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The UI/UX development of the 'Koin' application to create interactive Korean language learning

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ABSTRACT

With the rapid development of technology, there is an excellent opportunity to utilize it in creating interactive, application-based Korean language learning media. This study aims to design the 'Koin' application, primarily focusing on its UI and UX aspects, to enhance effectiveness and user engagement in Korean language learning. This research employs the design thinking method, which consists of five stages: empathize, define, ideate, prototype, and test. Data for this study were collected through qualitative and quantitative methods, including structured interviews and usability testing with beginner-level Korean language learners as participants. Two media experts and two subject matter experts in the Korean language were engaged to provide feedback and suggestions to ensure the validity of the developed application. The qualitative results demonstrate that the design thinking method has identified the user's needs in-depth and captured the user's good experience navigating the interface with relevant features. The quantitative results show that the UI/UX design of the Korean language learning application for beginners, developed using the design thinking method, resulted in a well-designed application with a final score of 80 points. This finding indicates that design thinking effectively designs learning applications that meet target users' needs and preferences.

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ABSTRAK

Dengan perkembangan teknologi yang sangat pesat, terdapat peluang besar untuk memanfaatkannya dalam menciptakan media pembelajaran bahasa Korea berbasis aplikasi yang interaktif. Penelitian ini bertujuan untuk merancang aplikasi 'Koin', dengan fokus utama pada UI dan UX untuk meningkatkan efektivitas dan keterlibatan pengguna dalam pembelajaran bahasa Korea. Penelitian ini menggunakan metode design thinking, yang terdiri dari lima tahap: empathize, define, ideate, prototype, dan test. Data untuk penelitian ini dikumpulkan dengan menggunakan metode kualitatif dan kuantitatif, termasuk wawancara terstruktur dan uji kegunaan dengan pemelajar bahasa Korea tingkat pemula sebagai partisipan. Selain itu, dua ahli media dan dua ahli materi pelajaran bahasa Korea juga dimintai pendapat untuk memberikan masukan serta saran untuk memastikan validitas aplikasi yang dikembangkan. Hasil kualitatif menunjukkan bahwa metode design thinking telah mengidentifikasi secara mendalam dan menggambarkan pengalaman positif pengguna pada navigasi antarmuka dengan fitur-fitur yang relevan. Hasil kuantitatif mengindikasikan bahwa desain UI/UX aplikasi pembelajaran bahasa Korea untuk pemula yang dikembangkan dengan metode design thinking menghasilkan aplikasi yang dirancang dengan baik dan mendapatkan skor akhir 80 poin. Temuan ini menunjukkan bahwa pendekatan design thinking efektif dalam merancang aplikasi pembelajaran yang sesuai dengan kebutuhan dan preferensi target pengguna.

Kata Kunci: *antarmuka pengguna; aplikasi pembelajaran bahasa Korea; design thinking; pengalaman pengguna*

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INTRODUCTION

In this era of technological advancement, social media through mobile devices will inevitably be used for communication and primary usage throughout our daily lives (Wiyanto, 2018). The availability of diverse applications within mobile devices further solidifies their position as a primary necessity (Mujasir et al., 2017). By maximizing the features already included in applications, the users can do an astonishing amount of activity with more ease and efficiency, including learning. In educational activities, applications are utilized as learning media. Application-based learning media are more advantageous due to the ease of understanding regarding material delivery, language, and visual presentation (Putra et al., 2017). App-based learning media presents the material in audio and visual formats, making it more attractive than conventional learning, which usually only relies on textual material (Tahel & Ginting, 2019).

It can be concluded from the above exposition that technological advancements significantly impact the development of application-based learning media. One field that greatly benefits from the development of application-based learning media is language learning (Haryadi et al., 2023). Alamsyah, in the book "*Strategi Efektif Dalam Pembelajaran Bahasa Asing*" states that application-based language learning media provides various interactive features, feedback, exercises, and other features that can help improve language skills. Moreover, Pujiono et al., in the book entitled "*Penggunaan Teknologi dalam Pembelajaran Bahasa Inggris*" explains that the use of application-based learning media creates a varied learning experience, enabling users to become familiar with pronunciation, vocabulary, and conversation. Studies indicate that language learning applications offer substantial opportunities to improve language proficiency and be valuable as learning media.

Several previous studies indicate that application-based learning media have been extensively developed for Korean language learning. Designed an application using the Android operating system that can support beginners' learning process of Korean by offering learning topics about introducing Hangeul letters (Damarullah et al., 2014). This research resulted in a Korean language learning application that provides features for letter recognition, pronunciation rules, and writing methods, including several examples of vocabulary and sentences. The test results showed that the application created functioned well and was easily understood by all ages, both children and adults. Furthermore, other research has developed a Korean language learning application focusing on Hangeul letters, batch, and combined batch (Somnya &Tjahjono, 2016). In addition, the application also provides a play menu that facilitates users in measuring their abilities regarding the material that has been learned in the application. Then, the research develops a Korean language learning application that contains materials about Hangeul vowel and consonant letters to make it easier for the general public to start learning Korean before moving to more complex levels (Havest & Rahayu, 2021). Previous studies show that application-based learning media are worth considering as a practical learning media in Korean language learning.

However, these application-based Korean language learning media for beginners still need to be improved regarding material, often only covering the introduction of Hangeul letters. Moreover, previous research on application-based Korean language learning media has yet to focus on the design of User Interface (UI) and User Experience (UX). However, Cholil and Susanto, in a book entitled "*Berkembang Dengan Desain Digital: Memahami UI, UX, Dan Figma Secara Komprehensif*" explain that User Interface (UI) and User Experience (UX) are crucial elements in the design of an application. Therefore, the designed applications are considered less user-friendly and unable to meet user needs fully. User Interface (UI) refers to the simple graphical interface that connects the interaction between the application and its users (Lukman & Larasati, 2018). Meanwhile, User Experience (UX) refers to the experience users feel when using a product or service (Aisy et al., 2021). Thus, User Interface (UI) and User Experience (UX) are two elements that cannot be separated. An application's success largely depends on its User Interface (UI) and User Experience (UX), which combine to make it useful and enhance user satisfaction.

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Therefore, this study aims to design an application-based Korean language learning media with broader material beyond Hangeul learning. In this case, it encompasses material related to Korean vocabulary and grammar for beginners, focusing the application design on User Interface (UI) and User Experience (UX) aspects. This study employs the design thinking method to ensure that the resulting application is user-friendly, meets the needs of beginner-level Korean language learners, and has the potential for continued use. In line with the stated research objectives, this study seeks to answer two key questions. First, it explores the design process of the Koin application, explicitly created for beginner-level learners of Korean vocabulary and grammar. This involves examining the principles and methodologies to develop a practical and user-friendly Korean learning application. Second, the study examines how beginner-level Korean language learners respond to the Koin application as media for learning Korea. The results of this study are expected to provide valuable insights into the strengths and areas for improvement of the Koin application, contributing to the development of more effective tools for learning the Korean language.

LITERATURE REVIEW

ICT-based learning media

Current technological advancements have brought significant changes to various aspects of life, including the world of education. One of the leading innovations is ICT (Information and Communication Technology)-based learning media, which offers a new approach to the learning process. Said and Hasanuddin (2019) state that ICT learning media are tools used in the learning process both inside and outside the classroom and can be used to complete assignments. In this context, ICT devices include mobile phones, computers, laptops, LCDs, and the Internet. ICT-based learning media are parts of educational resources that use information and communication technology to provide educational content for students (Khaira, 2021). Learning media is used as one of the methods commonly used by educators to improve the effectiveness and student learning outcomes (Al Hafizh & Fatah, 2022). In conclusion, ICT-based learning media uses information and communication technology to access and obtain learning materials.

Application

The word “application” originates from the English word “application,” which means use or implementation (Azis, 2018). In terminology, an application is a ready-to-use program for users to execute a function according to a designated target or objective. Meanwhile, according to Jogiyanto, an application is the implementation and storage of something, data, or a problem within a medium that can be transformed into a new form (Siregar et al., 2018). Applications are specifically created to functionalize something following the capabilities possessed by the application itself.

User Interface (UI)

User Interface is an interactive element that bridges the interaction between a system and its users. Roth explains that interface design or user interface is a tool used to manipulate objects in a digital form (Wibawanto & Nugrahani, 2018). Furthermore, Mcleod mentions that the user interface is where the interaction between a program or application and its users occurs, allowing the system to receive input and produce output (Bastian et al., 2021). A visually pleasing interface design should be directly proportional to functionality (Rauschenberger et al., 2013). Therefore, the user interface is closely related to user experience and is a crucial aspect of the design of an application.

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User Experience (UX)

According to ISO 9241-210, user experience (UX) refers to the responses from users due to their interaction with a product or service. Himawan and Yanu in the paper "*Interface User Experience*" suggest that user experience is conceptually similar to user interface (UI), with the primary difference in communication between the user and the system. While UI focuses on the system's design, UX emphasizes the user's overall experience. UX can be understood as the experiences users go through when interacting with a website or application. UX is crucial in application design as it fosters engaging and enjoyable interactions between users and the system. UX is very often about the value of the product and how this value is experienced by the users so that organizational goals are met (Maslov et al., 2021).

METHODS

This research focuses on UI/UX design, applying the design thinking method conducted through interviews and usability tests to gain a deeper understanding of the problems faced by beginner-level Korean language learners and evaluate the design of the Koin application. In this study, beginner-level Korean language learners at the Daehan language learning institution who have been learning Korean for 3-6 months and are interested in application-based Korean language learning media are selected as research participants and target users.

The participant criteria are specifically chosen based on reasons tailored to the research objectives. The requirements of participants who have learned Korean for 3-6 months are included in this study because this duration is considered ideal for learners to recognize Hangeul letters well and understand how to form syllables and essential words in Korean. This is crucial for the UI/UX design of the Koin application, which covers material related to vocabulary and grammar; this criterion ensures that participants have sufficient foundational knowledge to participate in the research with adequate understanding. Additionally, participants interested in application-based Korean language learning applications help ensure that this research represents the target users of the Koin application. Furthermore, with these criteria, the feedback received from participants is more relevant and ensures that the developed application meets user needs and preferences.

The interview was conducted online via the Zoom platform, using a structured set of questions in Indonesian. The purpose was to gain in-depth insights into the application's target users, specifically exploring users' experiences in learning Korean, their goals in studying the language, challenges encountered and needs to be related to more effective Korean language learning for beginners. The interviews involved three beginner-level Korean learners interested in app-based Korean language education, with each session averaging 20 minutes.

This research also involves two media experts and two Korean language content experts. Media experts ensure that the Koin application's UI/UX design is not only visually appealing but also easy to use and effective in meeting the needs of the target users. Meanwhile, Korean language content experts ensure that the quality of the materials used in the design meets standards and that beginner-level learners can easily understand and follow them.

The application design in this study uses the design thinking method. Mueller-Roterberg, in a book entitled "*Handbook of Design Thinking: Tips & Tools for How to Design Thinking*" explains that the design thinking method is a comprehensive, user-oriented, and innovative approach that aims to generate or develop ideas through project-based activities. Empathizing or experiencing what the user feels is critical in design thinking. This empathy is carried out to find out what users need by understanding their beliefs, values, motivations, behaviors, constraints, strengths, and challenges. Through this empathy, innovative solutions

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to solve problems also emerge. Design thinking is chosen because the stages in this method can help answer the problems faced by the target users, in this case, beginner-level Korean language learners. This research consists of five stages, with a more detailed explanation of each stage, using the design thinking method.

1. *Empathize*

   In the empathize stage, interviews are conducted with target users to gain a deeper understanding of their experiences while learning Korean. This interview discusses the media used for learning, the problems often encountered, how to overcome these problems so far, and the things the target users need to support better Korean language learning. This interview becomes the basis for designing the application to suit the needs of the target users.

2. *Define*

   This stage is carried out to define problems based on data obtained through the empathize stage. This stage involves data analysis and determining target users' main issues. This stage utilizes How Might We (HMW) to help further understand and simplify the complexity of existing problems.

3. *Ideate*

   After clearly understanding the problems users face, the next step is to determine solutions for these problems. This stage involves brainstorming to obtain as many solutions as possible. After all the solutions are collected, the solution deemed most appropriate for the problem is selected.

4. *Prototype*

   The solution determined from the ideate stage is then used to create an initial design. Target users will test the design later to detect flaws as early as possible. The design is temporary, as it can still be modified if problems are found.

5. *Test*

   In this stage, trials are conducted to evaluate the design results from the previous stage. Target users conduct trials through a distributed Maze link. Maze provides detailed information on how target users interact with the prototype, making it the chosen tool for testing in this research. Maze also makes it easier to understand the difficulties faced by target users.

This research analyzes qualitative data from interview results using open coding and axial coding methods. Open coding was conducted first by identifying and labeling concepts emerging from the raw interview data. Each significant piece of data was openly coded without the constraints of predefined categories. This allowed the author to develop an initial understanding of the underlying themes within the data. After the open coding process, axial coding was performed to connect the identified codes. At this stage, the author grouped these codes into more significant categories and began identifying relationships and patterns within the data. Axial coding helped create a more organized data structure and ultimately enabled the author to understand the broader context of the interview findings.

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The data was then analyzed thematically using an empathy map to present complex data in a visual form that is easier to understand and remember. Meanwhile, quantitative data from usability tests are analyzed and categorized based on grade scale, acceptability, and adjective rating. The grading scale has grades A, B, C, D, and F. Next, the acceptability rating has three levels: not acceptable, marginal, and acceptable. Meanwhile, the adjective rating has six levels: worst imaginable, poor, ok, good, excellent, and best imaginable.

RESULTS AND DISCUSSION

Design of the Koin application for beginner-level Korean vocabulary and grammar learning

Empathize

Empathize is the phase in which information about the target users is gathered to identify problems (Nazar et al., 2024). The empathizing phase of this research has produced three empathy maps, each representing users with different preferences. The empathy maps aim to visually present the complexity of interview data, making it easier to understand and remember. The empathy maps consist of four quadrants: says, does, feels, and thinks, which visualize the interview results (Santoso et al., 2024). Below are the empathy maps generated from the empathize phase.

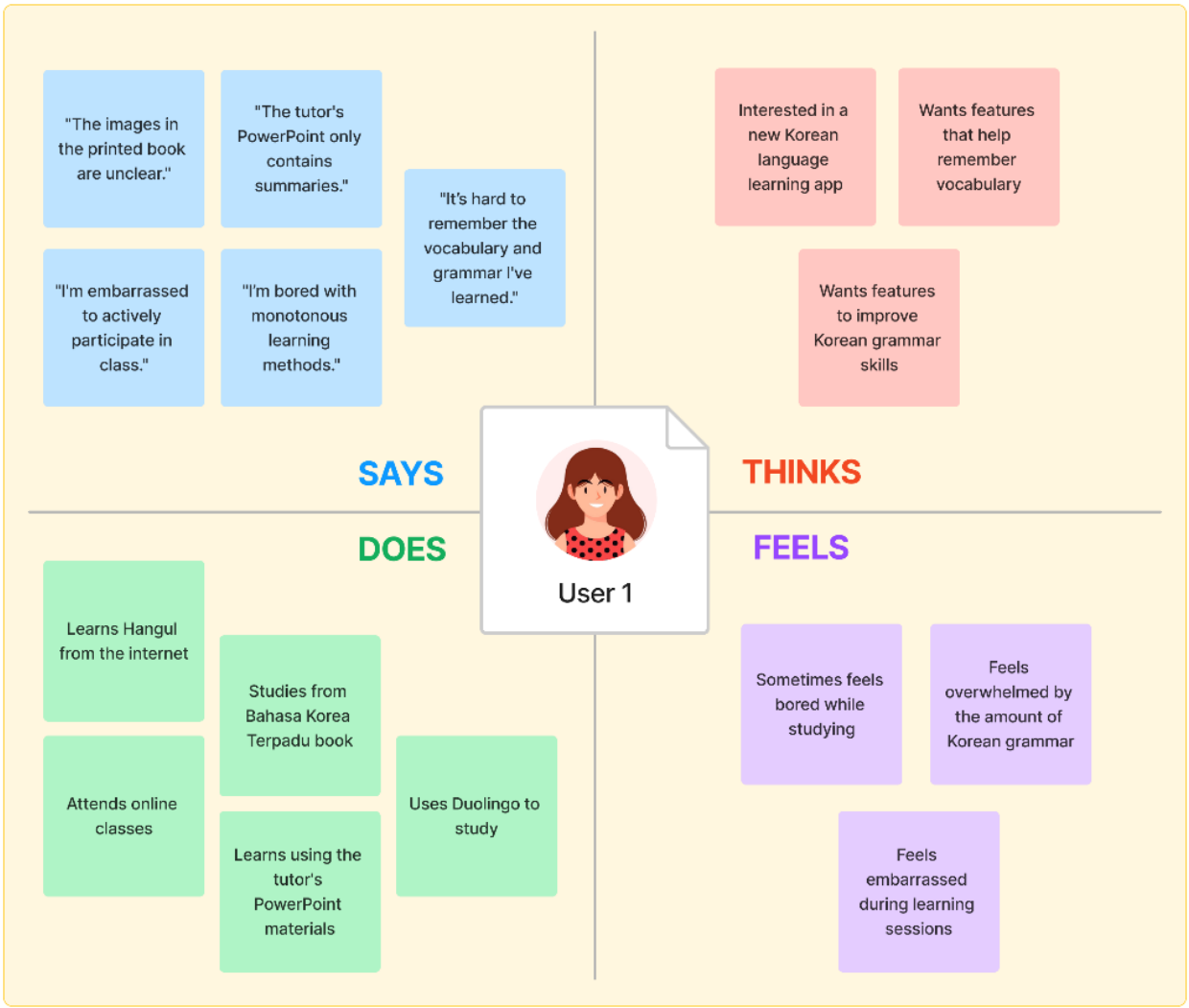

Figure 1. Empathy Map of the First User
Source: Author's Documentation 2024

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Based on **Figure 1**, the empathy map of the first user visualizes the profile of a beginner Korean language learner who actively uses various learning resources. However, they still face several challenges during the learning process. In the 'says' quadrant, it can be seen that the first user faces several issues, including inadequate quality of learning materials, limited learning content, reluctance to participate actively in the learning process, monotonous teaching methods, and difficulty remembering vocabulary and grammar previously learned. Therefore, in the 'thinks' quadrant, it is evident that the user expresses interest in using a new Korean language learning application and desires features that could assist in learning Korean vocabulary and grammar.

Furthermore, the 'does' quadrant provides a comprehensive overview of the learning resources the first user has utilized, namely the internet, online classes, books, materials from tutors, and language learning applications. Despite this, the first user still encounters various challenges in learning Korean. This indicates the importance of designing the ‘Koin’ application as an effective and efficient alternative learning resource. Finally, the 'feels' quadrant reflects the emotions the user experiences while learning Korean, ranging from boredom and surprise at the diverse Korean grammar structures to feelings of embarrassment during lessons. Therefore, the 'Koin' application should be designed to avoid boredom, present Korean grammar content in an easily understandable format, and encourage active participation in learning, thereby boosting user confidence.

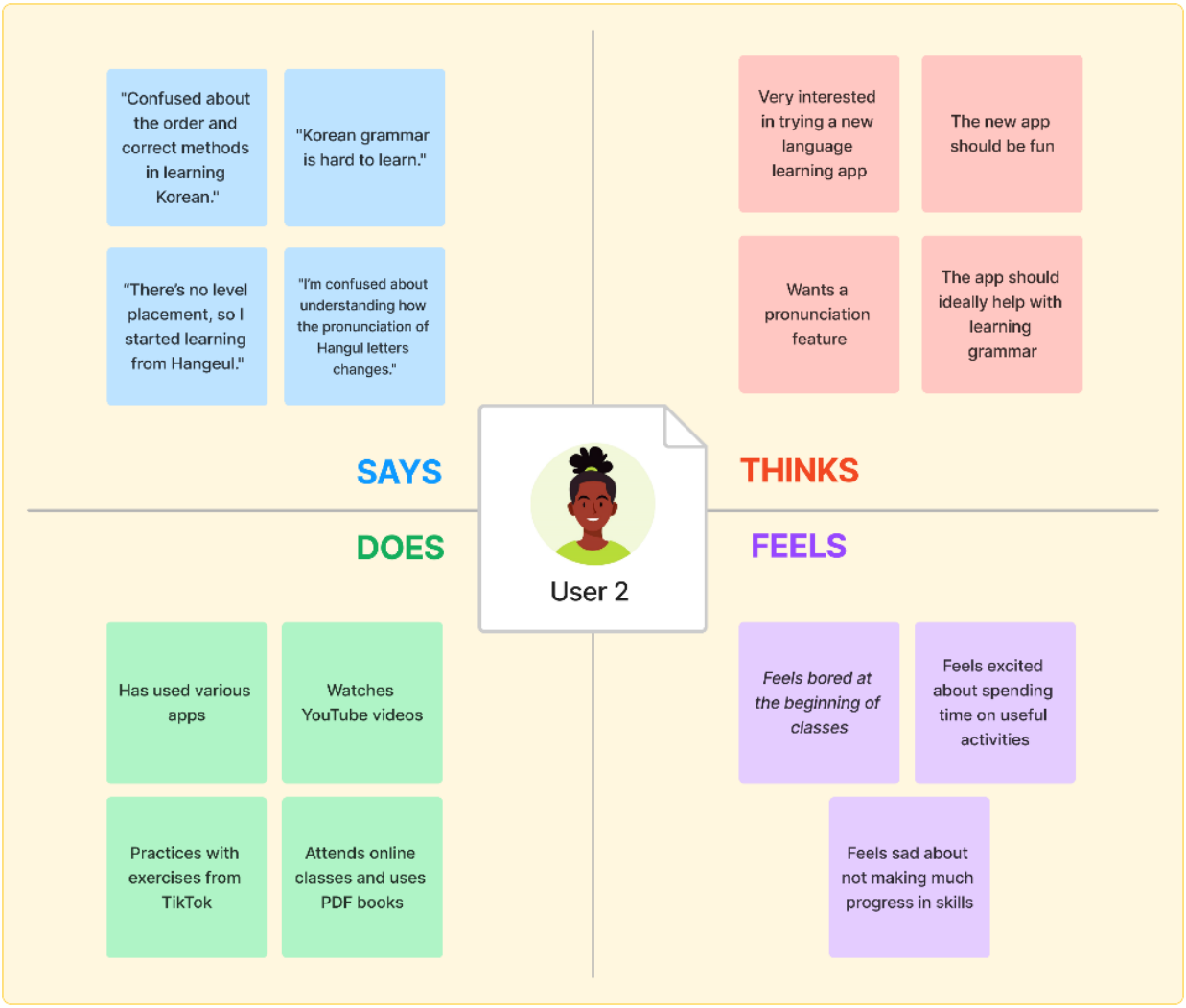

Figure 2. Empathy Map of the Second User
Source: Author’s Documentation 2024

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Based on **Figure 2**, the empathy map of the second user depicts an active user who enjoys activities that enhance productivity, leading them to decide to learn Korean. Nevertheless, the second user encountered some difficulties while learning Korean. In the 'says' quadrant, it is indicated that the user faces several challenges while learning Korean, including confusion in determining the correct order and method for studying, difficulty understanding the complex Korean grammar, and the absence of a level placement system, which leads to repetitive learning of content the user has already studied independently. The user also needs clarification on the changes in pronunciation of Hangeul letters. In the 'thinks' quadrant, the user is enthusiastic about trying a new Korean language learning application. The user expects the 'Koin' app to provide an enjoyable experience and become a practical learning resource by offering features such as pronunciation and tools to simplify learning Korean grammar.

The 'does' quadrant shows the user has diverse experiences using various media as learning resources. Furthermore, the user frequently interacts with digital platforms, indicating a preference for easily accessible and flexible learning resources. Meanwhile, the 'feels' quadrant illustrates a range of emotions the user experiences while learning Korean, such as boredom, enthusiasm, and sadness. Therefore, to fully meet the user's needs, the 'Koin' app needs to be well-designed to provide an enjoyable experience, ensuring that users do not feel bored and remain enthusiastic about learning Korean. Additionally, the app should include interactive features, positive feedback, and content variety to encourage users to improve their Korean language skills.

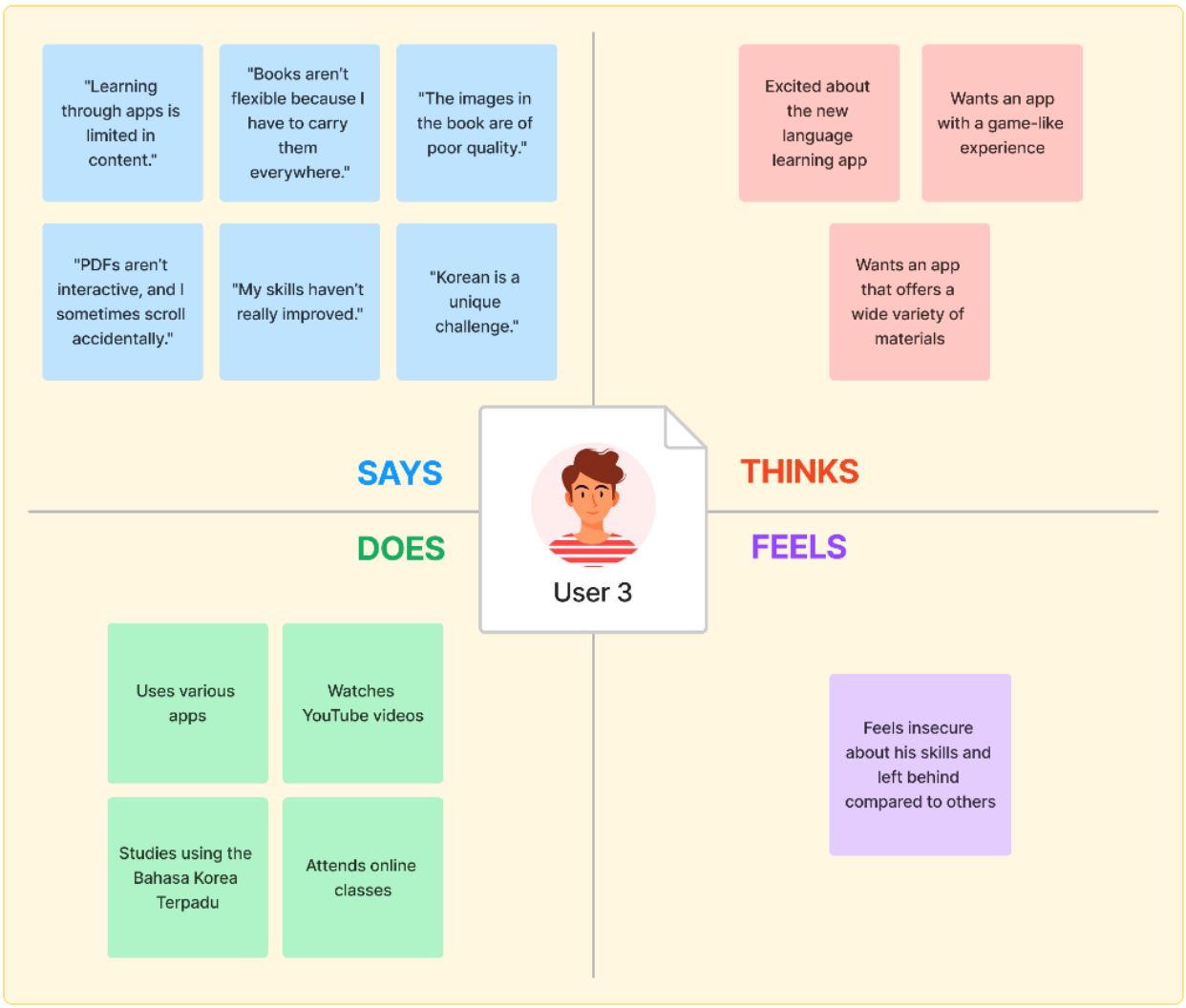

Figure 3. Empathy Map of the Third User
Source: Author's Documentation 2024

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Based on **Figure 3**, the empathy map of the third user visualizes a user who prefers applications that implement game concepts. Dissatisfaction with the current learning media is one of the main factors motivating users to choose gamified applications as alternative learning media. The 'says' quadrant reveals various problems users face while learning Korean. Users complain about the limited content in the applications they use as learning resources, the lack of flexibility in textbooks, the inadequate quality of images in textbooks, and the lack of interactivity in learning media. This makes users feel that their Korean language skills could be more active and perceive the language as challenging.

In the 'thinks' quadrant, users show interest in a new Korean language learning app and express their hope for an app that adopts a game-like format. Additionally, users desire an application that provides a variety of learning materials. Meanwhile, in the 'does' quadrant, it is evident that users actively engage with various learning sources, such as apps, YouTube video platforms, textbooks, and online classes. However, based on the 'feels' quadrant, there needs to be a match between users' efforts using various learning resources and their confidence in their Korean language skills. Users feel they need to catch up compared to other Korean learners at the same level. Therefore, the 'Koin' app must provide features or elements that encourage users to feel more confident in their abilities.

Define

The define stage connects the empathize stage with the ideate stage, aiming to make the design process more focused. The define stage seeks to analyze and formulate the problem using the insights gathered during the empathize stage (Sitorus et al., 2024). In the define stage, the issues faced by users while learning the Korean language are defined based on the data obtained from the previous stage. At this stage, How Might We (HMW) ensures that the solutions generated in the next stage are relevant and meet user needs. How Might We (HMW) is one of the tools used in design thinking to transform problems into questions (Rifa, 2024). This approach aims to shift the mindset that within every problem lies a solution (Pradana & Idris, 2021). **Table 1** presents a series of How Might We (HMW) questions.

Table 1. How Might We Questions

No	Problem	How Might We
1	Users feel uncomfortable with the current platform due to low-quality images.	How might we make the Koin app provide a more visually pleasant experience for users?
2	The learning media used by users offer limited content.	How might we ensure the Koin app provides more comprehensive learning materials for users?
3	Users feel embarrassed and lack confidence during learning.	How might we make the Koin app help users feel confident during the learning process?
4	Users sometimes feel bored during learning.	How might we make the learning process more engaging and interactive in the Koin app?
5	Users struggle to remember vocabulary and grammar they've learned.	How might we help users easily retain vocabulary and understand grammar in the Koin app?
6	Users are confused about the order and methods for learning.	How might we provide clear guidance to users on the proper learning sequence and methods in the Koin app?
7	Users find it difficult to pronounce Korean words correctly.	How might we help users easily pronounce Korean words correctly in the Koin app?
8	Users feel their skills are not improving.	How might we enable users to track their learning progress in the Koin app?
9	Users find learning Korean challenging.	How might we make learning Korean easier and more enjoyable, motivating users to continue using the Koin app?

Source: Author's Documentation 2024

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The How Might We (HMW) table that has been created plays an essential role as an effective guide during the brainstorming process for developing the Koin app, making it user-friendly and able to meet users' needs. This series of questions encourages generating creative and innovative ideas while simplifying determining which features should be included in the Koin app.

Ideate

The ideate stage is a phase in design thinking aimed at generating several creative ideas based on the problems identified earlier in the define stage (Adha et al., 2023). During this stage, creative activities, such as brainstorming feature ideas and wireframe design, are conducted. Brainstorming to determine features is carried out using the FigJam tool, based on the How Might We (HMW) questions that were previously formulated. The next step in the ideate stage is designing wireframes. Wireframes are simple frameworks illustrating product or application layouts and critical elements (Puspita & Astriani, 2023). In this stage, Whimsical is used as a tool for creating wireframes. The following image presents several wireframes of the main pages of the Koin app.

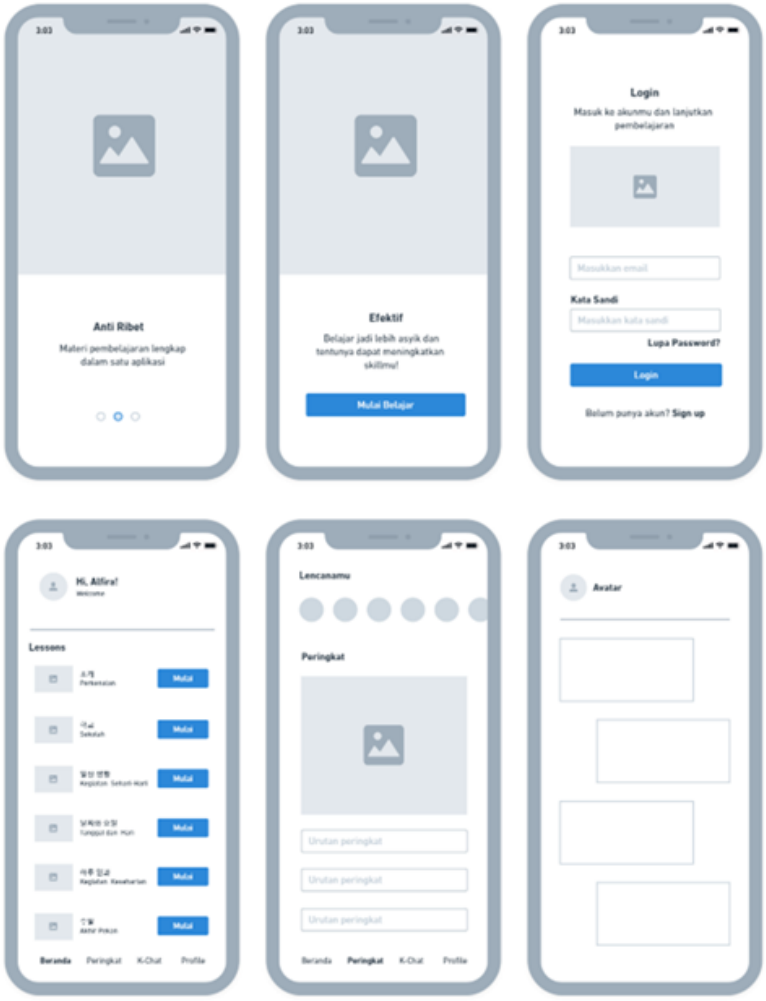

Figure 4. Koin App Wireframe
Source: Author's Documentation 2024

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Figure 4 shows the Koin app's wireframe, which consists of the onboarding, login, homepage, ranking, and K-Chat pages. Considering the limited space available, the wireframe is designed by adding blue for the primary button to highlight essential elements. Nevertheless, the wireframe design focuses on the layout of components rather than a detailed visual appearance.

Prototype

According to the design thinking process, the next step is to implement ideas and concepts into a prototype that closely resembles the final product and is functional and testable. In this stage, there are two complementary design steps: creating a style guide and a high-fidelity prototype to produce a representative and effective prototype that meets user needs. The style guide is a library of patterns that serves as a visualization guide for the interface. It includes buttons, colors, typography, iconography, and other components used in system design (Wardana & Prismana, 2022). After completing the style guide, the next step is to develop a high-fidelity prototype using Figma. A high-fidelity prototype is an application design that includes interactive visual elements that closely resemble the final product (Dumalang et al., 2023).

During the design process, the UI/UX of the Koin app was tailored to the preferences of the target users - beginner learners of Korean, specifically Gen Z users, known for their openness to technology and interest in modern design. As for the prototype development, high-quality illustrations were used to enhance the app's appeal and clarify the user interface. Most of the illustrations in the prototype are sourced from Freepik. Below are some high-fidelity prototype results, which will be tested on the target users.

1. *Onboarding Pages*

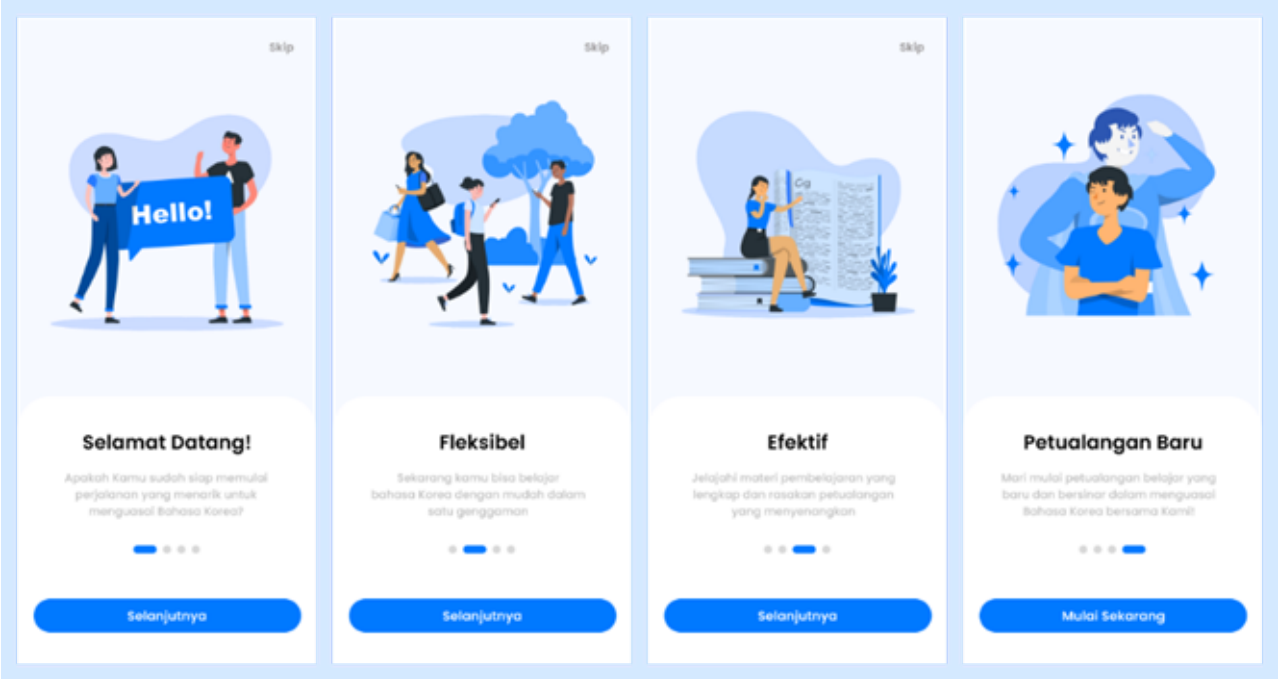

Figure 5. Onboarding Pages
Source: Author's Documentation 2024

The Koin app's onboarding page is designed to provide a good user experience by engaging users from the very start of the app while also serving as an informative guide about the app. This page introduces the app and includes images that help visualize its benefits.

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2. *Login, Registration, and Verification Pages*

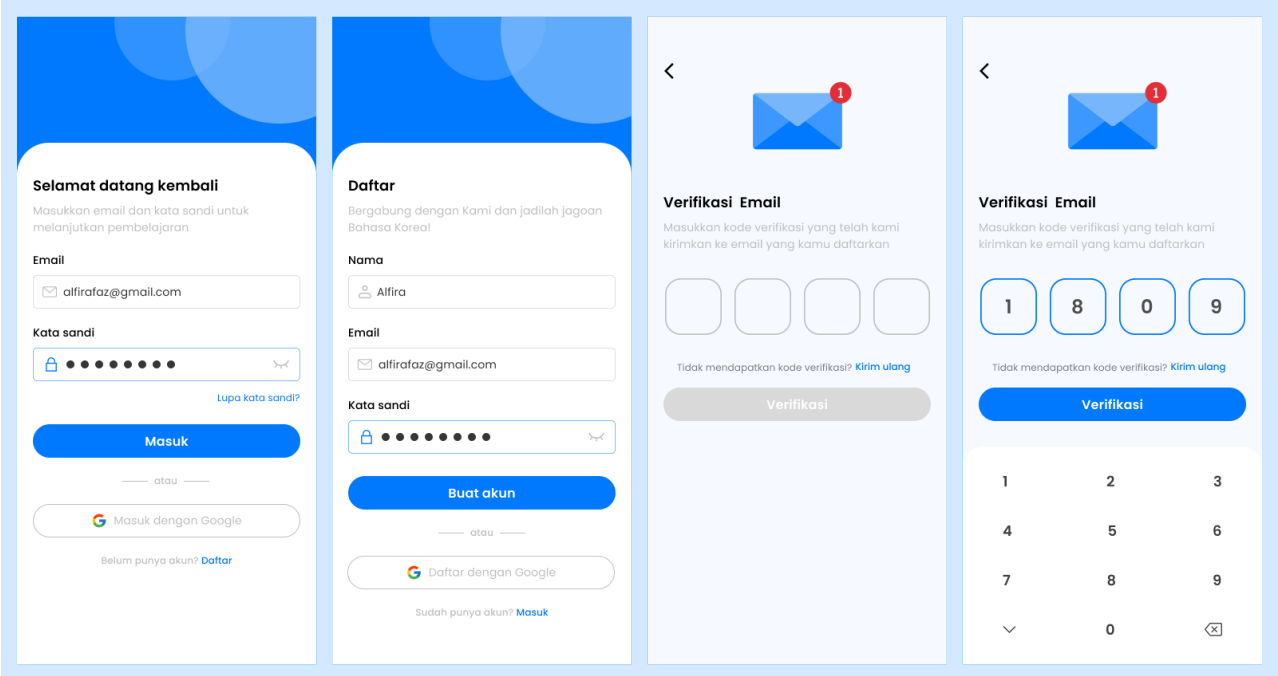

Figure 6. Login, Registration, and Verification Pages
Source: Author's Documentation 2024

Figure 6 above shows the login, registration, and verification pages of the Koin app. These pages are designed with a simple interface; for instance, the registration page requires only minimal information, allowing users to complete the registration process quickly. Additionally, there is an option to use a Google account to make logging in or registering easier without remembering an extra password. Once the registration is complete, users are directed to the verification page to ensure account security. Users need to enter the verification code sent to the email address used during registration.

3. *Main Features Pages*

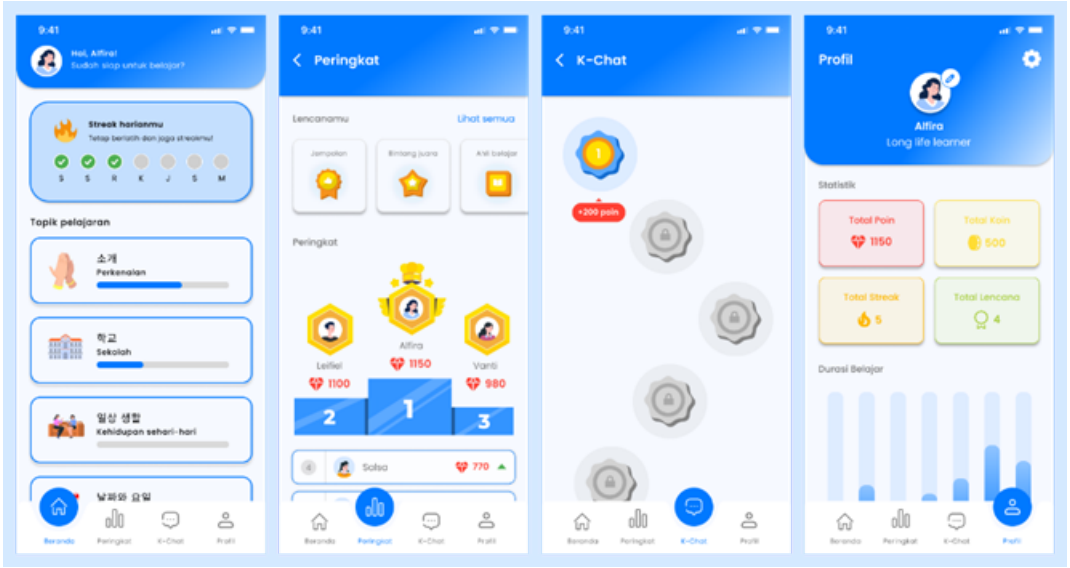

Figure 7. Main Features Pages
Source: Author's Documentation 2024

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Figure 7 above shows the four main features of the Koin app. First is the homepage, where users can choose from various lesson topics, with a streak feature included to motivate users to maintain learning consistency. Second is the ranking page, which allows users to view badges earned from learning activities and see rankings based on accumulated points. Third is the K-Chat page, a conversation simulation feature designed to help users practice their Korean language skills. Lastly, the profile page displays all of the user's learning achievements.

4. *Lesson Pages*

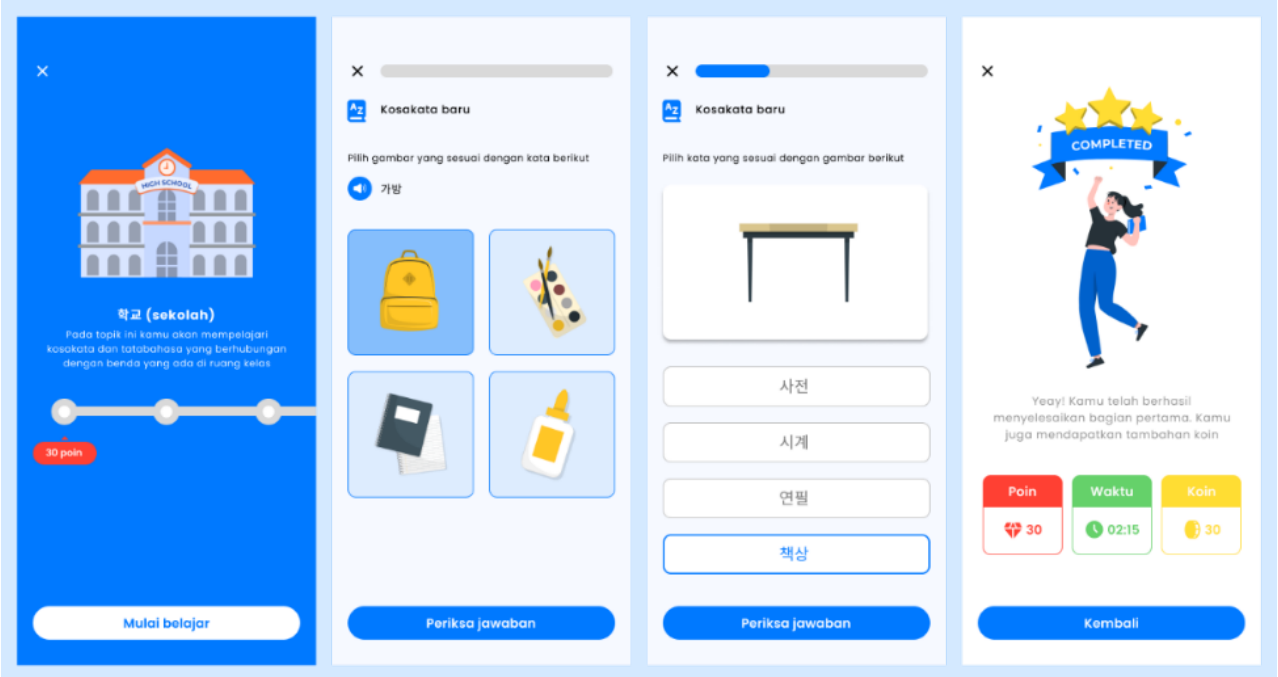

Figure 8. Lesson Pages
Source: Author's Documentation 2024

Figure 8 above provides a detailed view of the learning process in the Koin app, which uses gamification to create an enjoyable learning experience. Gamification involves applying game elements to increase user engagement within the app. Each lesson topic includes several stages and employs a repetition system to help users retain the material longer. This feature offers several questions for users to answer, such as choosing the correct image based on the displayed text, selecting the right vocabulary based on the image, arranging available words into a grammatically correct sentence, and translating short sentences from Korean to Indonesian using the provided vocabulary. These questions are designed to give users an interactive and enjoyable learning experience.

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5. *K-Chat Pages*

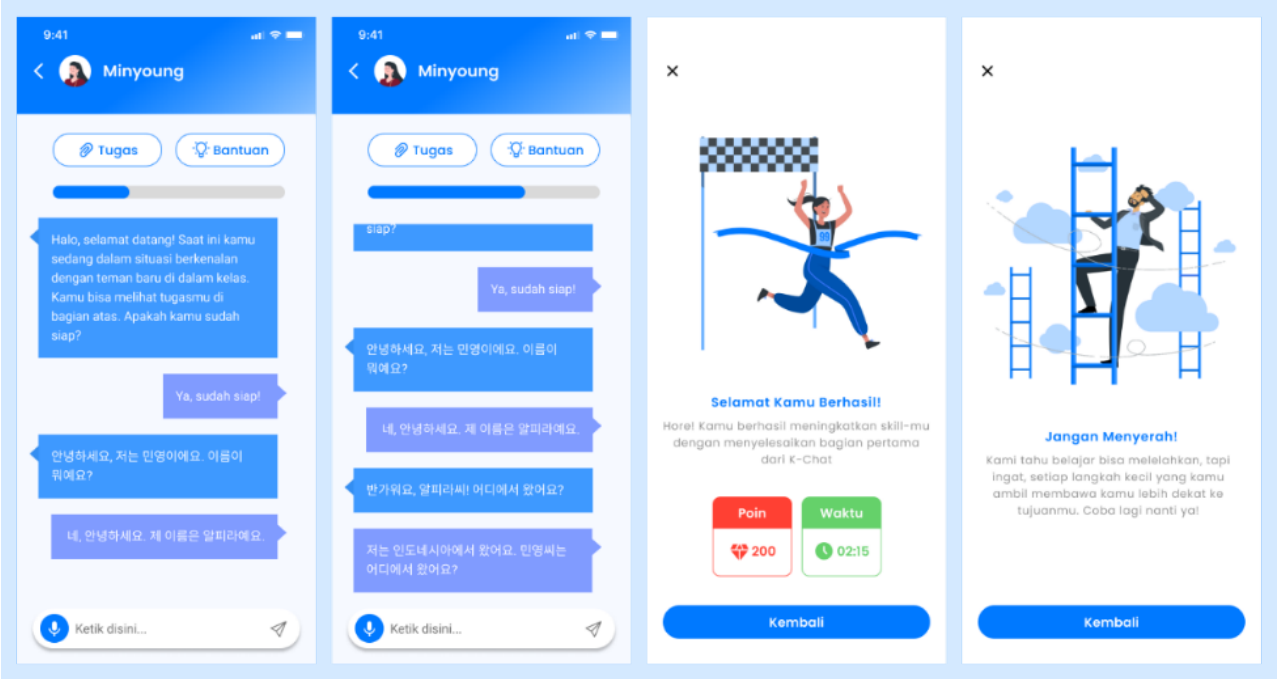

Figure 9. K-Chat Pages
Source: Author's Documentation 2024

Figure 9 above shows the detailed K-Chat feature, which is a conversation simulation based on everyday life topics. Each level has a specific scenario, and users must exchange the coins earned from previous learning activities to unlock levels. This encourages good learning habits, as users are motivated to participate actively. At the end of a learning session, users earn additional points, which are larger than regular lessons, and this helps users quickly move up to the top rankings.

Beginner Korean Learners' Responses to the Koin App Design as a Korean Language Learning Media

Test

The final stage is the testing phase, which involves evaluating the high-fidelity prototype developed in the preceding prototype phase (Ardiansyah & Rosyani, 2023). The testing phase in this study utilizes a maze tool integrated with Figma. Before conducting the prototype testing, a task scenario was prepared for users to complete during the testing process. This scenario was created to ensure that all app features function correctly and to assess whether the user interface is easy to understand and use. **Table 2** below is the list of task scenarios for the test.

Table 2. Task Scenario List

No	Features	Scenarios
1	Registration	Sign up as a new user by filling in the requested information and verifying your account via email.
2	Lesson Topic	Go to the homepage and select a lesson topic of interest. Then, complete one learning section.
3	Ranking	After finishing the lesson, access the ranking page and view your earned badges.
4	K-Chat	Go to the K-Chat page and complete the tasks in the conversation simulation.

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No	Features	Scenarios
5	Profile and Settings	Go to the profile page, check your learning duration statistics, and try switching the display to dark mode.

Source: Author's Documentation 2024

After the task scenarios were completed, the prototype was imported into Maze, and testing was conducted. In addition to testing the prototype's feasibility, this testing also helped identify shortcomings, including parts that were difficult for users to understand. These can later be improved to enhance the quality of the Koin app for optimal performance. Below are the results of the testing using Maze.

1. *Registration Feature Testing*

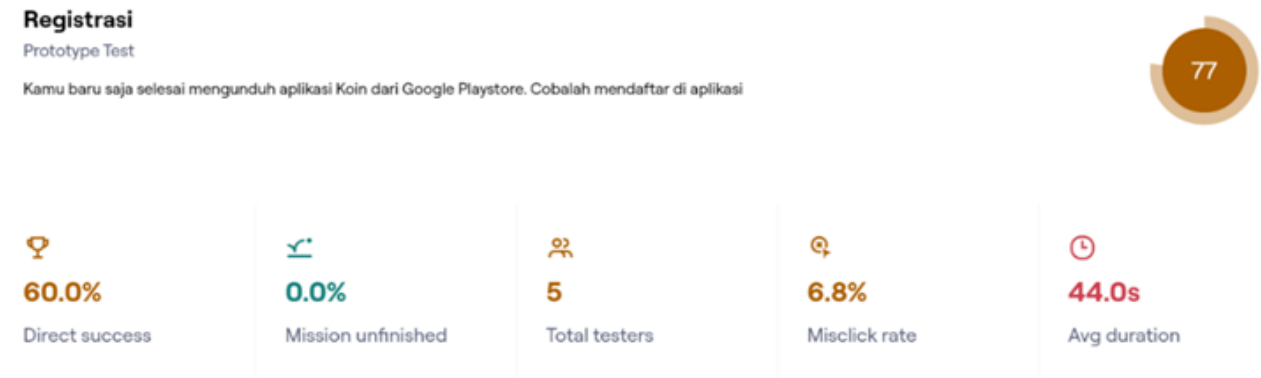

Figure 10. Registration Feature Testing
Source: Author's Documentation 2024

Based on **Figure 10**, the registration feature testing results, an overall score of 77 points was achieved. This score is calculated based on various factors, including success rate, accuracy in pressing components, and task completion speed. The success rate for the registration feature test reached 60%, indicating that half of the users completed the task well. However, there is still room for improvement, particularly in providing alternative paths to increase the success rate. Additionally, the click error rate was 6.8%, indicating that users made some misclicks.

2. *Lesson Topic Feature Testing*

Figure 11. Lesson Topic Feature Testing
Source: Author's Documentation 2024

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According to **Figure 11**, lesson topic feature testing results, an overall score of 82 points was achieved. The success rate for the lesson topic feature test reached 80%, indicating that most users completed the task well. However, there was a click error rate of 18.2%. Furthermore, the average time users took to complete the task was 159.6 seconds, indicating that although it could be completed successfully, it took a considerable amount of time.

3. *Ranking Feature Testing*

Figure 12. Ranking Feature Testing
Source: Author's Documentation 2024

Based on **Figure 12**, ranking feature testing results, an overall score of 90 points was achieved, with a success rate of 100% and a quick average completion time of 3.6 seconds. However, further analysis showed a high click error rate of 44.4%.

4. *K-Chat Feature Testing*

Figure 13. K-Chat Feature Testing
Source: Author's Documentation 2024

According to **Figure 13**, K-Chat feature testing results, an overall score of 72 points was achieved, with a success rate of 60%, a click error rate of 23.4%, and an average task completion time of 47.5 seconds. Based on the heatmap produced, this relatively low success rate is attributed to participants' tendency to use alternative paths, resulting in not meeting the criteria for direct success.

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5. Profile and Settings Feature Testing

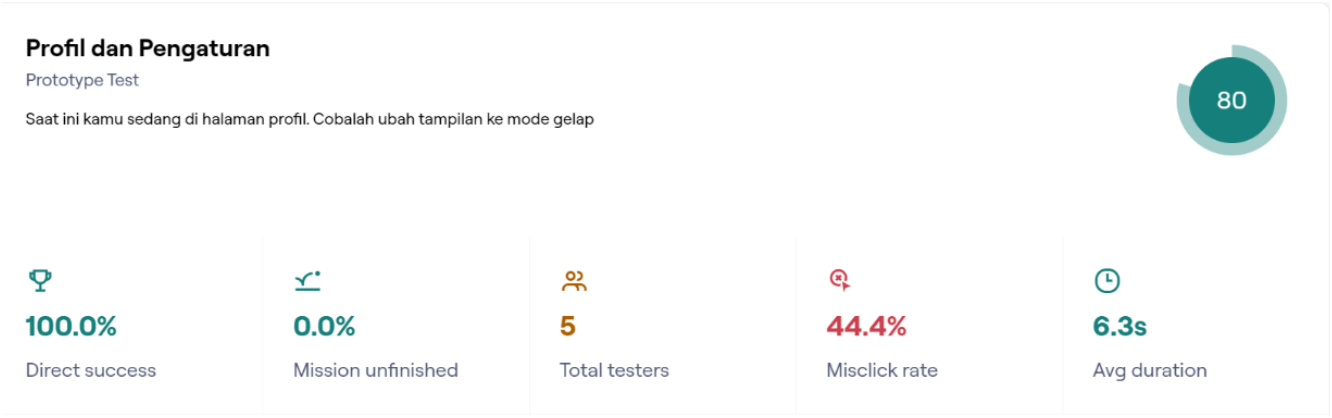

Figure 14. Profile and Settings Feature Testing
Source: Author's Documentation 2024

According to **Figure 14**, profile and settings testing results, an overall score of 80 points was achieved, with a perfect success rate of 100% and an average task completion time of 6.3 seconds. However, shortcomings in this design were found, evidenced by a click error rate of 44.4%. Further analysis showed that many click errors occurred when users switched from light to dark mode. Therefore, improvements are needed in the radio button size to reduce the click error rate.

Based on the usability test results, the Koin app received an overall score of 80 points, which places it in the B grade category and is considered acceptable in terms of usability. This score also aligns with an adjective rating of 'excellent,' reflecting that the app's UI/UX design is well-received by users. Furthermore, users expressed satisfaction with the app's usability, suggesting that the UI/UX design effectively meets their needs.

Discussion

This study aims to produce a UI/UX design for the Koin app as a Korean language learning media based on the design thinking method and to understand the response of beginner Korean learners to the Koin app design. Learning Korean is a complex and dynamic process, resulting in various challenges. Overall, the problems users face when learning Korean include difficulties with learning media, limited materials, feelings of embarrassment and lack of confidence, bland learning environments and methods, difficulty in understanding vocabulary and grammar, no structured learning levels leading to repeated material, and the perception that their skills are not improving significantly. This aligns with other research, which suggests that current Korean language learning media still needs to be considered more interactive, causing most learners to struggle when studying Korean (Somnya & Tjahjono, 2016).

Users' challenges indicate the need to develop an application-based learning media to study Korean more effectively and interactively, supported by attractive design and adequate features. This is also in line with the theory of the benefits of ICT-based learning media presented by Arifin et al. in a book entitled "*Media Pembelajaran Berbasis ICT*" which states that ICT-based learning media can be used as an alternative learning resource, making it easier to understand material and increasing learning efficiency by providing various features. Currently, the advancement of technology has driven the creation of many Korean language learning applications. However, user interviews reveal that most Korean learning applications are still not entirely user-friendly and fail to meet users' needs. Users often feel frustrated by the limitations of available features, lack of comprehensive material, and boring presentations.

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Developing the Koin app as a Korean language learning tool for beginners, using the design thinking method focused on UI/UX, addresses the problems users face in learning Korean. The Koin app has various features that facilitate a more enjoyable learning experience. Additionally, the Koin app is supported by AI technology for chat simulations and is designed to enhance users' skills, particularly in language learning. This feature represents a significant advantage of the Koin app. This aligns with other research. AI-supported tools can significantly improve users' skills during the language learning process (Lubis et al., 2024). The Koin app received positive feedback from users and has excellent potential as a solution to the current shortcomings of app-based Korean language learning media, which are often perceived as not user-friendly and fail to meet the needs of beginner Korean learners. The results of this study are consistent with previous research, showing that language learning app designs focused on UI/UX, combined with the design thinking method, can effectively meet user needs. Additionally, the application of the design thinking method in UI/UX design significantly influences the design outcome, allowing it to address the problems users face effectively (Krishnavarty et al., 2022; Pratama et al., 2022; Sari et al., 2022).

CONCLUSION

This study aims to design the 'Koin' application, primarily focusing on its UI and UX aspects, to enhance effectiveness and user engagement in Korean language learning. The research results show that the UI/UX design of the Koin app, as a Korean language learning media for beginners using the design thinking method, resulted in a well-suited application design that meets the needs and preferences of its target users. By employing the design thinking method, this study identified user needs in-depth, leading to an interface that is easy to understand, has relevant features, and provides a good user experience. These research findings are expected to make it easier for beginner Korean learners to learn vocabulary and grammar in an integrated manner. Additionally, this research can serve as an alternative app-based learning media for Korean language teachers to help achieve learning objectives more efficiently. For future research, it is recommended that the effectiveness of using the application in enhancing beginner Korean language learners' vocabulary and grammar skills be measured.

AUTHOR'S NOTE

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