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Management of Potential Mental Health and Behavioral Disorders for College Students Using Integrated Applications: Implementation of Human-Centered Design

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ABSTRACT Symptoms of mental disorders among college students have risen recently. A comprehensive synthetic review using a socio-ecological model as a guiding framework reveals that college students' mental health is influenced by several dynamic and interconnected factors at the individual level that can contribute to stress, anxiety, and depression. Several information and communication technology (ICT) services have been developed to improve healthcare, including the Depression, Anxiety, and Stress Scale 21 (DASS21) instrument. However, these applications do not receive continual monitoring and support from mental health professionals such as psychologists. To address the mental health difficulties of adolescent college students, it is critical that the services established provide appropriate interventions and successfully identify, detect, and address student mental health concerns. As a result, when creating an application interface, a Human-Centered Design (HCD) approach is required, which prioritizes human interaction to provide a more precise and user-friendly user experience. The success of the HappyMind app design was demonstrated by testing it on target users, namely college students and end-users, especially psychologists who served as evaluators. The results demonstrate that the HappyMind application design achieved an average score of 4 or 5, particularly for simplicity of use, text clarity, comfort, and visual appeal.

KEYWORDS: screening, mental health, behaviour disorders, hcd, user interface design

I. INTRODUCTION

About 50% of lifetime mental issues first appear in mid-adolescence, and seventy-five percent are evident by mid-twenties (1). Mental health symptoms have almost doubled among college students in recent years (2). A comprehensive synthetic review using the socio-ecological model as a framework showed that the mental health of college students is affected by a complex and interrelated set of factors at individual, interpersonal, institutional, community, and policy levels that can increase stress, anxiety, and depression (3). That makes it an appropriate environment to deal with mental health in this time of life that is crucial in psychological terms.

According to a survey carried out by the World Health Organization, one in four persons would suffer from some kind of mental disease during his life, teenagers and young adults being the most affected (4). A survey conducted by the American College Health Association (ACHA) found that more than sixty percent of students suffer from anxiety and forty percent report serious depression (5). One in three Indonesian teenagers had a mental health condition, and one in twenty had a mental disorder in the last 12 months, according to the 2022 I-NAMHS national survey (6). The national statistics from the 2018 Basic Health Research (Riskesdas) also reported that the working age population in Indonesia experienced emotional difficulties (7). But a university survey showed that over 40% of students were exposed to high levels of stress due to academic and environmental pressures (8).

Many information and communication technology services to improve healthcare such as the Digital Mental Health Intervention (DMHI) and chatbot applications are regarded tools for early

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diagnosis of depression (9). The Depression, Anxiety and Stress Scale 21 (DASS21) instrument enables the application to identify signs of depression in persons with mental health concerns early on and to offer resource assistance to these at-risk patients. However, the lack of the psychologist's presence in the process of solving mental health problems, especially among adolescents (students) may lead to ineffective and invalid management of these problems and may cause serious consequences.

Human-Centered Design (HCD) has been implemented in previous research broadly in digital mental health apps to improve usability, accessibility, user engagement and user satisfaction (10)(11). The applications are designed to enable stress management, anxiety reduction, depression screening and monitoring of mental health, while the active involvement of users helps increase the usability and acceptance of the system (12). However, the majority of available applications are mostly focused on self-assessment and self-monitoring, and hence, there is no constant help from mental health specialists (13). Many of these applications use established tests such as the Depression Anxiety Stress Scale (DASS-21), yet the assessment results are generally provided without professional comment or intervention thereafter (14). The HappyMind application fills this gap by integrating mental health self-assessment and psychologist engagement providing more comprehensive student care. Unlike earlier HCD-based studies that focus only on interface usability, this study integrates the needs of both students and psychologists into the design process. This work is unusual in that it utilizes HCD to provide a student mental health platform with self-assessment, continuous monitoring, and professional psychological help.

Therefore, it is important to guarantee that the services established using information and communication technology to treat mental health issues among college students can provide appropriate interventions and effectively identify, detect, and manage mental health conditions. Therefore, a Human-Centered Design (HCD) approach is important to develop an application interface focusing on human interaction. It results in a more intuitive, accurate and user-friendly experience (15). This project engaged target users and clinical psychologists to determine the attributes, roles, processes and infrastructure needed to develop information technology to address mental health challenges among students. The interface of the HappyMind application was developed as a university project to solve potential problems of mental health and behavior of students, by identifying and expressing the context of use, defining user needs, developing design solutions and assessing the design of the application using an integrated platform. Then, the HappyMind application interface design was evaluated and validated for effectiveness to target users, namely students, and evaluators, namely psychologists, in terms of gender neutrality and dynamic color changes.

II. METHOD

Using human-centered design helps create the HappyMind interface by focusing on what users need, making sure that every feature and service is useful for college students, psychologists, and health professionals who support them.

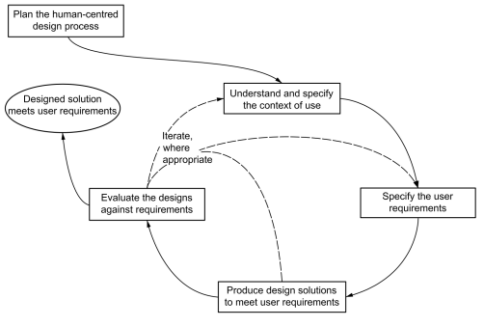

FIGURE 1. Interdependence of human-centred design activities based on ISO 9241-210:2010 (E)

A. Research Design

This study used a descriptive qualitative methodology with data triangulation to ensure the reliability and validity of identifying feature requirements for the HappyMind application, which addresses potential mental and behavioral disorders for college students and thus meets expectations. The prototype of the HappyMind program was tested to gather feedback from users, mainly college students and psychologists. The prototype testing of the HappyMind program revealed the need for further refinements, particularly the incorporation of more relevant Artificial Intelligence (AI).

B. Participants

This study used a descriptive qualitative methodology with data triangulation to ensure the reliability and validity of identifying feature requirements for the HappyMind application, which addresses potential mental and behavioral disorders for college students and thus meets expectations. The prototype of the HappyMind program was tested to gather feedback from users, mainly college students and psychologists. The prototype testing of the HappyMind program revealed the need for further refinements, particularly the incorporation of more relevant Artificial Intelligence (AI). In addition to the User Acceptance Test (UAT), the application of the System Usability Scale (SUS) as a method of testing for the HappyMind application, carried out by participants, was also explored using

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in-depth interview methods and Focus Group Discussions (FGD) to enrich perspectives (16).

C. Procedure

This research from the figure stage follows the four main activities of HCD (ISO 9241-210:2010), including :

1. Understanding and specifying the context of use :
   This stage involves considering the user context, which includes identifying users such as students, psychologists, and healthcare personnel. This stage also requires the identification of tasks, procedures, and infrastructure.
2. Specifying the user requirements :
   This study determined the collection of theme needs based on input from target users, specifically students and health professionals, including clinical psychologists; the main features identified are theme and music selection, chatbots, psychological tests, health certificate tests, and mental health literacy in the news portal.
3. Producing design solutions :
   At this point, the HappyMind Application's interface has been developed and assessed using the System Usability Scale (SUS) application on a scale of 1 to 5 with 59 student responders, one doctor, and one psychologist from the university health clinic.
4. Evaluating the design :
   The System Usability Scale (SUS) was selected as the usability evaluation instrument because it is a simple, reliable, and widely validated tool for measuring perceived usability. Compared with other usability assessment instruments, SUS requires fewer items and can be completed more quickly by respondents while maintaining high reliability. Since the primary objective of this study was to evaluate the overall usability and ease of use of the HappyMind application prototype among college students and psychologists, SUS was considered the most appropriate instrument. Furthermore, SUS has been extensively used in Human-Centered Design (HCD) studies and mobile application evaluations, enabling comparison of results with previous research. The System Usability Scale (SUS) test results were analyzed qualitatively and descriptively through thematic analysis of user input and by calculating the average score for each indicator across the established rating categories, ranging from "very low" to "very acceptable."
   The average score (mean) is calculated using the formula for get the result of SUS:

$$Mean = \frac{\sum xi}{n} \quad (1)$$

Refer (1) with xi = Each respondent's score on a specific indication. n = number of respondents (n=6).

D. Research Instruments

The HappyMind interface prototype evaluation questionnaire was tested using the SUS method, with 15 questions involving aspects such as button usability, text clarity, menu completeness, ease of flow, information access, comfort, ease of learning, color selection, function suitability, and display appeal, as detailed in the Google Form: https://forms.gle/bvxovJMoDiNJgKSE8.

The respondents who had tested with the SUS were then submitted to a consistency test, which included semi-structured interviews and observations to elicit more information about their experience using the HappyMind application, including feature preferences, barriers, and application demands.

E. Data Analysis

The quantitative data were evaluated by calculating the mean of each indicator and categorizing it using the following intervals: 1.0-1.9 (very poor), 2.0-2.9 (poor), 3.0-3.4 (sufficient), 3.5-4.4 (good), and 4.5-5.0 (excellent). Qualitative data from interviews and focus group discussions were thematically examined to discover patterns in student demands, which were then matched to SUS test results.

F. Ethical Considerations

The Health Research Ethics Committee of Jember State Polytechnic provided ethical permission for this study. Before data collection began, all participants were informed about the study's goal, procedures, and participation rights, and they were requested to sign an informed consent form. Participants' identities were kept private, and the data were only used for academic purposes.

III. Result and Discussion

A. College Student Perception

Figure 2 shows that the students emphasized the significance of an app with an intuitive and inclusive user interface (UI). They admired the gender-neutral layout and the dynamic color modification tool, which gave them a sense of personal responsibility and flexibility when using the app. An appealing design can improve college students' mental well-being and increase their motivation to use the app on a regular basis.

Furthermore, students responded that the app should be able to provide immediate emotional support via an interactive AI chatbot, particularly when they encounter academic difficulties or personal troubles. They additionally focused on the need for a peer-to-peer discussion forum where

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students can share their experiences, as peer support is seen as more readily accepted.

FIGURE 2. User Persona of College Student

B. *Clinical Psychologist's Perspective*

The psychologists in Figure 3 focused on content validity and professional integration. They determined that the app should not just provide general information but also include psychologists in content production and oversight. This is vital to preserve the information's quality and avoid the risk of misleading.

They also stressed the necessity of having access to safe, suitable, and reasonably priced digital resources, as well as culturally appropriate mental health literacy tools. Cultural, religious, and social conventions all have a big impact on how Indonesian students comprehend and express mental health difficulties. As a result, the app is designed to provide not only generic information but also to account for cultural differences and local context.

FIGURE 3. User Persona of Psychologist Clinic

C. *Theme Synthesis*

Thematic analysis of qualitative data showed eight main trends that reflect student requirements, namely:

1. AI chatbots provide improved mental health support.
2. kebutuhan forum dan dukungan kelompok sebaya,
3. Forums and peer group support are necessary,
4. Access to safe, appropriate, and affordable digital resources,
5. Psychologists are involved in application guidance
6. Culturally relevant mental health literacy,
7. Specific information about individual problems is available, and
8. Local resources applicable to the student environment.

These themes suggest that the development of AI-based mental health applications should not only focus on technology but also on the social, cultural, and institutional aspects that are important to college students' lives.

The results of this study showed that the Happy Mind application prototype largely achieves usability standards. The overall score for all indications is good (≥3.5), especially for simplicity of use, text clarity, application convenience, and visual appearance. These findings are consistent with prior research, which has shown that an intuitive and user-friendly interface is crucial for boosting user acceptance of digital interventions (17).

However, the menu completeness component received an average score of 3.3, which falls into the sufficient range. Despite receiving positive feedback, users believe that the application should include more significant features or menus. This finding is consistent with the findings of Lattie et al. (18) and Harrer et al. (19), who found that mental health applications for students require a range of characteristics, such as peer support, professional access, and contextual instructional content, to genuinely meet user demands.

D. *Illustration of Application UI Display*

The prototype of the Happy Mind app in the figure under evaluation includes several essential elements, including a homepage, a chatbot interface, mental health educational articles, a customizable user profile, and an avatar selection option. This interface was employed in interviews and surveys to investigate students' perceptions of the design's usability and relevance.

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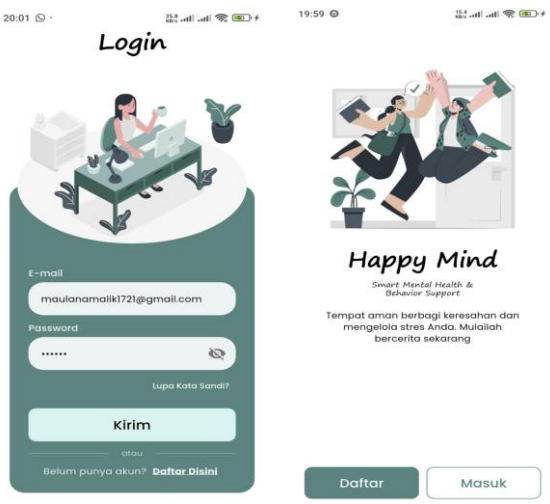

FIGURE 4. The registration interface of HappyMind's Application

The application also includes mental health support features such as a playlist of calming music, a chatbot chatroom, and the QoL Scale and DASS-21 instruments that evaluate users' psychological well-being. Test results are displayed live in a visual analytic format, providing students with a better comprehension of their condition. Figure 4 shows the user interface for the registration feature. The color scheme was chosen based on visual stimuli applied during interviews and conversations with students and healthcare workers regarding the app's usability.

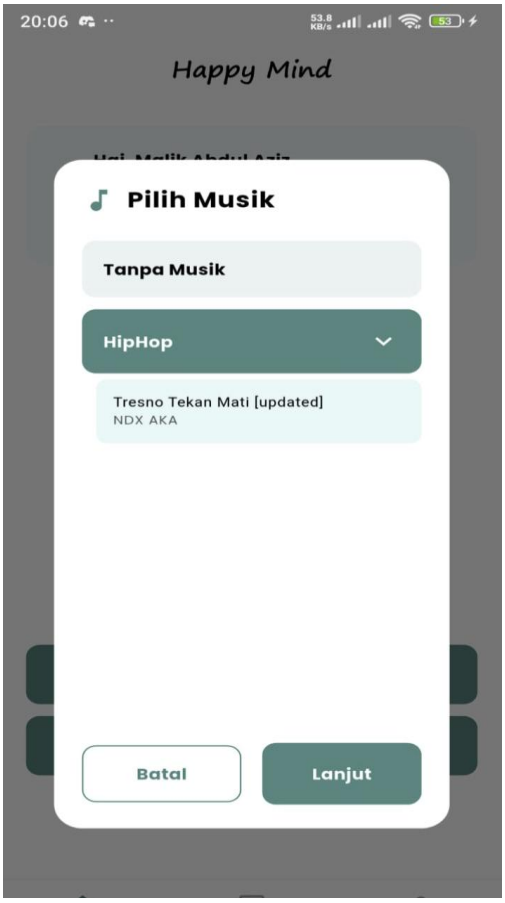

FIGURE 5. The interface of the select music *(Pilih Musik)* feature

Figure 5 shows the interface for the music selection feature, which is provided to enhance user comfort during stress tests. This feature is optional, meaning users can activate or deactivate it according to their convenience. Before conducting a quality of life assessment using the QoL scale test shown in Figure 7, users will first undergo a screening to identify their mental health status based on levels of stress, anxiety, and depression. This initial screening will influence questions related to the factors contributing to their mental health disorders. Figure 6 shows the interface of the chat room feature used to identify early mental health conditions, with an example of a stress scale test result.

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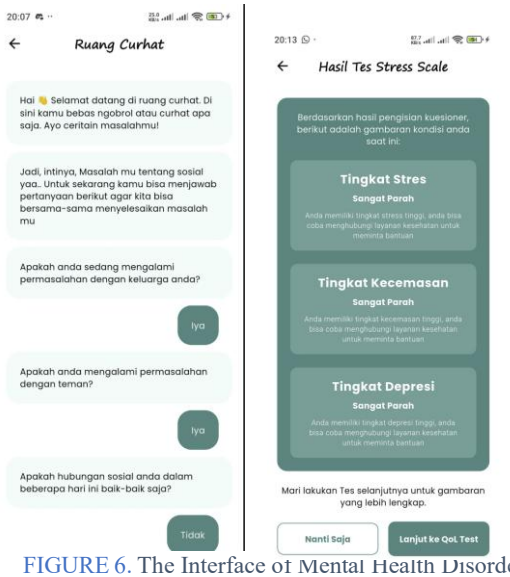

FIGURE 6. The Interface of Mental Health Disorder Early Screening Feature

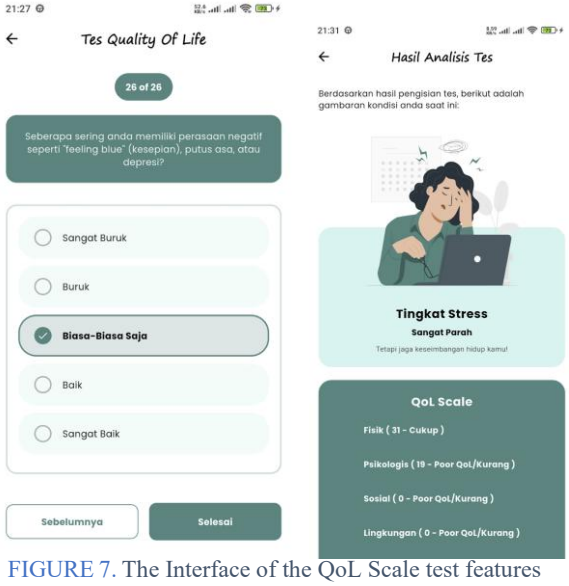

FIGURE 7. The Interface of the QoL Scale test features with automatic analysis results

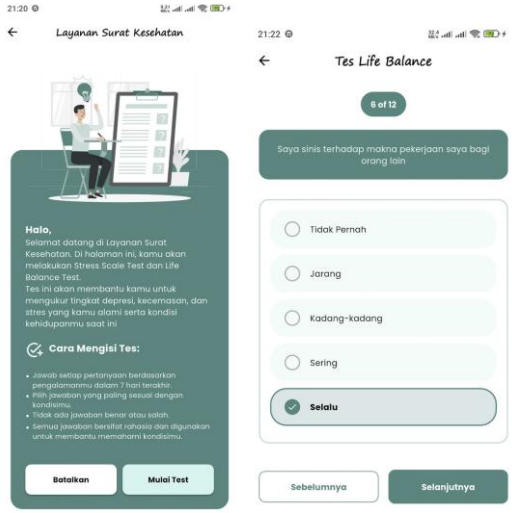

FIGURE 7. The Interface Of The Health Letter Service In The Happymind App

The HappyMind application also provides a health letter service feature by adopting questions from the DASS-21 and life balance as shown in Figure 8, which consists of an interface for instructions on how to use the feature and one example of a question.

E. User Test Result

A total of 59 respondents, one doctor, and one psychologist from a university health clinic, tested the HappyMind application prototype using the SUS assessment instrument, which includes 15 questions on a scale of 1–5, where:

Score 1 - 1,9 = Very Poor
Score 2 - 2,9 = Poor
Score 3 - 3,4 = Fair
Score 3,5 - 4,4 = Good
Score 4,5 - 5,0 = Very Good

This category is determined by dividing the score range (5-1 = 4) into five equal intervals (0.8).

TABLE 1. The Result of The User Test

Indicator	Mean	Category
The menu is complete	3,33	Fair
The usability of buttons on the website is easy to understand	4	Good
The text used is clear and easy to understand	4	
The menu is easy to understand	4	
The application flow is easy to follow	4	
I can easily find the information I need	4	
I can search for information quickly	4	
Information is easy to access	4	
I feel comfortable using this application	4	
I can easily remember how to use this application	4	
The application is easy to learn	4	
The application flow matches what I expect	4	
The choice of colors in the application is very good	4	
This application provides the functions I need	4	
I like the appearance of this application	4	

Table 1 explains that the calculation results show that practically all aspects fall into the favorable category, with an average score of about 4.0. The most positively regarded elements are button usability, text clarity, application convenience, ease of learning, and visual appearance (mean = 4.0). This conclusion confirms the application's overall ability to provide a satisfactory user experience. However, the menu completeness element obtained an average score of 3.3, indicating that it is sufficient. The result shows that, while the application is generally regarded as good, users believe that particular features or menus are insufficient to meet student requirements. This made the SUS test findings and qualitative input more contextual, as respondents could provide direct feedback on the app's actual appearance.

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IV. CONCLUSION

This study intended to determine the mental health support needs of Indonesian college students and to evaluate the usability of an AI-based mental health app created using a Human-Centered Design (HCD) methodology. The findings indicated that students need accessible mental health services that combine AI-based assistance, involvement of psychologists, peer groups, culturally responsive mental health literacy, individualized information and local support resources. These needs, the application developed was found to have a satisfactory usability with most usability indicators having a mean of 4.0 or higher, especially in terms of button usability, clarity of text, convenience of the application, and visual appearance, this indicates a positive user experience and acceptance of the proposed design. However, the menu completeness indication had a lower mean score of 3.3, indicating that further features and functionality are still needed to better satisfy user expectations. These findings suggest that the program has a good usability basis and the potential to improve student mental health in the Indonesian higher education context, while also highlighting the need for future feature enhancement and cultural adaption . In general, this study demonstrates the need of incorporating HCD principles, constant user interaction and cultural considerations in the development of AI-based mental health applications that effectively address the requirements of Indonesian college students.

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