



Developing the Interface of HaoSpace Mood Tracking Application Using Design Thinking

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Abstract—Mental health problems, particularly mood disorders, remain a major concern among adolescents and young adults, as they can affect academic performance, social interactions, and emotional well-being. Despite growing awareness, many adolescents still lack accessible tools to effectively monitor and manage their moods. The objective of this research is to design and develop a prototype of a mood tracking application called “HaoSpace” to address this gap. The research employed the Design Thinking methodology, which emphasizes a user-centered approach and involves five stages: empathize, define, ideate, prototype, and test, with participants consisting of students, workers, and a psychology expert. The resulting prototype includes features such as journaling, reminders, daily reports, and interactive visualizations in the form of graphs and mood-based calendars to facilitate self-monitoring and reflection. User testing showed positive responses regarding navigation, interface design, and feature relevance, while the psychology expert assessed the prototype as a feasible tool for self-reflection and emotional regulation among adolescents and young adults. In conclusion, HaoSpace demonstrates potential as a digital intervention to enhance mood awareness and promote mental well-being among adolescents and young adults.

Keywords: Design Thinking; Mental Health; Mood Tracking; User Experience

1. INTRODUCTION

Mental Health is one of the most important aspects of human life, especially in the modern era characterized by rapid changes, technological disruption, and increasing social and economic pressures [1]. It is a condition of psychological well-being that enables individuals to manage challenges, realize their potential, acquire knowledge, work effectively, and participate in society [2]. Despite its importance, mental disorders remain a significant global issue. The Indonesia National Adolescent Mental Health Survey (I-NAMHS) found that 34.9% of adolescents aged 10–17 experienced mental health issues, and 5.5% met the criteria for a mental disorder within twelve months [3]. Among these, mood disorders such as depression are the most common [4]. Mood disorders are psychiatric conditions involving prolonged sadness, intense happiness, or drastic mood swings, which significantly impair quality of life and functioning [4], [5]. Moods are generally less intense than emotions, last longer, and are not always triggered by specific events [6]. Individuals with mood disorders often struggle to feel and express emotions [7].

Although mental health services have been integrated into Indonesia’s National Health Insurance (JKN) system under Law No. 24 of 2014, I-NAMHS data show that less than 3% of adolescents with mental health issues sought professional help, with many instead turning to school staff (38.2%) rather than healthcare professionals [3]. This reflects limited accessibility of services, compounded by social stigma, discrimination, and low awareness about mental health [3], [8].

Simple daily habits, like understanding what brings happiness and recognizing triggers, can help maintain mood and well-being [6]. Previous studies have also explored online self-help interventions, showing that web-based mindfulness and relaxation exercises effectively reduced anxiety during the COVID-19 outbreak, with mindfulness having stronger effects. This demonstrates the potential of digital approaches in supporting mental health [9]. Journaling has also been found beneficial, as participants who wrote about positive experiences for four weeks reported significantly lower depression scores than those who did not [10]. This suggests that journaling positive experiences can help regulate emotions. However, for some people, traditional journaling with paper and pen may be challenging, exhausting and time-consuming, with limited visual elements that restrict self-expression. To address this, digital journaling on platforms like blogs offers a more practical and engaging alternative [11].

Based on this issue, this research focuses on designing and prototyping a mobile application for mood tracking as an alternative tool to help users regulate their emotions through digital journaling. This aims to support individuals in better understanding their emotions recognizing how daily activities influence mood changes. The application allows users to be able to record daily journals and monitor their mood patterns, including the average daily mood presented in a daily report. The primary target users are adolescents and young adults aged 15–25 years. While this range includes both adolescents (15–18 years) and young adults (19–25 years), the initial implementation and evaluation of the application will focus on young adults (18–25 years), particularly university students and early-career workers, who are more accessible and exhibit a high prevalence of mental health challenges related to academic stress and life transitions. Future development may expand to include younger adolescents. Therefore, the application should be designed with features that are intuitive, interactive, simple, visually appealing, and easy to navigate, aligning with the needs and digital habits of this user group.

This research applies the Design Thinking methodology to guide the design process and ensure the prototype effectively meets user needs. Design Thinking is a user-centered approach that emphasizes empathy toward users' challenges and consists of five stages: Empathize, Define, Ideate, Prototype, and Test [12], [13]. Prior studies highlight its effectiveness, such as the “WellMe” mobile application achieved excellent usability (SUS 81.5 – excellent) [14]; a scholarship information system design at SMA Negeri 1 Singaraja achieved 100% effectiveness and zero errors through modified Design Thinking [13]; and improvements in the re-registration system at Universitas Pendidikan Ganesha resulted in significantly higher user satisfaction (SUS 95 – best imaginable) [15]. Other studies, such as the UI/UX improvements of the “BeFind” platform [12] and the development of interactive learning media Cirgeo's World [16], also confirmed that Design Thinking enhances usability, learnability, and overall user satisfaction.

Besides Design Thinking, another widely used approach is User Centered Design (UCD). UCD emphasizes the active involvement of users to understand their characteristics and system needs so that the results meet usefulness and usability aspects [17]. UCD is often applied to interface design to ensure alignment with specific user groups [18], and aims to produce improvements that reflect user expectations through direct engagement [19]. However, this research chooses Design Thinking because, in addition to focusing on user needs, it also encourages broader empathy, ideation, and innovation to generate diverse ideas and ensure solutions address real user problems.

In summary, the purpose of this research is to design and prototype a mobile application for mood tracking using the Design Thinking methodology. The expected outcome is a prototype that is user-friendly, visually appealing, and aligned with target user needs. Although this research is limited to the prototype stage without full technical implementation, it provides an important foundation for future development of digital tools that can support mental well-being.

2. RESEARCH METHODOLOGY

The research framework employed in this research is presented in a structured manner, as illustrated in Figure 1. This research employs a Design Thinking approach, preceded by a literature review to identify and gather information on the features required or frequently used by users of similar applications. The insights obtained from the literature review serve as the basis for the subsequent Design Thinking process.

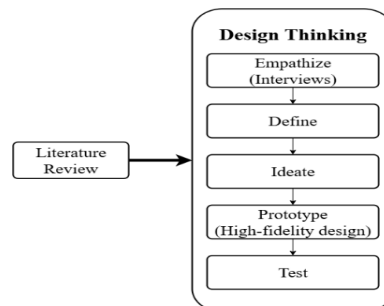


Figure 1. Research Method Flow

2.1 Research Participants

The study targeted adolescents and young adults aged 15–25 years, with the initial implementation focusing on young adults (18–25 years), particularly university students and early-career workers. Nine participants were involved in the initial stage (five students and four workers), and a psychology expert was included during testing to validate the prototype. Participants were selected using purposive sampling, as they were deemed relevant to the study's objectives.

2.2 Research Stages

- Literature Review - Literature review is a data collection method conducted by gathering information from various scientific sources such as books, journals, articles, and other relevant references. In this research, the literature review was conducted by examining previous studies that discuss user motivation and experiences in using similar applications, as well as features that are popular or favored by users.
- Empathize - Empathize is the process of understanding user needs and problems through observation, interviews, questionnaires, or other research methods [13], [15]. In this research, it was conducted to explore user issues and analyze potential user needs, aligning them with findings from the literature review. Interviews were held with a sample of five students and four working professionals, representing academic and professional sectors. Participants answered open-ended questions regarding their background and daily routines, personal mood management strategies, validation of needs, feature preferences, and expectations for the application. Example of the questions include:

1. “Can you describe your daily routine and how it affects your mood?”
 2. “What do you usually do when you feel stressed, anxious, or sad?”
 3. “Do you think having an application to track mood would be useful for you? Why or why not?”
- c) Define - Define is the process of formulating specific problem statements and identifying user needs based on insights gained from the Empathize stage [12], [13], [14], [16]. In this research, this stage is divided into two parts: first, analyzing user problems and needs by creating user personas, point of view statements, and identifying user pain points. Then, based on the analysis, the system’s functional requirements are identified to serve as the foundation for designing solutions in the next stage.
- d) Ideate – Ideate is the process of generating and refining solution ideas through techniques such as brainstorming or ‘How Might We’ questions [13], [14]. These ideas are then prioritized using a priority matrix and organized into an application flow, which serves as the basis for prototype development [12], [13]. In this research, the researchers held a brainstorming session to identify and prioritize ideas for inclusion in the initial version of the application and design the overall application flow based on the functional requirements analyzed during the Define stage.
- e) Prototype - Prototype is the process of creating an initial version of the solution based on ideation results. Prototypes can be low- or high-fidelity designs that visualize and simulate user interactions [12], [14], [16]. In this research, based on the application flow developed during the Ideate stage, the researcher designed a high-fidelity prototype.
- f) Test - Test is the process of evaluating the prototype with users to collect feedback and identify areas for improvement [12], [16]. In this research, two testing processes were carried out: one with prospective users who were interviewed during the Empathize stage, and another with a psychology expert. The prototype was presented and operated, followed by direct interviews with users to gather feedback, while the expert assessed UX aspects and validated whether the solution effectively addresses the research problem.

3. RESULT AND DISCUSSION

3.1 Result of Literature Review

The literature review in this research was conducted by examining previous research on user motivations, experiences, and common features in similar applications. Key features identified include self-monitoring tools such as habit tracking and journaling, simple and interactive interfaces, and data visualization via graphs, calendars, and charts. Users also value reminders, flexible mood tracking (e.g., multiple entries or adding descriptions), onboarding guides, and simple daily challenges to support mood improvement. Interactive elements such as polls, quizzes, and games, together with strong security, data export and backup, educational content, social support forums, and communication with healthcare providers, were highlighted as important for enhancing engagement and satisfaction. In this research, the literature review served as the foundation for the subsequent stages of the Design Thinking process. It confirmed that journaling and visualization are effective strategies for emotional regulation, later validated in the Empathize and Define stages.

3.2 Result of Design Thinking Methodology

This research resulted in a UI/UX prototype of the HaoSpace application, designed for mood tracking to help users regulate emotions through digital journaling.

3.2.1 Empathize Stage

The Empathize stage results are summarized in an Empathy Map to identify user needs, divided into four quadrants: what users say, think, do, and feel [13], [14]. From interviews with five students and four workers, the researcher created two general empathy maps representing each group. Figure 2(a) presents the Empathy Map for the Student Group, while Figure 2(b) illustrates the Empathy Map for the Worker Group.



Figure 2. (a) Empathy Map for the Student Group; (b) Empathy Map for Group Workers

The results were synthesized into empathy maps that described what users say, think, do, and feel. Both groups experienced challenges with consistency, privacy, and clarity in reflecting on their moods. For example, students emphasized reminders and visualizations, while workers preferred a calming interface without pressure. These insights directly guided the identification of functional requirements such as reminders, flexible journaling, and mood visualization.

3.2.2 Define Stage

The Define stage synthesized user data into personas, point-of-view statements, and pain points.

a) Problem Analysis and User Needs

1. User Persona

A user persona is a representation of target users that highlights their goals, needs, and frustrations [13]. Figure 3 shows an example of a user persona from the student group, while Figure 4 presents an example of a user persona from the worker group.

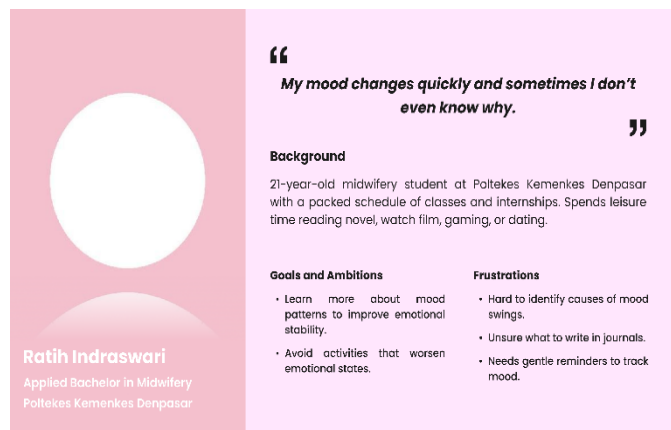


Figure 3. Example of a User Persona from the Student Group

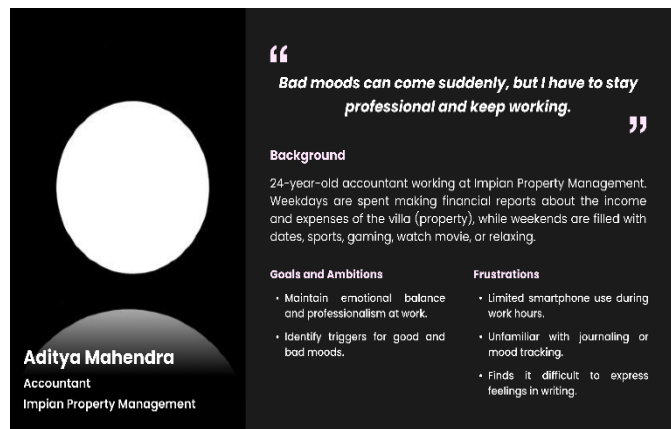


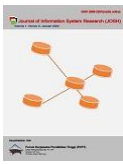
Figure 4. Example of a User Persona from the Worker Group

2. Point of View

The point of view focuses more specifically on the target user's needs and key insights [13], [14]. Table 1 presents the point of view statements for both the student and worker groups.

Table 1. Point of View

Users	Needs	Insight
Students	A mood tracking app with multiple daily entries, visual tools (graphs, color-coded calendars, history), fun features (challenges, quotes), privacy and security, gentle reminders, and simple guidance.	Users are more motivated when the app is flexible, visually engaging, enjoyable, and secure. Clear guidance and gentle reminders help them stay consistent and recognize emotional patterns.
Workers	A simple, calming app for light reflection without daily pressure, with visual summaries, mood reports, safe private space, mood-based suggestions or challenges, an intuitive interface, and optional reminders.	Workers feel comfortable when reflection is simple, calming, and fits into their free time. They value privacy, mood-based suggestions or challenges, and visual reports that clarify emotional patterns, while an intuitive interface and optional reminders encourage consistent but pressure-free use.



3. Pain point

Pain points refer to specific challenges experienced by users across different aspects, with the goal of reducing these difficulties to enhance user satisfaction when interacting with the system [13]. Table 2 presents the identified pain points for both the student and worker groups.

Table 2. Pain Points

Category	Pain Points
Emotional Awareness	Users often experience unexplained mood swings, making reflection difficult, and many struggle with journaling or expressing their feelings in words.
Consistency & Reminders	Busy schedules, especially for workers, make consistent mood tracking difficult. Reminders help, but should be optional, customizable, and adaptable.
App Interaction	Most users are new to mood tracking and not used to regular journaling. They prefer flexible, spontaneous input with options to add notes or photos.
Interface & Visualization	Overly cluttered or colorful designs reduce interest. Users prefer a calm, clean, and engaging interface with simple visuals like charts or calendars.
Feature Relevance	Users prefer features relevant to their mood, avoiding complexity, while valuing simple, personalized challenges or suggestions.
Tech Familiarity	Many need onboarding or basic guidance to use the app. Advanced features like smartwatch integration or AI chatbots are seen as optional bonuses.
Privacy & Security	Some users fear their entries being read or leaked. Strong and transparent privacy controls are essential.

These pain points guided the identification of system requirements. For instance, the difficulty of consistent journaling led to the requirement for reminders (SRS-F-06), while issues of privacy were translated into non-functional requirements for strong security and transparent controls (SRS-NF-02). This shows a clear link between user challenges and the concrete features to be implemented in the application.

b) System Requirement Analysis

The functional and non-functional requirements were designed based on the results of problem analysis and user needs. The system requirements analysis was limited to aspects related to the application design, excluding any technical implementation aspects.

1. Functional Requirements

- SRS-F-01 : The system shall display application guides.
- SRS-F-02 : The system shall allow users to record and manage daily mood entries with optional notes and photos (CRUD).
- SRS-F-03 : The system shall allow multiple mood entries each day.
- SRS-F-04 : The system shall allow users to view and complete daily challenges.
- SRS-F-05 : The system shall display daily reports and data visualizations of mood patterns.
- SRS-F-06 : The system allows users to activate and create reminders.
- SRS-F-07 : The system allows users to manage their profiles.
- SRS-F-08 : The system allows users to access application configuration settings.

2. Non-functional Requirements

- SRS-NF-01 : The system shall have a friendly and intuitive interface that is easy to navigate for first-time users.
- SRS-NF-02 : The system shall use a visually calming color scheme and clear visual cues to represent different moods.

3.2.3 Ideate Stage

a) Prioritization Idea

At this stage, the proposed features were evaluated and prioritized using the **Eisenhower Matrix**, informed by the findings from the literature review and the Define phase. The selected features for development application in this research, include all features from the “Do” quadrant and several from the “Decide” quadrant. These features were selected based on a brainstorming session with the supervisor by identifying and prioritizing ideas to be included in the initial version of the application, based on the priority matrix in Table 3.

Table 3. Priority Matrix

DO	DECIDE
1. Self-Monitoring (habit tracking and journaling)	1. Simple daily challenge to support tracking & classification and serve as simple activity recommendations to improve mood.
2. Simple, clean, intuitive, interactive UI	2. Polls, quizzes, or simple games for interactive features
3. Data visualization (graph, calendar, chart, list, etc)	3. Stronger security and privacy
4. Reminder/notification feature	4. Export data report user

- | | |
|--|---|
| <ol style="list-style-type: none"> 5. Flexibility while tracking mood (e.g. add description, unlimited mood entries for a day) 6. Onboarding guide | <ol style="list-style-type: none"> 5. Back-Up Data (e.g., Google Drive Sync) |
|--|---|

DELEGATE	DELETE
<ol style="list-style-type: none"> 1. Strategy/educational content (avoid triggers) 2. Fast and efficient apps 	<ol style="list-style-type: none"> 1. Chat features with AI or discussion forums to provide social support 2. Communication with healthcare providers 3. Sharing information to public 4. Integration into smartwatch or menstrual cycle 5. Persuasive Design

This prioritization demonstrates the importance of balancing desirability and simplicity. By focusing on core features emphasized by users, the design avoided unnecessary complexity and ensured accessibility for adolescents and young adults.

b) Application Flow

After selecting the features or solutions to be implemented in the application, the researcher proceeded to design the overall application flow based on the functional requirements analyzed during the Define stage. Figure 5 illustrates the overall flow of the HaoSpace application.

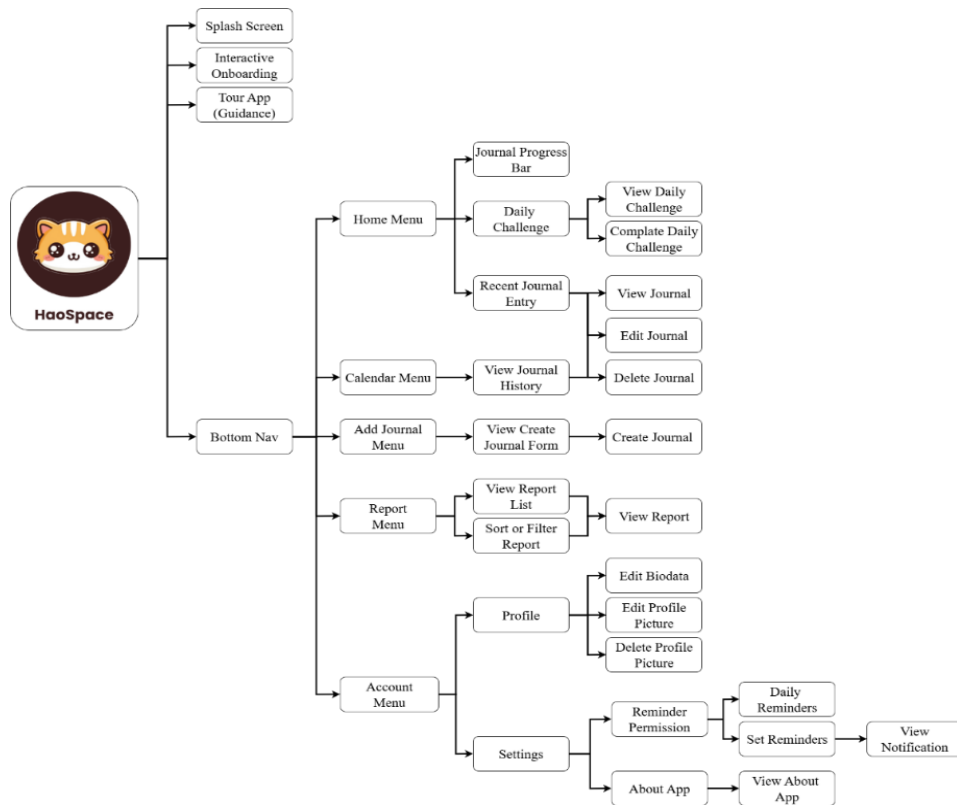


Figure 5. HaoSpace Application Flow

3.2.4 Prototype Stage

In this stage, the prototype designed by the researcher is a high-fidelity design reflecting the functional requirements and user preferences. The design prototype includes several key visual elements that reflect the identity and purpose of the application, such as:

- a) The name of the application is named **HaoSpace**, derived from the name of cat character “**Hao**” (好), means good or positive, while **Space** refers to a place or room. This combination reflects the core philosophy of the application, offering users a safe and comfortable space to track, understand, and improve their mood positively.
- b) The primary color of the application prototype is soft orange (#F9B24E), chosen for its association with positive emotions, warmth, and energy [20], [21]. The secondary color is dark brown (#3C1E1E), complemented by neutral tones such as white (#FFFFFF), cool gray (#B9BBC6), light gray (#EEEEEE), and black (#000000), along with selective accent colors to enrich visual diversity.
- c) The font style used in this application prototype is **Poppins**, a geometric sans-serif typeface. Poppins was chosen because of its modern, clean appearance, strong readability across various screen sizes [22]. In addition,

sans-serif styles are easier to read for students using digital devices [23]. Figures 6 - 11 present a high-fidelity design of the HaoSpace application.

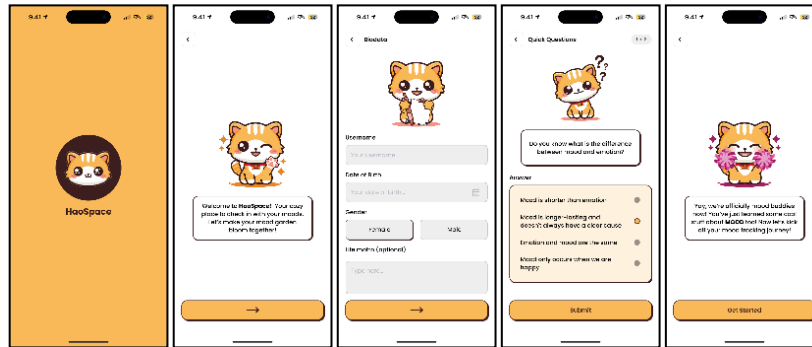


Figure 6. Interface Onboarding Process (Splash Screen; Welcome Screen; Biodata Input Screen; Quick Questions Screen; Ending Screen)

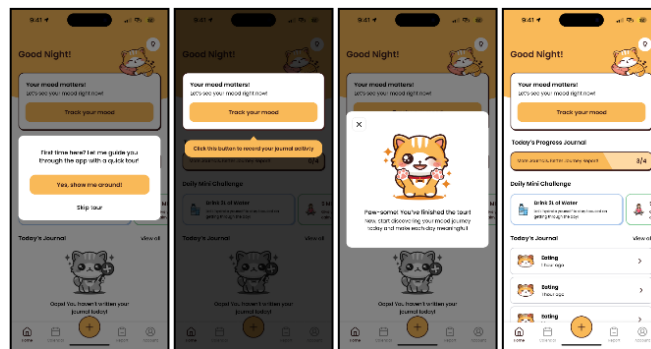


Figure 7. Interface Guidance Taking Process (App Tour Prompt, App Tour Progress, Tour Completion Confirmations, Home Page)

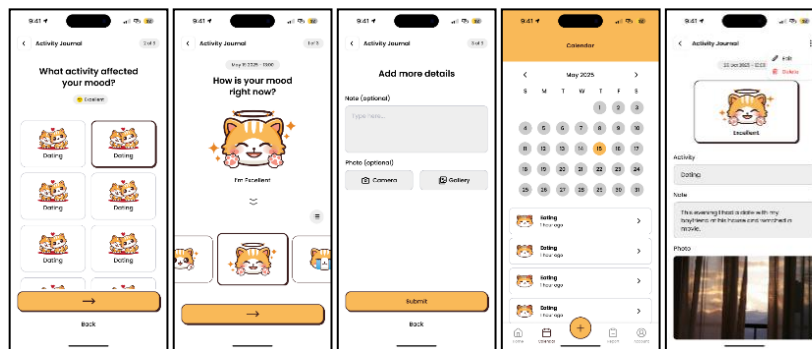


Figure 8. Interface Journal Management (Section Form Mood Entry; Section Form Activity Entry; Section Form Optional Add Note and Photo; Calendar Page; Detail Activity Journal Page with Sections for Editing and Deleting Journal Entry)

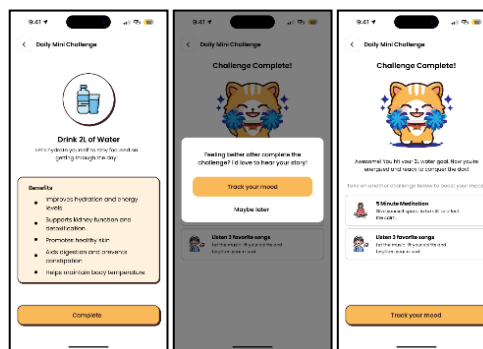


Figure 9. Interface Completing Daily Challenges (Daily Challenge Detail Page; Pop-up Prompting the User to Track Mood after Completing the Challenge; Daily Challenge Detail Page after the Challenge is Completed)

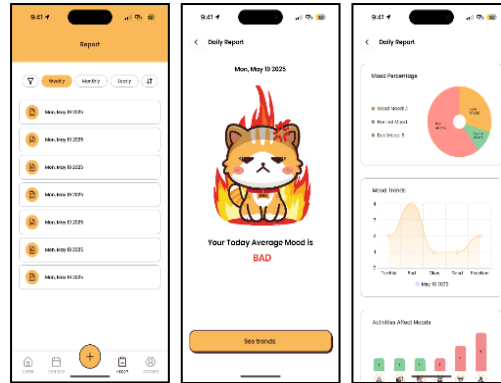


Figure 10. Interface Viewing Daily Reports (Report Page; Detail Report Page; See Trends Page)

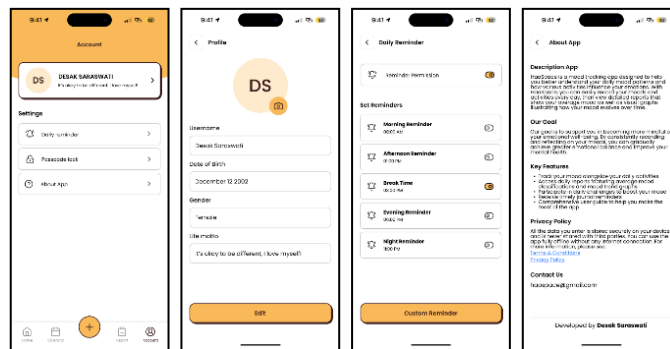


Figure 11. Interface Account Configuration (Account Page; Profile Page; Reminder Active; About App Page)

3.2.5 Test Stage

a) Evaluation by Potential Application Users

These participants consisted of five students and four workers. The evaluation process was carried out through offline and online meetings. Here, participants were free to comment, ask questions, and provide feedback on the prototype to support further improvement of the application. Overall, the user testing results showed a positive response toward the designed prototype. Table 4 presents a summary of comments and Table 5 presents a summary of suggestions from potential users who participated in the evaluation process.

Table 4. Summary of Comments

Aspect	Summary of Comments
Overall Design	The design is good, not cluttered, features are relevant with design, and navigation is clear
Characters/Mascots	Cute, iconic, expressive, and enhance the appearance of the app
Color & Font	Colors and fonts are appropriate and comfortable to read
Navigation	Navigation is clear, easy to understand, and interactions are varied
Feature Placement	Feature placements like daily challenge and calendar are easy to access and visible
Data Visualization	Mood and calendar visualizations are appropriate and not excessive
Onboarding	Onboarding is interesting and simple
Journal	Mood and activity are well represented visually
Word Usage	Wording is not an issue as long as it matches the feature’s function
App Appearance	The app looks cute, attractive, and is appreciated by non-tech-savvy users

Table 5. Summary of Suggestions

Aspect	Summary of Suggestions
Notes Input	Do not limit character count for notes input
Photo Input	Allow uploading more than one photo in the activity journal
Calendar Marking	Add color indicators or emojis to the calendar to show journal entries
Clear Photo Button	Replace the “clear” button with an “X” icon or a “change” label
Mascot/Emoji App	Add mascot animations (e.g., GIFs) and emoji input for mood expression
Security	Add a passcode feature
Multi-language	Add multi-language support (Bahasa Indonesia & English)
Audio	Include audio elements to enhance app experience



b) Evaluation by an Expert in Human Psychology

In this research, the prototype was validated by Dr. Dewi Arum Widhiyanti Metra Putri, S.Psi., M.A., M.Psi., Psychologist, a lecturer in the Guidance and Counseling Study Program at Universitas Pendidikan Ganesha. The evaluation produced the following results:

1. From the perspective of User Experience (UX), the design aligns with psychological aspects. Out of the ten evaluated indicators, four received a score of 3 (Acceptable) and six received a score of 4 (Highly Acceptable). This indicates that the HaoSpace application prototype is well-received and acceptable from a psychological standpoint.
2. The proposed solution in this research, developing a mood tracking application, particularly through its journaling feature is considered beneficial in helping adolescents recognize, manage, and express their emotions by fostering self-awareness and daily emotional reflection. Psychologically, journaling is also deemed appropriate as a complementary approach in counseling interventions, as it allows professionals such as counselors to monitor the emotional dynamics of their clients in a more structured manner and to design targeted intervention strategies.
3. No suggestions for improvement were provided. Overall, the evaluation concluded that the HaoSpace application prototype is “Feasible for prototype design testing without revision”.

The testing stage results provide strong evidence that the prototype features aligned with the functional and non-functional requirements defined in earlier stages. Positive user feedback on navigation, journaling, and visualization indicates that the design decisions made during the Ideate and Prototype stages successfully addressed the pain points identified during Empathize and Define. Furthermore, the suggestions for improvement highlight the potential for greater personalization and engagement, showing that users are not only able to use the application but also envision ways to make it more meaningful to their daily routines.

From the expert evaluation, the emphasis on journaling as a beneficial tool for emotional reflection reinforces both the literature review and the needs expressed by users, strengthening the psychological validity of the prototype. This alignment across literature, user insights, and expert validation demonstrates that HaoSpace is not only usable but also significant as a digital intervention to support self-awareness and mood regulation.

3.3 Discussion

These findings collectively address the objectives outlined in the introduction, demonstrating how user needs were identified and translated into requirements, how prioritized features shaped the prototype, and how the final design was validated for usability and psychological relevance. The results of this research demonstrate that the Design Thinking methodology effectively connected user needs, literature insights, and final prototype features. Each stage contributed progressively: empathy revealed user challenges, Define translated them into requirements, Ideate prioritized feasible solutions, Prototype embodied the design, and Test validated usability and relevance. The findings confirm that identified pain points directly shaped functional requirements and prototype features. The alignment between literature, user feedback, and expert validation highlights the significance of this study. HaoSpace shows potential as a user-centered digital intervention for supporting mood tracking, reflection, and emotional regulation among adolescents and young adults.

4. CONCLUSION

This research successfully designed a prototype of the HaoSpace application using the Design Thinking methodology. By applying the five stages of empathize, define, ideate, prototype, and test, the research produced a mood tracking solution that is simple, interactive, and user-oriented. The results confirm that Design Thinking is effective in aligning application features with user needs while ensuring usability and clarity in interface design. The prototype provides both students and workers with tools to record, reflect, and monitor their moods daily, supporting greater self-awareness and emotional regulation. Feedback from participants highlighted the clarity of navigation and the usefulness of features such as journaling and visualization, while expert validation confirmed its potential as a supportive digital tool for emotional well-being. These findings suggest that mood tracking applications can serve as practical aids for fostering healthier coping strategies and daily reflection. Overall, the research objectives were achieved, and the study demonstrates the value of Design Thinking in digital mental health application development. However, as the research was limited to the prototyping stage with a relatively small participant group, further work is needed. Future development may focus on technical implementation, incorporating user-driven improvements, and conducting evaluations with larger and more diverse populations to enhance the application’s effectiveness, scalability, and long-term impact.

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