

## **CHAPTER IV**

### **RESULT AND DISCUSSION**

#### **4.1 Result**

This project was carried out with the author's colleagues, Reyna Odilla Herda Cahyono. In this project, a Research and Development (R&D) approach was used as a systematic method to create and refine products through structured stages. The R&D process in this study was carefully executed to ensure the successful development and optimisation of the educational game LexiFun as a vocabulary learning medium. This R&D method employs the ADDIE model, the first stage begins with an analysis to gather information on student needs and content requirements. This model is followed by the design stage to create a memory matching game.

The design stage was followed by the development stage, which was assisted by a third party, a developer, to implement the design as an application. The application was then tested by experts to evaluate the product. Based on the feedback received, revisions were made to refine the main product. Further refinements were made during the implementation stage, during which the game was distributed to the public, with a particular focus on second-semester Applied Foreign Languages students at the A2 level. In this results and discussion chapter, the researcher explains each stage of the development of the LexiFun as a vocabulary learning media and details how each stage contributed to the final product.

The development of LexiFun began based on the results of a needs analysis, which showed that many students struggled to master English vocabulary and preferred learning through digital media. Prior to development, a prototype was created using Canva to illustrate the app's navigation, user interface, game mechanics, and learning features, serving as a guide for developers throughout the creation process. The final product is an Android-based English vocabulary learning app in the form of a memory card matching game, with a focus on mastering functional vocabulary. Validation results indicate that

LexiFun can be used as a learning tool, although several improvements were suggested, such as adding the word bank, removing background music, and revising some vocabulary items to improve accuracy. Additionally, feedback from the target users indicates that they enjoy using this app as a learning tool and view it as an engaging way to learn English vocabulary.

#### **4.1.1 Analysis**

The initial stage is the analysis stage, which functions as the preliminary stage in recognizing existing problems in the surrounding environment. During this stage, the researcher maps user characteristics and functional requirements to ensure that the developed media provides an effective solution to the identified learning challenges.

##### **4.1.1.1 Analysis of Students Needs**

The development of the LexiFun application began with an analysis that served as an initial framework for determining the application objectives and content. The researcher developed an application focused on English vocabulary learning at the A2 level. The subjects of this study were second-semester students in the Applied Foreign Languages Program with a concentration in English at Universitas Diponegoro. This research caught the researcher's attention because, based on placement assessments on the Oxford website (<https://www.oxfordonlineenglish.com/english-level-test/vocabulary>), The participants consisted of 63 second-semester students from Class A and Class B of the English concentration program. Among these students, 27 were categorized as having an A2 proficiency level. In fact, students in their second semester are expected to have already reached the B1 level.

Pilih level setelah mengerjakan Placement Test (sesuai dengan hasil yang telah diupload)  
58 responses

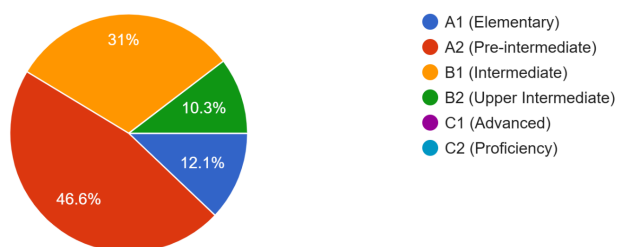


Figure 4.1 English proficiency level of second-semester students

63 students engaged in this assessment. However, five students could not access the Google Form, necessitating the collection of their assessment findings using WhatsApp. During this stage, the researchers gave a questionnaire with statements to the learners. The statements consisted of a five-point scale: strongly disagree, disagree, neutral, agree, and strongly agree. These statements pertained to the students' need for educational resources, specifically for acquiring English vocabulary.

Table 4.1 Results of the Student Needs Questionnaire

Question in English	Average score	Category
I feel the need for an additional application that specifically focuses on vocabulary development to support my college studies.	83,70%	Strongly agree
I am more motivated to learn English independently if the material is packaged in the form of a game rather than reading a textbook.	79,26%	Agree

The study's findings reveal that 22 of 27 students concur that further learning tools enhance vocabulary proficiency. This is supported by the finding that 19 out of 27 students demonstrated greater motivation when games were used as a tool for self-directed learning. The results of the two questionnaires indicate

that students exhibit a strong interest in acquiring vocabulary through digital educational games.

#### 4.1.1.2 Analysis of Content

The second stage of this analysis involves an analysis of the game's content needs. The content study for the development of the LexiFun application concentrated on enhancing vocabulary to elevate learners' competency from level A2 to level B1. The researcher created a word list derived from the Oxford 3000 corpus to guarantee that the chosen topics exhibit high frequency of use in academic and professional settings. This content is separated into three primary categories: Conjunctions and Prepositions, Quantifiers, and Modal Auxiliary Verbs. The selection of these three topics was made on the basis of an initial needs analysis, which was subsequently confirmed through a questionnaire regarding user needs related to these topics.

Table 4.2 Results of the Topic Needs Questionnaire

<b>Question in English</b>	<b>Average score</b>	<b>Category</b>
I often feel confused about choosing the right conjunction to connect sentences (Example: 'Although' vs 'However') as well as the use of prepositions that follow certain verbs (Example: 'Apologize to' vs 'Apologize for').	68,89%	Agree
I often feel confused distinguishing the use of the word quantity (Quantifiers such as: Few, Little, Several) in a sentence.	65,93%	Agree
I find it difficult to distinguish the functions of auxiliary verbs (Modals) such as 'Might', 'Should', 'Ought to' and essential verbs in college assignment instructions.	63,70%	Agree

The results of the questionnaire indicate that 15 out of 27 students encountered challenges in selecting the appropriate conjunctions and in employing prepositions that follow verbs. Additionally, 14 students encountered challenges in employing quantifiers such as "few," "little," and "several" in a sentence.

Furthermore, 15 out of 27 students exhibited difficulty distinguishing between modal verbs such as might, should, and ought to. The findings indicate that more than 50% of the students require further study in these areas.

In addition to the card-matching game, the researchers also developed a blank sentence mode for the LexiFun application. The initial mode incorporates a bilingual card-matching strategy, wherein users are tasked with matching English vocabulary with Indonesian vocabulary. The objective of this mode is to facilitate a comprehensive comprehension of fundamental concepts. The subsequent stage of the program involves the implementation of a monolingual strategy in the form of a card-matching mode, the purpose of which is to facilitate the matching of vocabulary with their English equivalents. The final mode is known as blank sentence mode, wherein users are tasked with answering fill-in-the-blank questions that are designed to assess their level of understanding of the vocabulary they have acquired. The researchers chose these three methods to enable users to comprehend the meanings and synonyms of words and to use the acquired vocabulary in sentences. The selection of these three modes was also supported by the students, as indicated by the statements below.

Table 4.3 Results of the Content Needs Questionnaire

<b>Question in English</b>	<b>Average score</b>	<b>Category</b>
In the memory matching game, I feel that the translation mode (English - Indonesian) is very helpful for the memorization process in the early stages.	80%	Strongly agree
Looking for synonyms in the game will be very helpful for me to expand the variety of words so I don't keep repeating the same words.	84,44%	Strongly agree
Blank sentence mode (filling in the gaps in a sentence) is the best way for me to understand how a word is used in reality.	78,52%	Agree

The selection of this mode is supported by the finding that 21 out of 27 students agreed that the translation mode facilitates vocabulary retention in the

early stages. Additionally, 22 out of 27 students agreed that the synonym mode can expand their vocabulary. Furthermore, 20 out of 27 students agreed that the blank sentence mode is effective for applying the terms they have learned.

#### **4.1.1.3 Analysis of Technology**

The researchers chose the Android platform as the medium for developing LexiFun. The selection of the Android platform was based on research conducted by Vanage (2025), which stated that sales of Android devices dominated the global market from 2011 to 2023. Furthermore, Android's dominance in the global market stems from the wider accessibility of its devices, as well as their relatively lower cost of use compared to other platforms. Android is an open-source system that allows many manufacturers to produce more affordable devices, making them accessible to a wide range of people. This is supported by research conducted by Aritonang, Sugara, and Pane (2024), which explains that the high usage of Android devices is influenced by the system's flexibility and the ease of use across various economic groups. Therefore, Android is considered more effective as an application development platform for this study. Data regarding the mobile operating systems of Applied Foreign Languages students at Universitas Diponegoro was not included in the needs analysis questionnaire. Consequently, this study cannot definitively determine the proportion of the target users who use Android devices. The selection of Android was primarily based on considerations of widespread usage and more affordable production costs.

#### **4.1.2 Design**

The second phase is the design phase, during which the results from the analysis phase are processed into structured learning materials. In this phase, the researcher designs the game concept, navigation framework, and visual components such as colours and fonts.

#### 4.1.2.1 Design of Navigation Structure

During the design phase, the researcher created a navigation structure to establish a linear workflow. The design begins with a simple menu interface to ensure functional clarity and allow users to identify the next page without technical ambiguity. The workflow then directs users to the topic page, where the users can select one of three vocabulary topics. After selecting a topic, users are directed to the mode page. Users must first select the translation mode to access the synonym and blank sentence modes. Next, the navigation flow directs users to the level page. Users can start the game by clicking on level one. Then, the navigation flow proceeds to the level two game page and subsequently to the level three game page if the user has completed each level. Once all levels and modes have been completed, the navigation flow automatically displays the score page.

This workflow is designed to be as simple as possible, reducing navigation complexity and allowing users to focus their working memory on processing vocabulary information. Consequently, this navigation framework facilitates a smooth digital language learning process.

#### 4.1.2.2 Design of User Interface

The name LexiFun is derived from the word "lexicon", which means "a collection of words", and the word "fun", which means "enjoyment". Therefore, the name LexiFun aims to increase users' interest in learning vocabulary in a fun way. After selecting the product name, the next step was to design the product logo. Since this application is a card-matching game, the researcher chose a card image as the application icon.



Figure 4.2 LexiFun logo

'LexiFun' employs a vibrant and contrasting color palette to produce an engaging educational environment. The selected color palette features magenta as the dominant color, complemented by white, yellow, and black as accent shades. Magenta is associated with color psychology, representing energy and confidence; it reflects passion, energy, and assertiveness. LexiFun uses a pink color scheme to create a visually appealing and enjoyable user experience. Previous research has shown that users perceive soft colors as soothing and pleasant to look at (Rook et al., 2026). Additionally, white functions as a stabilizing component that emphasizes significant details. In a study titled "Efek warna dalam dunia desain dan periklanan" written by Monica (2011), the color yellow symbolizes sunlight, which conveys meanings of intellect, wisdom, optimism, light, joy, and idealism. Yellow is believed to enhance concentration; therefore, the researcher used yellow in several elements to evoke a sense of optimism that can boost concentration. Additionally, the LexiFun app features black on the timer; black conveys a sense of confidence and strength, as it symbolizes formality, elegance, and power. Furthermore, the black on the timer serves as a contrast, allowing users to quickly see the remaining time.

The subsequent step is choosing the font. The researcher used a typeface called "Happy Font" from the Canva design repository. This typeface is distinguished by bold, rounded characters. It seeks to reduce the formal atmosphere associated with acquiring a foreign language, making the learning process feel more approachable and enjoyable for users. Its uncomplicated, relaxed aesthetic offers comfort while maintaining user engagement. It is generally applied to all words and sentences in the LexiFun game, with its size proportionally modified to ensure optimal readability on Android screens.

This application is designed for college students. Therefore, it features a minimalist design that minimises unnecessary visual distractions, allowing users to concentrate fully on the vocabulary material presented. The cards are designed with rounded corners to achieve a formal yet user-friendly aesthetic. To enhance satisfaction, the researcher implemented a white flash effect when a correct card pair is matched. Once the user finishes the game before time runs out, a 'WIN'

message appears to acknowledge this achievement. Conversely, when the allotted time expires, the ‘TIME IS UP’ element appears to signal the end of the game.

The researchers meticulously organised the card pattern to prevent a disordered interface. This augments the user's pleasure and mitigates cognitive weariness during gameplay. The application of a vibrant colour scheme, legible typefaces, and captivating visual effects fosters an enjoyable educational experience that motivates learners to enhance their vocabulary.

#### 4.1.2.3 Design of Guidelines

The researcher, along with the team member, has complete responsibility for assembling lexical content and developing the interface prototype. An external team autonomously creates all visual components, including card designs and functional icons, using Adobe Illustrator software.



Figure 4.3 Application visual assets 1      Figure 4.4 Application visual assets 2

The researchers collaborated with the technical development team to incorporate the concept into the development system. Therefore, the researchers established explicit standards about game flow, visual effects, level duration, and design.

Table 4.4 Design Guidelines Matrix from Researchers

No	Components	Researcher-created assets	Implementation instructions
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1	Content	19 word pairs for the translation and synonym modes, and 19 questions for the blank sentence mode.	Integrated into a random system.
2	Colour	<ol style="list-style-type: none"> <li>1. Pink (#E14791)</li> <li>2. Vivid Magenta (#CB0184) (#CE0082) (#D10085) (#D10A85) (#D10D85)</li> <li>3. White (#FFFFFF)</li> <li>4. Orange (#F6BC2E) (#FBA92A) (#F9AE2B) (#F5BD2F)</li> <li>5. Yellow (#F1CE32) (#F2CA32) (#F1CF32)</li> <li>6. Black (#000000)</li> <li>7. Red (#FF2828)</li> <li>8. Green (#6ACD6B)</li> </ol>	Implemented based on a prototype.
3	Typography	Happy font (Canva).	Implemented for all titles, words, and sentences listed in the prototype.
4	Time	Black colour.	Level 1 (30 seconds) Level 2 (45 seconds) Level 3 (60 seconds)
5	Card	The corners of the cards are slightly rounded, not too square or sharp. There is a small gap between each card.	Level 1 (4 word pairs, or 8 cards) Level 2 (6 word pairs, or 12 cards) Level 3 (9 word pairs, or 18 cards)
6	Effect	White shining effect.	Implemented when the user successfully matches the card pairs correctly.

7	Key	Unlock levels 2 and 3. Unlock synonym mode and blank sentence mode.	Implemented if the user has not yet completed the initial levels and initial modes.
8	Display	The 'WIN' and 'TIME IS UP' displays	The 'WIN' sign is displayed if the user successfully completes the level or mode. The 'TIME IS UP' sign is displayed if the user has not yet successfully completed the level or mode.

### 4.1.3 Development

The third stage is the development stage, wherein all design concepts are consolidated into a memory matching game application. In addition to the technical production process, this stage also involves expert validation and product revisions to ensure the suitability and accuracy of the content before the application is tested.

#### 4.1.3.1 Process of Development

The development stage of the LexiFun application constitutes an effort to collaborate that blends linguistic, graphic, and technical implementation elements to convert content and interface designs into a digital platform.

### 1. Alur Awal Aplikasi

File	Keterangan	Kode Relevan
lib/main.dart	Inisialisasi Flutter, Firebase, auth controller, dan audio awal.	<pre> 11   Future&lt;void&gt; main() async { 12     WidgetsFlutterBinding.ensureInitialized(); 13   14     final audioService = AudioService(); 15     final firebaseEnabled = await _initializeFirebase(); 16     final authController = await GameAuthController.create( 17       firebaseEnabled: firebaseEnabled, 18     ); 19   20     runApp(MyApp(authController: authController)); 21   22     await audioService.playBGM('audio/bgm.mp3'); 23     audioService.setVolume(0.5); 24   }</pre>


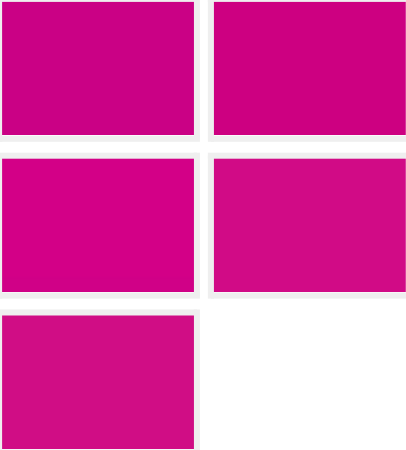
Figure 4.5 Programming language







During the development process, the developer employed the Flutter framework to guarantee responsiveness and optimal performance on mobile

devices. The selection of Flutter allows researchers to create an interactive user interface that maintains the engagement and navigability of English-language material for users. Moreover, this technology facilitates the strong, cross-platform integration of vocabulary resources and the blank sentence mechanism developed by the researchers into the application system.

The researchers selected a colour palette that integrates vibrant and neutral colours to maintain an appropriate and engaging educational atmosphere. Vivid magenta and pink were used as the primary visual identity. Orange and yellow were utilized on several elements. White was employed for the background to achieve design balance, maintain a clean layout, and enhance text readability. The timer appeared in black to provide a stark contrast. Furthermore, red and green served effectively as feedback indicators, with red denoting an improper response and green denoting a correct response. The subsequent table presents a list of the colors utilized in the project, along with the respective codes.

Table 4.5 Colour Palette

No	Colour	Code
1		Pink (#E14791)
2		Vivid Magenta (#CB0184) (#CE0082) (#D10085) (#D10A85) (#D10D85)

3		White (#FFFFFF)
4		Orange (#F6BC2E) (#FBA92A) (#F9AE2B) (#F5BD2F)
5		Yellow (#F1CE32) (#F2CA32) (#F1CF32)
6		Black (#000000)
7		Red (#FF2828)
8		Green (#6ACD6B)

The application begins with a splash screen featuring the application name on a white and magenta backdrop. The phrase “Login with Google” is shown, enabling users to enter the menu page.

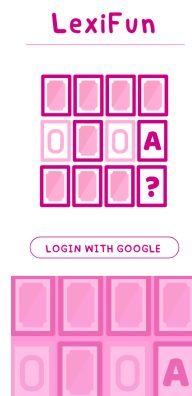


Figure 4.6 Splash screen

The menu page features a ‘Play’ button to initiate a game session, an ‘Information’ icon providing details about LexiFun, and a profile section displaying the Google account used to access the application. The Google account login functions solely to store user progress data, allowing the system to save checkpoints and record the last level reached by each user. The application does not collect, store, or process users' personal data beyond the information required for authentication and progress tracking. This enables users to continue their learning progress from their most recently completed level. Additionally, users can review the list of words selected for the game in the ‘Word Bank’ section.

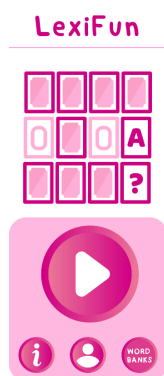


Figure 4.7 Home page

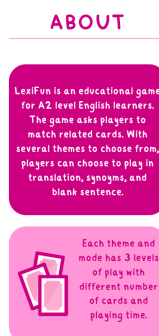


Figure 4.8 Info icon

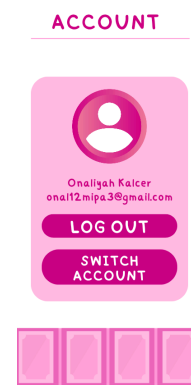


Figure 4.9 Profile icon



Figure 4.10 Word bank icon

WORD BANKS

Conjunctions and Prepositions

Word	Meaning	Synonym
Although	Malagipun	Even though
Outside	Di luar	Outdoors
Past	Massa lalu	After
Unless	Kecuali jika	Except if
While	Sementara	When
Against	Melawan	Opposed to
According to	Menurut	Based on
Between	Di antara	In between
After	Setelah	Following
Despite	Malagipun	In spite of

At the bottom right of the table is a 'NEXT' button.

Figure 4.11 List of words

At the topic selection page, users are presented with three options: Conjunctions and Prepositions, Quantifiers, and Modal Auxiliary Verbs. Topics are chosen according to the functional vocabulary category, encompassing terms that assist learners in developing grammatical structures and forming links between ideas within a phrase.



Figure 4.12 Topics page

After selecting a topic, the following page presented three mode options: Translation, Synonyms, and Blank Sentences. Users are required to fulfill all stages in Translation mode to gain access to Synonyms mode and Blank Sentences mode. Each topic has 19 English vocabulary words or phrases, followed by a list

of those words in Indonesian and synonyms, with the same number of words. The total vocabulary list from the three topics on LexiFun is 171 words.



Figure 4.13 Modes page

Users are presented with three difficulty levels on the difficulty level page. Each level has a different duration, starting with level one at 30 seconds, followed by level two at 45 seconds, and the final level at 60 seconds. This selection of durations aligns with Davis's (2015) [18] scaffolding strategy, which intentionally structures complexity in a tiered manner within increasingly complex new activities. Therefore, LexiFun is designed such that users must complete the initial level before accessing the next one.



Figure 4.14 Levels page

Upon choosing Level 1, the user receives a face-down card, and the timer commences.



Figure 4.15 First level

A 'white shining' effect signifies that the user has accurately matched the correct pair of words.



Figure 4.16 White shining effect

Upon successfully matching all pairings before the time limit expires, a 'WIN' display appears as a reward, indicating that the user may progress to the next level.



Figure 4.17 ‘WIN’ pop up

If the user fails to match all pairs within the designated time, a “TIME IS UP” display appears, signaling the need to restart the level.

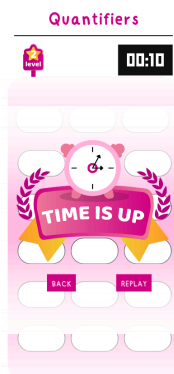


Figure 4.18 ‘TIME IS UP’ pop up

The previously mentioned interface exclusively relates to the translation and synonym modes, differentiating it from the final mode, blank sentence. In the blank sentence mode, vocabulary items from levels 1–3 are integrated into a single set of sentence-completion exercises. Therefore, each topic contains 19 blank-sentence questions derived from four vocabulary items in level 1, six vocabulary items in level 2, and nine vocabulary items in level 3, resulting in a total of 57 blank-sentence questions across the three topics.

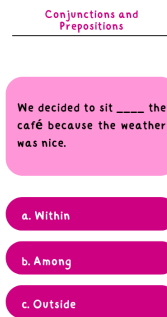


Figure 4.19 Blank sentence mode

While the user selects the correct answer, the displayed color is green. Red is the color that appears if the user chooses the wrong answer.

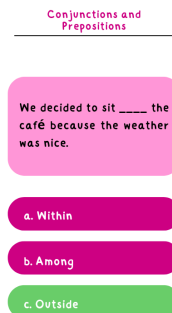


Figure 4.20 Correct answer



Figure 4.21 Wrong answer

Upon selection of all answers, the score of correct and incorrect responses is presented. Subsequently, the user may transition to an alternative topic.

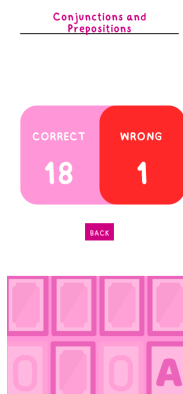


Figure 4.22 Blank sentence result

#### 4.1.3.2 Expert Validation

At this stage, the researchers performed expert validation to validate the outcomes of the generated application. The validation procedure was conducted by an expert and lecturer specializing in English language education, Naila Rohmah, S.Pd., M.Li., with a focus on two main aspects: media and teaching materials. Media validation involves assessing the visual aspects of the application, such as color, layout, and typography. Material validation, on the other hand, covers the clarity, accuracy, and suitability of the content for A2-level learners.

This stage aimed to evaluate the application's language and technical appropriateness with experts prior to its distribution to research participants. The researchers supplied tools consisting of a likert scale and open-ended questions. Several suggestions were made regarding design improvements to ensure the LexiFun application meets the established requirements.

**FORM OF VALIDATION ON PRODUCT**  
**"VOCABULARY LEARNING GAME: LEXIFUN"**

Validator :  
 Date of Validation :

A. Expert Validation for Media

Table 1. Statement of Expert Validation for Media

No	Questions
1	The layout of the games is well-structured and visually appealing. (Strongly Disagree/Disagree/Netral/Agree/Strongly Agree)
2	The typography (font type, size, and spacing) is clear and easy to read. (Strongly Disagree/Disagree/Netral/Agree/Strongly Agree)
3	The visual elements (graphics and icons) support the understanding of the content. (Strongly Disagree/Disagree/Netral/Agree/Strongly Agree)
4	The color scheme and design aesthetics are appropriate and professional. (Strongly Disagree/Disagree/Netral/Agree/Strongly Agree)
5	The organization of sections enhances readability and navigation. (Strongly Disagree/Disagree/Netral/Agree/Strongly Agree)

Figure 4.23 Validation for media

B. Expert Validation for Material

Table 2. Statement of Expert Validation for Material

No	Questions
1	The materials provided in the games are accurate. (Strongly Disagree/Disagree/Netral/Agree/Strongly Agree)
2	The content is clear and easy to understand. (Strongly Disagree/Disagree/Netral/Agree/Strongly Agree)
3	The material is relevant and applicable for A2 learners for studying vocabulary. (Strongly Disagree/Disagree/Netral/Agree/Strongly Agree)
4	The language used in the game is appropriate and professional. (Strongly Disagree/Disagree/Netral/Agree/Strongly Agree)
5	What suggestions do you have for improving the game's design? (Paragraph) <i>Revisi program dari quantity and measurement agar kreatif.</i>
6	What recommendations do you have for enhancing the game's content? (Paragraph) <i>Tambahkan word bank dan review kembali materi, review di bagian quantity and measurement dan auxiliary and modal verb.</i>

Figure 4.24 Validation for material

Researchers received feedback regarding changing the term 'theme' to 'topic'. Additionally, another suggestion was to remove the background sound feature and replace it with a 'word banks' feature containing vocabulary words and their meanings, which would appear during gameplay sessions to serve as educational content for users.

The researchers obtained approval from experts, which allowed them to distribute the modified LexiFun application to second-semester applied foreign language students specialising in English for a user test.

**SURAT PERNYATAAN VALIDASI  
DOSEN PEMBIMBING TUGAS AKHIR**

Saya yang bertanda tangan di bawah ini:

Nama : Naila Rohmah S.Pd., M.Li.  
NIP : 198912262024062001  
Prod : Bahasa Asing Terapan

Menyatakan bahwa proyek tugas akhir atas nama mahasiswa:


Nama : Rima Frida Lestari  
NIM : 40020522650047  
Prod : Bahasa Asing Terapan  
Judul TA : Developing a User-Friendly Digital Game-Based Language Learning (DGBLL) Application for A2-Level EFL Vocabulary Acquisition

Setelah dilakukan penilaian atas proyek tersebut dapat dinyatakan:

<input type="checkbox"/>	Layak digunakan tanpa revisi
<input checked="" type="checkbox"/>	Layak digunakan dengan revisi sesuai aturan
<input type="checkbox"/>	Tidak layak

Demikian surat validasi ini dibuat agar dapat digunakan sebagaimana mestinya.

Semarang, 21 April, 2026  
Validator

  
Naila Rohmah S.Pd., M.Li.  
NIP. 198912262024062001

Catatan:  
Pengisian kolom diberi tanda (x)

Figure 4.25 Validation form

#### 4.1.3.3 Product Revision

This stage serves as a further development of the suggestions and improvements proposed by the experts. The improvement process was executed collaboratively, during which the researcher directed the technical developer to modify the topic names, replace certain terminology in the Quantifiers and Modal Auxiliary Verbs topics, revise the questions in the blank sentence mode, removed songs from the game, and create a 'word bank' page featuring a compilation of vocabulary utilized in this game. The upgrading process resulted in substantial improvements to the application's content, preparing it for testing with the target demographic: second-semester Applied Foreign Languages students at Universitas Diponegoro.



Figure 4.26 Before revision 1



Figure 4.27 After revision 1



Figure 4.28 Before revision 2



Figure 4.29 After revision 2

#### 4.1.4 Implementation

The implementation phase is conducted to test the product's functionality with the target user group in a real-world learning setting. This phase involves the distribution of the LexiFun application to second-semester applied foreign language students at Universitas Diponegoro, with the aim of collecting data on user experience and identifying any technical issues that may occur.

##### 4.1.4.1 User Test

The product trial was conducted twice in accordance with the second-semester course schedule for students in the Applied Foreign Languages Program at Universitas Diponegoro at the A2 level. There were supposed to be 27

students at the A2 level, but a total of five students from the two classes were unable to participate in the trial. The trial for Class B was held on April 21, 2026, with 10 students, while the trial for Class A was held on April 23, 2026, with 12 students. The trials took place in Room 306, Pleburan Campus, Universitas Diponegoro.

Before the game began, the researchers introduced themselves and explained the purpose and objectives of the experiment. Subsequently, the researcher delineated the regulations of the game, encompassing temporal constraints, the quantity of levels, and the applicable modes for each subject. The researchers also explained several features within the app, including the word banks, which contain words that users can study before starting the game. In order to optimize the use of time, the researcher divided the students into three groups: the first group focused on conjunctions and prepositions, the second group focused on quantifiers, and the third group focused on modal auxiliary verbs.



Figure 4.30 User test

During the gaming session, the students initially required a period of acclimatization; however, they subsequently demonstrated their focus on the game. The completion of each level in every mode was rapidly achieved by some students, while others necessitated multiple attempts to progress to subsequent levels or modes. The duration of a single topic in the LexiFun game is approximately 30 minutes.

#### 4.1.5 Evaluation

The final phase is the evaluation, which assesses the degree to which the generated media fulfill quality requirements and educational objectives. The researcher evaluates the feedback gathered from prior stages to assess the efficacy and overall success of the product development.

##### 4.1.5.1 User Feedback

Researchers gathered data to assess the scope to which the application fulfils users' requirements following a user test involving 22 students. The average rating scores from responders, as indicated by the disseminated questionnaire, were as follows:

Table 4.6 User Feedback

No	Question in English	Average Score	Category
1	Aesthetic appeal and user-friendliness	84,55%	Strongly agree
2	Layout and typography appropriateness	86,36%	Strongly agree
3	Visual elements for content understanding	76,36%	Agree
4	Clarity of vocabulary presentation	83,64%	Strongly agree
5	Relevance of functional vocabulary for A2 level	92,73%	Strongly agree
6	Utility as an instructional learning resource	89,09%	Strongly agree
7	Interactive elements for enhanced learning experience	80,91%	Strongly agree
8	recommendation to use this game for vocabulary learning	83,64%	Strongly agree
9	Alignment with A2 level learners' needs	82,73%	Strongly agree

The table indicates that the majority of aspects obtained really high ratings. Numerous elements garnered high scores from the 20 participants, particularly with typography and layout appropriateness, relevance of functional vocabulary for A2 level, clarity of vocabulary presentation, and utility as an instructional learning resource. This signifies that the produced medium has received an exceptional rating on visual presentation, material clarity, suitability for the learners' proficiency level, and educational efficacy. Nineteen respondents concurred that LexiFun is entertaining and user-friendly, as indicated by statement

one. Nonetheless, certain parts had marginally lower agreement rates, including interactive elements (16 respondents), visual elements for content comprehension (14 respondents), and alignment with A2-level learners' requirements (17 respondents). Overall, these results suggest that the LexiFun application has been positively welcomed by users; nevertheless, certain parts necessitate additional enhancement according to the short-answer responses.

In addition to the nine Likert-scale statements, the researchers incorporated a question to gather feedback on potential enhancements to the LexiFun application. The researchers then proceeded to categorize the responses obtained from the 22 students into four primary categories. This summary of the input is intended to offer a comprehensive overview of the respondents' perspectives.

Table 4.7 User Suggestion

No	Aspects	Responses
1	Mechanics and challenges	11 users, representing 50% of all users, recommended extending the duration of the timer feature for each level, especially level three.
2	Animation and responsiveness	Certain users perceived the flip-card animation (during the card's rotation) as excessively sluggish. They perceived this as a little disruption to the game's rhythm and proposed accelerating the animation to enhance the fluidity and responsiveness of the gameplay.
3	Audio	A user enquired about the lack of background music in the application and proposed its inclusion to enhance the learning experience. Audio elements were initially created but removed during development based on feedback from subject matter experts who wanted to keep users focused.
4	Content and technical development	There is an aspiration to augment the vocabulary breadth and complexity to extend the application use duration. Moreover, there were numerous technical observations concerning latency problems on specific devices, alongside appeals for the application availability on iOS and the provision of additional colour options.

The feedback indicated that the majority of students focused on in-game mechanics such as timers and flip-card effects. It is recommended that the

development of the LexiFun application in the future be guided by the following principles: the incorporation of background music, the establishment of levels, and the measurement of vocabulary acquisition.

#### **4.1.5.2 Analysis of User Feedback**

The findings from the short-answer questions indicated that 11 of the 22 respondents expressed a need for additional time for Level 3, identifying the rising number of vocabulary terms as a challenge to completing the game within the 60-second time constraint. Moreover, certain respondents perceived that the flip-card effect is excessively time-consuming, hence impeding the game's pace. Concerning feature development, comments indicated that LexiFun should be accessible for download on iOS devices, along with the incorporation of additional word varieties and levels to improve user retention.

One response proposed reintroducing background music, which had been part of the original edition but was subsequently substituted—following expert recommendations—with a "word bank" function that presents vocabulary throughout games to furnish users with essential knowledge. Additional feedback revealed that respondents assessed the application fundamental features and provided suggestions for enhancements related to duration, content development, and technological elements.

#### **4.1.5.3 Product Improvement**

After completing the implementation stage, the researcher proceeded to the evaluation stage. The initial time allocation in LexiFun was established by benchmarking a memory-matching game called Santa Matching Game, which provides 30 seconds for matching six pairs of cards. Since LexiFun requires users to match vocabulary items rather than visual images, additional processing and recall are needed during gameplay. Therefore, the duration was progressively increased according to the number of cards presented at each level, namely 30 seconds for Level 1 (8 cards), 45 seconds for Level 2 (12 cards), and 60 seconds for Level 3 (18 cards). User testing revealed that participants experienced

difficulties completing Level 3 within the allocated time, indicating that the higher number of vocabulary items imposed greater cognitive demands. Consequently, the time limit for Level 3 was extended based on user feedback, while the durations for Levels 1 and 2 were retained as participants did not report similar difficulties. The feedback indicates that most users struggled to complete level three within 60 seconds, and some perceived the flip card impact as excessively long, impeding the game's fluidity. Among the several respondents suggesting an extension of time at level three, two respondents suggested an exact duration. The first respondent suggested modifying the duration at level three to 120 seconds. The second respondent advised an addition of approximately 15 to 20 seconds. Consequently, following discussions with the expert in the field, the researcher decided to extend the duration from the prior 60 seconds to 90 seconds. The time limit was extended following user feedback and was further supported by Cognitive Load Theory. According to Sweller et al. (2019), working memory has severe limitations when processing novel information, and instructional activities should be organised in ways that reduce excessive working memory load. Furthermore, learning tasks with higher complexity require appropriate management of intrinsic cognitive load. Therefore, additional time was provided in higher levels to accommodate the increased task complexity and to reduce excessive cognitive demands during gameplay. Alongside the modification for the duration of level three, the flip card effect was expedited to enhance user comfort during gameplay. These two aspects are prioritised because of their direct correlation with the user's comfort and the fluidity of the learning experience. This modification is anticipated to create a more equitable balance between challenge and user-friendliness in gameplay activities.



Figure 4.31 Timer before revision

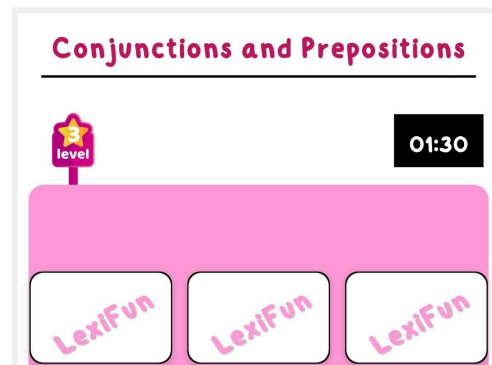


Figure 4.32 Timer after revision

Other suggestions, including the development of the application for the iOS platform and the expansion of vocabulary words and levels, were not executed in this study but were documented as suggestions for future research to enhance the application's comprehensiveness.

## 4.2 Discussion

The English proficiency of second-semester students in the Applied Foreign Languages Program at Universitas Diponegoro is at the A2 level. However, second-semester students are expected to have reached the B1 level. This requires students who are still at the A2 level to expand their vocabulary, particularly functional vocabulary frequently used in academic and professional settings. Therefore, additional learning materials are needed to introduce more vocabulary to students in a contextual and practical manner to bridge the gap between their current proficiency level and the expected level of English.

Therefore, the LexiFun application was developed using the ADDIE model, which consists of five stages. During the analysis stage, learning needs and user characteristics were identified to ensure the relevance of the educational media being developed. The design stage focused on designing the structure of the content, features, and game flow. Next, during the development stage, the media was technically produced in accordance with the established design; during this stage, validation by experts revealed the need for several improvements in content and media aspects. The implementation stage involved user testing of the media

by the target users, while the evaluation stage was conducted to assess the media's effectiveness and quality. The feedback results showed positive responses, indicating that LexiFun was well-received. Nevertheless, LexiFun was designed as a supplementary tool focused on enhancing functional vocabulary.

LexiFun's design combines the memory-matching game mechanism with translations, synonyms, and blank sentences. With the blank sentence mode, users can apply the vocabulary they have learned in a sentence, thereby supporting more meaningful learning. LexiFun was also designed using the scaffolding approach, a staged learning method, starting from the most basic level with fewer words and increasing as the user moves forward. LexiFun, by using the scaffolding approach and changing the games, is not only a tool to introduce functional vocabulary but also to help students use it in context.

This study supports the previous research, one of which was conducted by Nevyta, Purba, and Hutagalung (2023), which showed a significant increase in the memory matching card learning method in mastering vocabulary based on the results of pre-tests and post-tests. However, there is a difference in the language focus used, where Nevyta, Purba, and Hutagalung (2023) focused on German vocabulary, whereas this study focuses on English vocabulary. In addition, this study aligns with the findings of Hidayah and Puspaningrum (2025), which stated that memory matching games can improve the ability to remember vocabulary. The main difference in this study lies in the approach used, namely digital game-based learning compared to manual matching cards, as well as the focus on functional vocabulary compared to general vocabulary. This difference makes LexiFun a further development of learning media based on existing approaches.