the multimedia digital dictionary flipbook effectively enhances vocabulary learning and engagement among international kindergarten learners. The results suggest that such digital tools are not only beneficial but necessary to support language acquisition and overcome language barriers. In conclusion, the multimedia digital dictionary flipbook

represents a valuable resource for early Malay language education among international students in Malaysia.

Keywords: Multimedia, Digital flipbook, Malay language, ADDIE Model, Kindergarten

INTRODUCTION

The development of an interactive multimedia digital dictionary flipbook designed for international kindergarten students is to address their challenges faced in learning Malay language vocabulary. By applying various multimedia elements such as texts, audio, image, animation video and interactive quizzes, the project expects to create an interesting, dynamic and effective educational resource. A study by Petun et al. (2023) found that advancements in technology can be used to choose and create learning media in today's era of globalization. Combining learning with media can make the learning process more creative and engaging. Learning media serve as tools to support teaching and learning, helping to achieve educational goals more effectively and efficiently (Janan, 2024). They also play a role in delivering subject content while capturing students' interest. Malay Language was a fundamental basic language of Malaysia. This language is serving as the national language and a core medium for communication and education in this country. All the students in Malaysia including international students must learn Malay Language, as it is essential for them to fully participate in academic, social and cultural activities. The international kindergarten students are observed to face difficulties in learning Malay as second language, they always lack focus and bored through traditional learning (Nowawi et al., 2023). Existing traditional learning tools, such as printed books, always lack of interactive and animated elements, leading the failure to capture the attention of young learners. Without interactive and animated learning tools, students struggle to grasp and retain new vocabulary, which affects their ability to learn the language effectively (Halali, 2022).

Research in Indonesia schools found that digital flipbooks with only text and static images are not effective in keeping students engaged due to the lack of multimedia elements (Natsir et al., 2022). On the other hand, multimedia-based learning tools have been shown to increase students' interest and motivation significantly. The research study of Nafiah et al. (2023) reported that elementary students showed more enthusiasm and interest in learning when using interactive digital materials compared to traditional printed resources. Other studies have found that combining text, audio, images, and animations improves vocabulary learning and retention by helping students focus and stay engaged (Zhang & Zou, 2021). These features make the learning process more fun and interactive, which is particularly useful for young learners (Ilham et al., 2023). Based on the other research, the study compared printed and digital multilingual dictionaries for early education, highlighting the benefits of digital formats, such as durability and easy access. The research analysis shows that that both students and teachers favour digital dictionaries due to their accessibility and support for literacy development (Ratminingsih et al., 2021). For international students at Universiti Sultan Zainal Abidin and Universiti Malaysia Terengganu, traditional methods of teaching Malay are seen as time-consuming and challenging (Shawai et al., 2022). In primary education, challenges in vocabulary arise due to limited resources for non-native speakers (Retnam & Khalid, 2021). Figure 1 below show an analysis of traditional Malay language learning

from the research articles by Shawai et al. (2022). SD, D, A, SA and M in the figure stand for strongly disagree, disagree, agree, strongly agree and medium respectively.

Figure 1

Analysis of Traditional Malay Language Learning (Shawai et al., 2022)

Item	SD	D	A	SA	M
It is easy to learn Malay Language using the traditional system.	34 (20%)	71 (41.8%)	50 (29.4%)	15 (88%)	-
I found it easy to understand Malay language using the traditional system.	36 (21.2%)	78 (45.9%)	40 (23.4%)	16 (9.4%)	-
It is time consuming to learn Malay language with traditional system.	19 (11.2%)	49 (28.8%)	74 (43.5%)	28 (16.5%)	-
Traditional learning system provides collaborative Malay language learning.	33 (19.4%)	40 (23.5%)	76 (44.7%)	21 (12.4%)	-
Feedback to learners by teacher to access their learning experience is time consuming.	14 (8.3%)	43 (25.6%)	61 (36.3%)	50 (29.8%)	2 (1.2%)
Malay traditional learning system takes time to complete a given task.	9 (5.3%)	39 (23.1%)	76 (45.0%)	45 (26.6%)	1 (0.6%)
Traditional learning system provides useful and interesting learning activities.	30 (17.9%)	58 (34.5%)	59 (35.1%)	21 (12.5%)	2 (1.2%)
It is easy to find information i needed with the traditional Malay language learning system.	31 (18.2%)	86 (50.6%)	43 (25.3%)	10 (5.9%)	-
Malay traditional learning system provides easy readability.	21 (12.7%)	86 (51.8%)	47 (28.3%)	12 (7.2%)	4 (2.4%)
I was comfortable with the Malay	39	66	51	14	-

The use of multimedia elements in education has been proven to improve the learning experience, especially for language learning among young students. However, the tools currently available for teaching Malay vocabulary to early learners are still lacking in terms of interactivity and multimedia features. For example, digital flipbooks like the Malay-English Dictionary by Dr. Bhanot (Arlieza, 2021). only use static visuals and text, without including engaging features such as animations or quizzes. Similarly, printed dictionaries are commonly used as reference tools but are not interactive enough to capture the attention of young learners effectively. Research has shown the limitations of these existing digital flipbooks. For instance, studies conducted at Universiti Sultan Zainal Abidin and Universiti Malaysia Terengganu showed that traditional methods are often considered time-consuming and difficult to remember, especially for non-native learners (Shawai et al., 2022). Furthermore, the Indonesian school research found that digital flipbooks that only consists of text and static images are not effective and fail to maintain students' engagement. This is due to the lack of attractive multimedia elements of the digital flipbooks (Natsir et al., 2022). On the other hand, the research notes that using multimedia-based learning tools are significantly help to increase students' interest and motivation. The study of Nafiah et al. (2023) reported that elementary students were more enthusiastic and interested in learning with the use of interactive digital materials compared to traditional printed resources.

Animations, audio and interactive quizzes are some of the essential multimedia features that make learning more interesting and effective. Some studies have proved that combining text, audio, images, and animations enhances vocabulary learning and acquisition. These multimedia elements are effective by helping students focus and stay engaged (Zhang & Zou, 2021). Besides, these features provide positive impact which help the learning process become fun and interactive. This type of learning method is particularly helpful to young learners (Ilham et al., 2023). The design

and development of a multimedia digital dictionary flipbook are used to help international kindergarten students and learn Malay vocabulary in a more efficient style. This flipbook designed will merge text, images, animations, sound, and quizzes for a dynamic and interactive experience. Research justifies the use of such multimedia tools for language learning. The multimedia learning tools have been proven to increase motivation and improve learning outcomes (Putriani & Kristiantari, 2022). By using these elements, the proposed flipbook able to provide a better learning experience for young learners in both classrooms and at home. Figure 2 below is a research result on the reason to use digital flipbook in learning. The results show positive feedback for each statement.

Figure 2

Reason of Using Digital Flipbook in Learning (Hadiapurwa et al., 2021)

Reasons for using a digital flipbook	Percentage (%)
Easy to use	100
Easy to read text	100
Facilitates learning	100
Attractive and enjoyable	90
Easy to understand	90

The objectives of this study are formulated based on the identified research questions to ensure a clear direction in achieving the purpose of the research. The study aims to address the challenges faced by international kindergarten students in learning Malay vocabulary, guide the development of an effective interactive multimedia digital dictionary flipbook, and assess its impact on vocabulary acquisition. The specific objectives are:

a. To identify and analyze the challenges and learning needs of international kindergarten students in acquiring Malay vocabulary effectively.
b. To determine the essential design and content features required for developing an interactive multimedia digital dictionary flipbook tailored to the needs of international kindergarten students.
c. To evaluate the effectiveness of the multimedia digital dictionary flipbook in enhancing vocabulary learning and acquisition among international kindergarten students.

BACKGROUND

Previous studies have emphasized the growing importance of digital tools in enhancing language learning, particularly for young and international learners. Ratminingsih et al. (2021) found that while digital dictionaries are more accessible than traditional printed versions, they often lack engaging multimedia features that could enhance user experience. Nasaruddin and Kamalludeen (2020) demonstrated that multimedia tools significantly improve vocabulary retention among Malay ESL learners. Similarly, Mundiri et al. (2023) highlighted that integrating multimedia elements into learning tools effectively enhances literacy development in children. Supporting this, Nowawi and Ahmad (2023) found that interactive tools are particularly effective for teaching Malay vocabulary. Retnam and Khalid (2021) argued that modern digital tools help address the

limitations of traditional teaching methods in Malay language instruction. Shawai et al. (2022) further noted that conventional approaches are largely ineffective for international students, underscoring the need for innovative digital solutions. In line with this, Natsir et al. (2022) reported that teachers trained in digital book development were better equipped to implement advanced learning tools in the classroom. Collectively, these findings affirm that multimedia-based approaches offer superior effectiveness compared to traditional methods in supporting vocabulary acquisition and language learning.

Several studies have highlighted the benefits of digital flipbooks in enhancing the learning experience for young students. Nafiah et al. (2023) reported that digital flipbooks significantly increase students' interest and motivation. Similarly, Fatmawati et al. (2023) found that multimedia flipbooks improve comprehension and help maintain students' concentration. Putriani and Kristiantari (2022) emphasized that the use of animations in flipbooks can enhance creativity and focus. Hadiapurwa et al. (2021) concluded that digital flipbooks support better understanding of visual content and successfully capture students' attention. In classroom settings, Hermansyah et al. (2023) found digital flipbooks to be highly effective, while Dharmayanti et al. (2021) demonstrated their usefulness in online learning environments. These findings collectively show that digital flipbooks contribute positively to students' learning engagement and understanding. In addition to functionality, several studies stress the importance of design elements in educational materials for young learners. Ma et al. (2023) discovered that using larger font sizes helps children read more comfortably and prevents eye strain. Zheng and Lee (2020) found that bright and warm colours enhance children's interest in learning tools. Ilieva (2022) also highlighted that child-friendly colours, large fonts, and clear visuals are essential design considerations for young learners. Dewi et al. (2023) supported the use of visuals and animations, noting their effectiveness in helping children remember new vocabulary. Furthermore, Hermansyah et al. (2023) emphasized that user-friendly design focusing on simplicity and accessibility improves the overall learning experience.

In summary, the reviewed studies collectively emphasize the effectiveness of digital and multimedia flipbooks in enhancing vocabulary acquisition, engagement, and comprehension among young learners, particularly international students. These tools not only increase motivation and focus but also support better retention and understanding through interactive elements such as animation, audio, and visuals. Moreover, thoughtful design considerations such as the use of large fonts, child-friendly colours, and simple navigation will play a vital role in ensuring that these digital materials are accessible, appealing, and developmentally appropriate for young children. The integration of both multimedia features and user-centered design makes digital flipbooks a highly suitable solution for improving Malay language learning experiences in early education settings.

Multimedia Tools for Language Learning

Research consistently shows that multimedia tools are highly effective in education, particularly for enhancing vocabulary learning and maintaining student engagement. Ilham et al. (2023) found that multimedia resources improved vocabulary, motivation, and confidence among preschoolers. Similarly, Suardani (2021) reported that multimedia tools significantly increased children's interest and active participation in learning. Riskasari et al. (2020) emphasized that multimedia

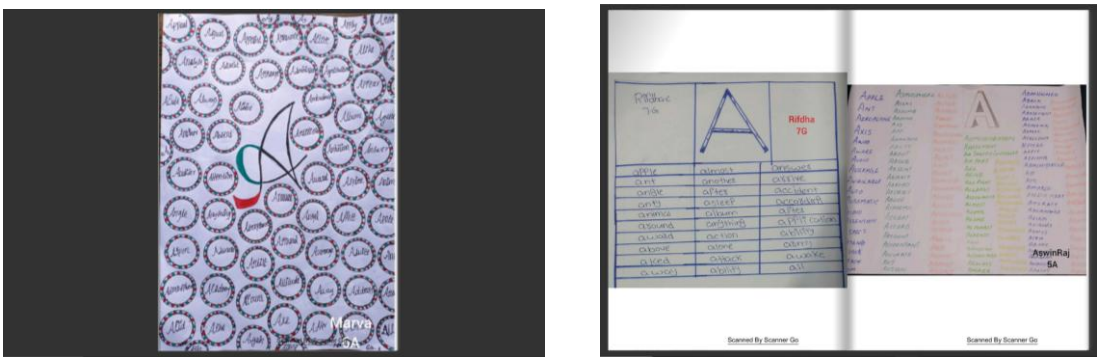
aligns well with modern educational needs by promoting flexibility and creativity in the classroom. Mundiri et al. (2023) also highlighted that these tools support the development of essential skills among kindergarten learners. Several studies have focused specifically on vocabulary acquisition. Zain et al. (2020) developed a multimedia Malay vocabulary app for secondary school students and found it improved language understanding. Zhang and Zou (2021) confirmed that combining text, visuals, and audio enhances vocabulary retention. Similarly, Parmawati et al. (2022) created multilingual dictionaries featuring audio and animation, which improved literacy and learner engagement. The use of digital flipbooks and e-books has also been proven effective. Rachim and Ambarwati (2021) developed an animated e-flipbook and showed it made learning more interesting and engaging. Salim et al. (2020) found that including animations and quizzes in flipbooks significantly improved students' learning outcomes. Khadijah and Rezeki (2023) developed multimedia pop-up books and discovered that animations captured children's attention more effectively than static visuals. Nafiah et al. (2023) supported this by showing that animated digital flipbooks-maintained student focus and encouraged active learning. Fatmawati et al. (2023) added that embedded quizzes helped reinforce content and increased student participation. Furthermore, Petun et al. (2023) demonstrated that multimedia features in digital books enhanced understanding of complex subjects like history. Lastly, Dharmayanti et al. (2021) showed that digital flipbooks improved student engagement in online learning settings.

RELATED WORK

Based on the research, most of the existing flipbooks, such as the FlipHTML5 Digital Dictionary Flipbook by Vinod (2021), only provide basic features like text. This example of digital dictionary flipbooks are lack of quizzes, animations, and audio narration, which making them less attractive (Figure 3).

Figure 3

FlipHTML5 Digital Dictionary Flipbook (Vinod, 2021)



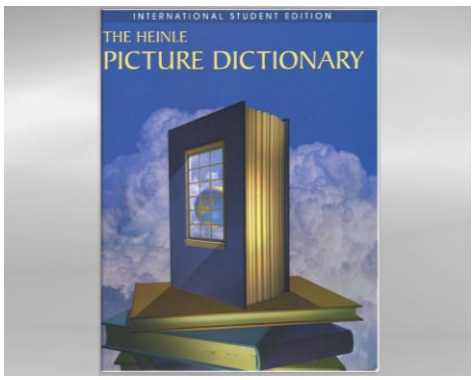
The Heinle Picture Dictionary (Staracademy, 2020) and Children's Picture Dictionary (Staracademy, 2021) only consist of words and pictures but it is lack of voice and interactive features (Figure 4 & 5). The Children's Illustrated Dictionary (Zidni, 2020) and MacMillan Children's Dictionary (SK Pendek Digital Library, 2021) designed in colourful visuals but also without multimedia integration (Figure 6 & 7). The Malay-English Dictionary (Arlieza, 2021) is simple and easy to use but does not include advanced features like visual content,

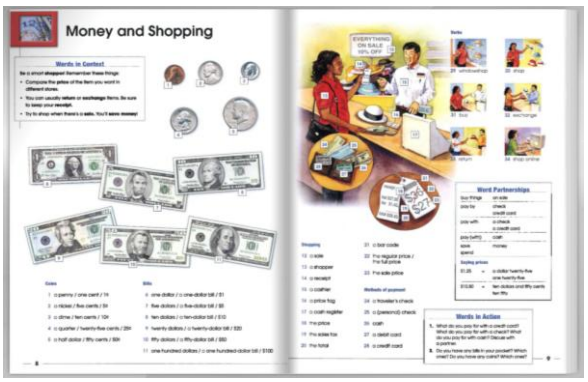
quizzes or animations (Figure 8). To conclude, these limitations of available digital flipbook show the need for better-designed flipbooks, which with multimedia elements to improve learning.

The current version of the digital dictionary flipbook presents vocabulary in colorful, handwritten-style text. However, the text formatting lacks consistency, which may affect readability and user experience. Additionally, the flipbook is limited in its features, as it does not include interactive elements such as quizzes, dynamic animations, or audio narration. These missing components are crucial for enhancing engagement and making the learning process more effective and enjoyable, particularly for young learners who benefit from multisensory interaction.

Figure 4

The Heinle Picture Dictionary (Staracademy, 2020)





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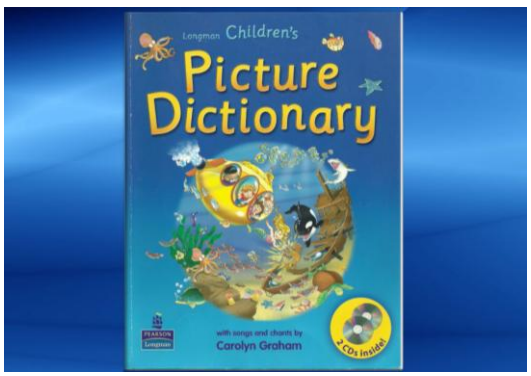
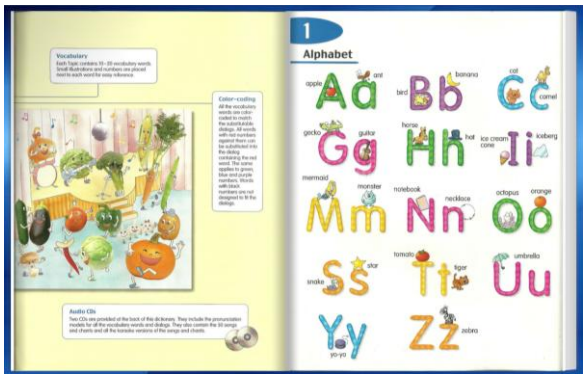
This flipbook features text-based definitions accompanied by images and offers a simple interface that allows users to navigate through vocabulary words. However, it functions primarily as a static reference tool with minimal interactivity. The layout is cluttered and lacks visual organization, which can hinder user experience, especially for young learners. Furthermore, the flipbook does not include essential features such as voice support for word pronunciation, animations, or interactive quizzes which are important for maintaining engagement and supporting effective learning among children.

Figure 5

Children's Picture Dictionary (Staracademy, 2021)





This digital dictionary flipbook presents vocabulary using a straightforward format that combines text with images. The visuals are simple, colorful, and attractive, and the content is arranged in a well-organized layout that enhances readability and ease of use. However, the absence of key interactive elements such as sound, animations, and quizzes has limits the flipbook's ability to fully engage young learners. Without these features, the learning experience may become less stimulating and less effective in maintaining students' motivation and interest.

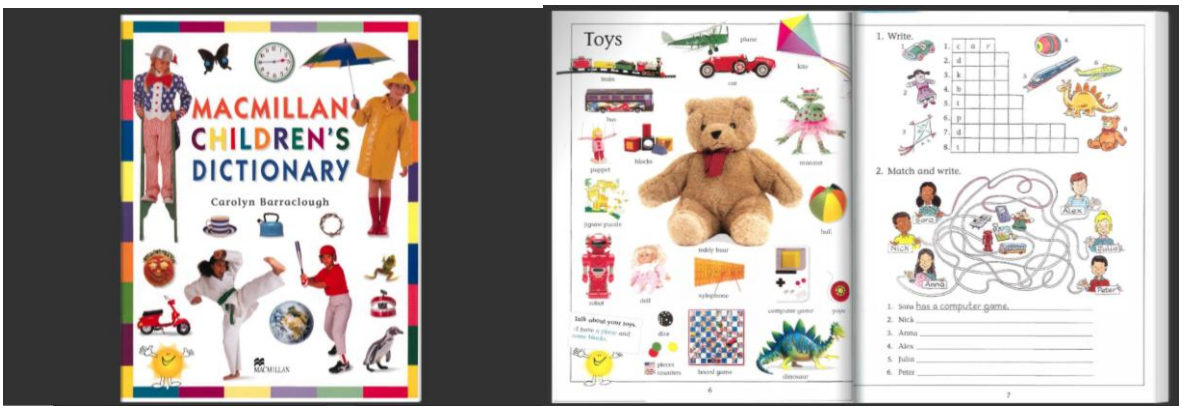
Figure 6

Children's Illustrated Dictionary (Zidni, 2020)

This digital flipbook is designed with colorful visuals and text, presented in an accessible and user-friendly layout. While the design is visually appealing, its functionality is limited to basic page flipping, offering minimal interactivity. Like other similar digital flipbooks, it lacks important features such as audio narration, animations, and interactive quizzes. These elements are essential for fostering engagement and supporting interactive learning, particularly for young children who benefit from multisensory educational experiences

Figure 7

MacMillan Children's Dictionary (SK Pendek Digital Library, 2021)



This flipbook is designed to support vocabulary learning for children, featuring colorful images and word lists that cater to young learners. It includes simple exercises to reinforce vocabulary understanding; however, it does not provide immediate feedback, which limits its instructional effectiveness. Additionally, the absence of animations, audio narration, and interactive quizzes

reduces the flipbook's ability to fully engage children and deliver a dynamic, multisensory learning experience.

Figure 8

Malay-English Dictionary (Arlieza, 2021)

This digital dictionary flipbook features basic text elements and presents vocabulary in a small font size. Its format simulates the look and feel of a physical dictionary, offering a simple and easy-to-navigate user experience. However, despite its functional layout, the flipbook lacks interactivity and engaging features. It does not provide audio narration for pronunciation, dynamic animations, or quizzes to reinforce vocabulary understanding. Additionally, it includes minimal visual content, which further limits its appeal and effectiveness particularly for young learners or beginners who benefit greatly from visual and interactive learning elements.

RESEARCH METHODOLOGY

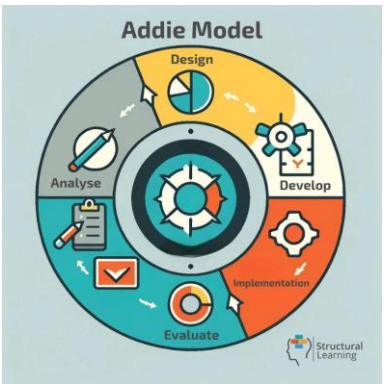
The ADDIE model is a systematic framework widely used in instructional design to guide the creation of effective educational tools and programs. It has five phases which are analyze, design, develop, implement, and evaluate (Main, 2023). This method helps ensure that the final product meets the target audience's needs by systematically including user feedback and aligning with educational goals. In this regard, a research study identified that this model supports a systematic and repeated process. This help to ensure the educational programs match with specific learning objectives and the needs of users (Spatioti et al., 2022). According to the research articles by Spatioti et al. (2022), ADDIE provides a step-by-step approach to organize and streamline the instructional design process. This model ensures that all parts of the design process are well-planned and connected. In conclude, the ADDIE model guides the developer and designer to focus on the needs, goals, and abilities of the learners from the Analysis phase to Evaluation phase. It is flexible and can be adapted to suit different users. These advantages making it useful for a wide range of learning contexts. This approach helps ensure the final product is efficient, effective and meets the learners' requirements (Petun et al., 2023).

The ADDIE model is very suitable for the development of proposed digital flipbook because it uses a user-centred approach to develop the multimedia digital dictionary flipbook. By using the ADDIE model, every stage of the development process will focus on resolving the

problems faced by international kindergarten students learning Malay. This approach ensures a structured and repeated process where feedback and improvements lead to a fun and useful educational tool. Figure 9 below is the visual that represent the ADDIE Model.

Figure 9

ADDIE Model (Main, 2023)



Analysis Phase

In the Analysis phase, the focus is on understanding the needs and challenges of the target audience, their learning goals, and whether the project is possible to carry out. This step involves identifying who the learners are, what they aim to achieve, and the gaps in their current knowledge or skills (Main, 2023). Through analysis, the instructional design can be better tailored to meet the specific needs of the users and ensure the learning goals are effectively achieved.

The activities for this phase involve several important steps. First and foremost, research will be done on the chosen topic to identify related problems and possible solutions. To get more understanding, interviews will be conducted with the principal to learn about the challenges faced by international kindergarten students in learning Malay vocabulary. Interviewers prepare an outline by identifying the main topics and drafting relevant questions. Interviews are a flexible and dynamic method where new ideas and issues can arise during the conversation, to allow interviewers exploring these points immediately (Roberts, 2020). During the interviews, the standard syllabus for the students will also be collected. After that, data on current teaching methods and tools will be gathered and analyzed to find their weaknesses for improvement. On the other hand, the suitable vocabulary syllabus for kindergarten students will be identified. A literature review will also be done to compare traditional and digital multilingual dictionaries, which will provide useful information for the project. The findings from all these activities will be summarized in a needs analysis report. Finally, a proposal report will be prepared as a detailed guideline for the developers and designers to follow during the project. The deliverables for this phase include a detailed needs analysis report that summarizes all the findings and requirements, a proposal report as the complete guidance. Both reports will provide important insights into the

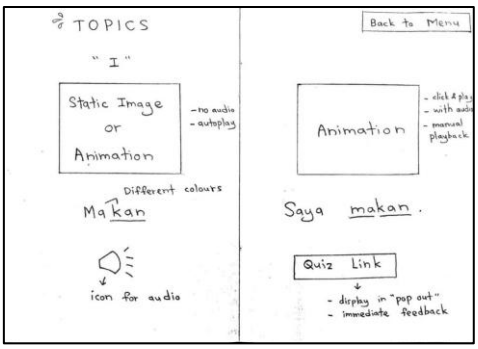
flipbook's key features, such as the vocabulary topics to include, the multimedia elements needed, and the design aspects to consider, and the tools requirement for creating an effective learning tool.

Design Phase

In the Design phase, information gathered during the analysis is utilized to establish clear instructional goals, learning objectives, and appropriate teaching strategies. According to Main (2023), this phase also involves selecting effective teaching methods, content, and assessment tools tailored to the learners' needs. For this project, the Design phase focuses on developing the overall structure, layout, and multimedia elements of the digital flipbook to ensure alignment with the cognitive and developmental needs of kindergarten students. The design process includes several key activities. Firstly, vocabulary content will be developed based on the relevant syllabus to ensure age-appropriateness and alignment with learning outcomes. Particular attention will be given to the selection of suitable fonts, colors, images, and animations, with considerations for accessibility, including color-blind-friendly design. Additionally, a detailed plan will be formulated for incorporating interactive features such as quiz links, navigation elements, and functional buttons for audio and video playback. These features are essential for making the flipbook engaging and user-friendly. A storyboard will then be developed to visually map out the flipbook's structure, outlining the layout of each page, the content flow, and the integration of multimedia components (Figure 10). This storyboard also serves as a low-fidelity prototype of the project. Finally, design elements such as the cover page, content menu, and interactive navigation buttons (e.g., "Back to Menu" and "Audio Play") will be drafted. The deliverables for this phase include a complete storyboard and draft designs for key pages and multimedia features, laying a strong foundation for the development stage.

Figure 10

Example of the Storyboard



Development Phase

In the Development phase, all instructional materials and learning resources are created to support the implementation of the instructional design. This includes the preparation of content, lesson components, and multimedia elements that will be used within the learning tool (Main, 2023). For this project, the digital dictionary flipbook is developed using selected tools and technologies to create a comprehensive, engaging, and age-appropriate learning experience for young learners. The development process involves several key activities. Initially, the layout of the flipbook are

featuring designated areas for text, images, animations, and quizzes which is designed using Adobe InDesign (Figure 11). Once completed, the layout is exported in PDF format to facilitate conversion into a digital flipbook later in the process. For vocabulary words that cannot be represented with animation, high-resolution static images are created by tracing and designing them in Adobe Animate, ensuring they are vector-based for clarity and scalability (Figure 12).

Figure 11

Adobe InDesign (Layout + Button + Insert Image + Decorative Elements Design)

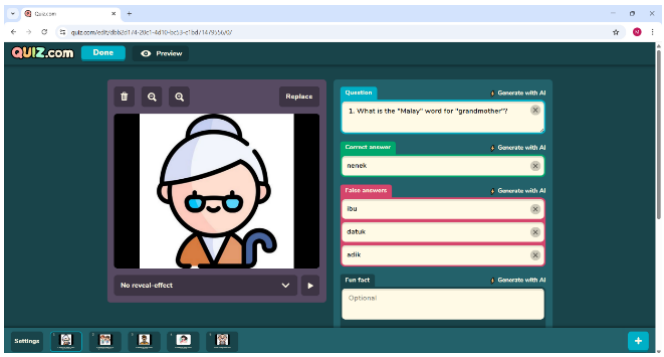
Figure 12

Adobe Animate (Trace Image + Create Animation)

Additionally, animated sequences illustrating vocabulary words and related example sentences are developed using Adobe Animate to enhance the learning experience with visual storytelling. Audio narrations are recorded using mobile devices or AI-generated voice tools and subsequently edited with CapCut Pro to ensure consistency and clear sound quality. To foster interactivity and engagement, vocabulary quizzes are created using the Quiz.com platform, allowing learners to test their knowledge and receive immediate feedback (Figure 13). Finally, all these components including the PDF layout, vector images, animated videos, audio files, and quiz links are integrated into a cohesive digital flipbook using the Heyzine platform. This integration ensures a seamless user experience with embedded multimedia elements that support both language acquisition and learner engagement. The main deliverable for this phase is a fully functional prototype of the digital dictionary flipbook, complete with interactive features such as text, images, animations, audio narration, and quizzes.

Figure 13

Quiz.com Website



Implementation Phase

The Implementation phase is about delivering the training program or educational course. It ensures that the materials and strategies created are applied effectively in real-life teaching or training situations (Main, 2023). The implementation phase tests the flipbook in a real-world environment to gather user feedback. In this phase, the developer and designer must ensure all necessary technical preparations are complete, such as setting up devices, and providing access to online platforms. After that, the final product which are the multimedia digital dictionary flipbook will be share with the target users such as students, principal and teachers in a real classroom environment (Figure 14). The flipbook will be tested its function with primary target users and secondary users. Primary target users which international kindergarten students between 4 to 6 years old are allowed to interact with the flipbook during their lessons. This session will be conducted in focus group which five students in a group, while the developer and designer will observe the users experience of the students. Principal and teachers which are secondary target users will also be involved in this phase to test the usage of the flipbook. Testing with principal and teachers are important to ensure the flipbook designed are suitable as an additional teaching tool in kindergarten levels. The deliverables for this phase include the distribution of the flipbook to the target primary and secondary users. The testing sessions with be conducted with both students and teachers.

Figure 14

Application Demonstration and Flipbook Exploration

Evaluation Phase

The Evaluation phase assesses the effectiveness of the flipbook and identifies areas for improvement. This includes formative evaluations during the development stage and summative evaluations after the course is delivered. The goal is to identify areas for improvement and make the learning experience better (Main, 2023). This step ensures continuous improvement of the instructional design. The activities for this phase involve gathering and analyzing feedback to improve the flipbook. In this phase, expert review will be conducted with target experts which are multimedia lecturer and international kindergarten principal. The multimedia lecturer is expert in evaluating the design aspect of the project while the international kindergarten principal is expert in evaluating content for young learners. Interviews will be conducted with principal and teacher, while focus groups will be conducted with kindergarten international students. These methods are to collect qualitative feedback. Observations is needed to know how the students use the flipbook. The results from observation on the ease of use, attractiveness, and learning benefits through the multimedia digital dictionary flipbook will be recorded for further analysis. Based on the feedback from evaluation, analysis process will be made to the multimedia elements and interactive features to enhance users' experience on the flipbook. Finally, a detailed evaluation results will be prepared to summarize the flipbook's effectiveness and providing recommendations for future improvements. The deliverables for this phase include gains professional feedback through expert review, records evaluation results and the improvement for final version of the multimedia digital dictionary flipbook.

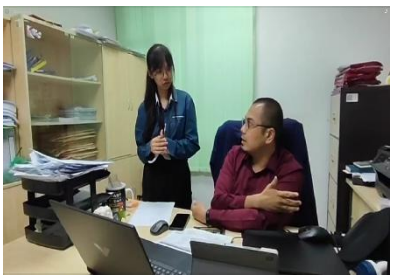
EVALUATION RESULTS

Formative Evaluation

This evaluation was conducted during the development stage of the Multimedia Digital Dictionary Flipbook to collect feedback from experts for improvement before the final version was produced. Formative evaluation is an important process in instructional design that helps identify weaknesses and potential improvements in multimedia products (Osidak et al., 2024; Deswita et al., 2025). It focuses on diagnosing issues in usability, content structure, and multimedia integration. In this study, the formative evaluation involved three experts: Expert 1 and Expert 2 were from the field of early childhood education, and Expert 3 had expertise in multimedia design and development (Figure 15).

Figure 15

Expert Review Process


Data were collected through independent product testing followed by structured and semi-structured interviews. Experts tested the flipbook using various devices such as laptops, tablets, and smartphones. They explored multimedia features like text, pronunciation audio, animations, interactive buttons, and quizzes. This allowed them to provide feedback based on actual user experience. Experts evaluated the product using four main dimensions: multimedia design and learning experience, design and usability, language and content quality, and overall satisfaction. They all agreed that the multimedia elements were well-integrated, appropriate for young learners, and did not cause confusion. They confirmed that the large text size and clear layout made the content readable for users aged 4 to 6. Expert 3 suggested changing the font to a more decorative but readable typeface to enhance visual appeal. In terms of functionality and usability, experts stated that the colours, layout, and button styles were attractive and age appropriate. Buttons were intuitive and easy for children to use. Expert 3 recommended applying colour harmony principles to improve overall aesthetics. Regarding language and content quality, all experts agreed that the vocabulary was relevant, bilingual translations were consistent, and pronunciations were clear and helpful for learning. All three experts believed that the flipbook successfully motivated learners, supported independent use, and achieved its educational goals. Expert 1 noted that learners today are already exposed to digital devices and can explore the flipbook independently. Expert 2 shared that the product was in line with their school's digital learning sessions. Expert 3 mentioned that interactive features created a fun learning environment. Feedback from this evaluation led to adjustments in text design, layout, and icon improvements to better support learning outcomes

Summative Evaluation

The summative evaluation was conducted after the product was fully developed. It aimed to assess the outcome, effectiveness, and usability of the flipbook with actual users. Summative evaluation provides confirmation that the educational objectives have been met and the product is ready for real-world use (Arsenyan & Mirowska, 2021; Minatani, 2020). For this project, the evaluation involved international kindergarten students from UUM International School. The participants consisted of nine international students aged between 4 and 6 years, from countries including Algeria and the Philippines. These students were selected because they matched the flipbook's target user group such as non-Malay speakers with limited exposure to the Malay language. The evaluation process followed three stages: (1) a pre-test, (2) flipbook interaction and guided testing, and (3) a feedback session using emoji sticks. The pre-test involved a vocabulary matching activity using flashcards and mahjong paper (Figure 16). Students matched Malay vocabulary words to images. Only three students matched some words correctly, and none matched all words. Six students placed all cards incorrectly. These results confirmed that the vocabulary selected for the flipbook was unfamiliar to the target users, validating its educational relevance.

Figure 16

Pre-Test with International Kindergarten Student

In the product demonstration stage, each student used a device (tablet or laptop) to explore the flipbook. They were instructed to navigate through menus, play pronunciation audio, view animations, and attempt quizzes. Observations were recorded throughout the session. Students were mostly able to use the flipbook independently. Facial expressions, reactions, and attention span were also noted (Figure 17).

Figure 17

Testing and Demonstration Stage

During the Q&A feedback session, nine structured questions were presented to the participating kindergarten students, who responded using emoji sticks displaying happy or sad faces. The questions were categorized into four key evaluation dimensions: visual design and appeal,

usability and interaction, educational effectiveness, and text format preference. In terms of visual appeal, all nine students responded positively to the cartoon-style images and the use of bright, engaging colors. Regarding usability, all students liked the button designs, and seven were able to navigate the flipbook independently without adult assistance. In the dimension of educational value, every student indicated that they had learned something new and expressed enjoyment of the quiz and sound features integrated into the flipbook. For format preference, all participants preferred the digital flipbook format over printed books and agreed that the text was clear and easy to read. Overall, the feedback demonstrates that the digital dictionary flipbook was visually attractive, easy to use, educationally beneficial, and well-suited to the cognitive and developmental needs of the target age group. The positive responses and active engagement of the children further validate the effectiveness of the multimedia design and interactive features implemented in the flipbook.

DISCUSSION

Based on both formative and summative evaluations, the Multimedia Digital Dictionary Flipbook has proven to be an effective and engaging tool for teaching Malay vocabulary to international kindergarten students. Feedback from both expert reviewers and young users highlighted that the integration of multimedia elements such as text, audio, visuals, animations, and interactive quizzes which capable to create a meaningful and enjoyable learning experience. These results are consistent with previous studies on multimedia learning. For example, Nafiah et al. (2023) found that animations in flipbooks helped sustain student focus and boost motivation. Zhang and Zou (2021) confirmed that combining text, visuals, and audio enhances vocabulary retention, while Ilham et al. (2023) emphasized the importance of visual and interactive features in early language acquisition. The project followed the structured ADDIE model, which supported systematic development. During the analysis and design phases, user needs and learning goals were clearly identified. In the development phase, multimedia tools such as Adobe InDesign, Adobe Animate, CapCut Pro, and the Heyzine Flipbook platform were used to create and assemble the content. Expert feedback during formative evaluation helped refine the flipbook's layout, interactivity, and usability. Summative evaluation results confirmed that the students enjoyed using the flipbook, learned new vocabulary, and preferred the digital format over traditional printed books. Notably, seven out of nine students were able to use the flipbook independently, indicating that the interface was intuitive and age appropriate. Although two students required assistance, this was expected for younger or less tech-experienced users and did not negatively impact the learning outcomes. Overall, the successful development and positive feedback support the value of multimedia-based tools in helping international early learners acquire a second language. These findings also suggest strong potential for integrating such tools into formal kindergarten classrooms or using them as supplementary resources at home.

CONCLUSION AND FUTURE WORK

This study aimed to design and develop a Multimedia Digital Dictionary Flipbook for international kindergarten students to learn and enhance Malay vocabulary acquisition. Following the ADDIE model, each development phase was completed with careful attention to learners' needs and instructional goals. The final product included text, bilingual content, voice narration,

visuals, animations, interactive buttons, and quizzes. These elements were developed using a range of multimedia tools to create an engaging and interactive digital learning environment. Formative evaluation from three expert reviewers confirmed that the flipbook was suitable for early learners. They gave feedback that helped improve design, interface, and educational effectiveness. Summative evaluation conducted with nine international students showed positive results in visual design appeal, usability, educational effectiveness, and content preference. The flipbook achieved its objectives and supported vocabulary learning in a way that traditional methods could not. The interactive and visual-rich approach helped international students remain engaged and motivated during the learning process.

For future development, the flipbook could be expanded to include more topics and vocabulary, especially those relevant to daily life communication. Additional features such as speech recording, gamified quizzes, multilingual support (e.g., Arabic, Mandarin), and progress tracking tools could further improve the learning experience. Larger-scale testing involving diverse user backgrounds and long-term observation would help strengthen the validity of the product's impact. Integration with existing kindergarten curricula or mobile app versions could also widen access to the tool. In conclusion, the Multimedia Digital Dictionary Flipbook was proven to be helpful and necessary for international kindergarten students in acquiring Malay vocabulary. The project successfully delivered a creative, functional, and educational multimedia product suitable for early language learners.

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