ISSN. 2338-7475
E-ISSN. 2620-7869
Hearty
Jurnal Kesehatan Masyarakat
Berinan, Tulus, Sepenuh Hati,Berbesar Hati, Jujur, Sehat dan Kuat
Vol. 14 No. 4, Agustus 2026, Hal. 1200-1220

PROTOTYPE WEBSITE FOR EARLY DETECTION OF ADOLESCENT DEPRESSION AND ANXIETY BASED ON THE MINI MINDHEAR YOUTH SCALE VERSION 1 AT A SENIOR HIGH SCHOOL IN CIREBON REGENCY, WEST JAVA

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Abstrak

Mental health disorders such as depression and anxiety among adolescents are increasing and often go undetected early, impacting academic performance, social relationships, and quality of life. Schools are important settings for early screening because adolescents spend most of their time in this environment. This study aims to design and develop a prototype website for early detection of depression and anxiety based on the Mini MindHear Youth Scale Version 1 (MMYS V.1) for high school students in Cirebon Regency, West Java. The research method used is Research and Development (R&D) with the Software Development Life Cycle (SDLC) model, including planning, requirement analysis, system design, implementation, and evaluation using User Acceptance Testing (UAT). The system was developed as a website prototype capable of structured and rapid screening. Validity testing showed all items were valid with r-count greater than r-table (0.216). Reliability testing produced a value of 0.683, indicating a reliable category. Usability testing using the System Usability Scale (SUS) resulted in a score of 75.77, categorized as acceptable. Risk levels and recommendations are provided. The developed prototype meets functional, validity, reliability, and usability requirements and can be used as an early screening tool for adolescent mental health in school settings.

Keywords: Depression, Anxiety, Adolescents, Mini MindHear Youth Scale, Rule-Based Reasoning, Application Prototype

Introduction

Mental health disorders such as depression, stress, and anxiety affect an individual's emotions, thoughts, and behavior. Depression is characterized by persistent sadness, loss of energy, interest, and pleasure in daily activities for more than two weeks, often accompanied by physical symptoms such as sleep disturbances and changes in appetite. Stress is the body's response to pressure or perceived threats, commonly manifested by restlessness, anxiety, and irritability, while anxiety refers to excessive fear or worry that interferes with daily functioning. Mental health problems among children and adolescents have increased significantly in recent years. The World Health Organization (WHO) estimated in 2021 that approximately 10–20% of children and adolescents experience mental disorders, with early symptoms frequently remaining undetected. Anxiety affects approximately 20–30% of adolescents, while depression ranges from 10–25%. In Indonesia, the prevalence of depression increased from 3.09% to 3.70%, affecting approximately 10 million people, with the highest prevalence occurring among individuals aged 15–24 years. The 2022 Indonesian Adolescent Mental Health Survey reported that 5.5% of adolescents aged 10–17 years experienced mental disorders, including depression (1.0%), anxiety (3.7%), post-traumatic stress disorder (0.9%), and attention deficit hyperactivity disorder

Submitted: June-2026 Received: June-2026 Available Online: August-2026

(0.5%). Furthermore, the 2023 Indonesian Health Survey (SKI) reported a mental disorder prevalence of 2.8% among individuals aged 15–24 years, while West Java Province recorded a higher prevalence of 4.4%. These findings indicate that adolescent mental health remains a significant public health concern, compounded by limited access to mental health professionals, low mental health literacy, and social stigma that discourages adolescents from seeking professional help.

Mental health interventions in Indonesia prioritize several high-risk population groups, including adolescents, school-aged children, the workforce, infants and toddlers, prenatal and postnatal mothers, and older adults, with adolescents receiving particular attention. Good mental health is essential for children's emotional, social, and academic development; however, mental health problems often remain unidentified, resulting in long-term negative impacts on academic performance, interpersonal relationships, and behavioral development. Therefore, early detection within school settings is crucial, as adolescents spend a substantial amount of time at school. Timely identification and intervention can prevent the progression of mental disorders into adulthood and improve overall quality of life. Law Number 17 of 2023 concerning Health emphasizes that mental health is an integral component of individual well-being and should be addressed through promotive, preventive, curative, rehabilitative, and palliative efforts supported by information technology. Likewise, the Indonesian Ministry of Health's 2025 strategic agenda promotes the improvement of public health through a life-course approach and the utilization of digital health technologies. Consequently, developing a technology-based early detection system for schools is highly relevant.

This study proposes a rule-based reasoning approach to identify symptoms of depression and anxiety using predefined if–then rules within a knowledge-based system. The system employs the Mini MindHear Youth Scale Version 1 (MMYS V1) as the screening instrument, enabling adolescents to report their symptoms systematically and allowing the system to generate objective assessments of their mental health status. A preliminary study conducted at one senior high school in Cirebon Regency, West Java, revealed a large and socially diverse student population, an increasing number of students admitted through academic achievement pathways, and the absence of a technology-based mental health screening system. Counseling records also indicated a gradual increase in the number of students seeking assistance for emotional and psychological concerns. These findings highlight the need for an efficient web-based early detection system. Based on this background, this study is entitled "Prototype of a Web-Based Early Detection System for Adolescent Depression and Anxiety Using the Mini MindHear Youth Scale Version 1 at a Senior High School in Cirebon, West Java."

Based on the aforementioned background, the research problem addressed in this study is how to design a web-based early detection system for depression and anxiety among senior high school students in a school located in Cirebon Regency, West Java. The general objective of this study is to develop a prototype website for the early detection of depression and anxiety among senior high school students. Specifically, the study aims to identify system requirements to determine the necessary features and detection workflow, design the system architecture, database, process flow, and user interface, implement the prototype using the Software Development Life Cycle (SDLC) with a rule-based reasoning approach, and evaluate the system using the User Acceptance Test (UAT) and the System Usability Scale (SUS) to assess user acceptance and system usability. The expected contributions of this study include providing a reference for the development of mental health early detection systems and supporting educational activities in the Diploma III Health Information Management Program at the Health Polytechnic of the Ministry of Health Tasikmalaya, Cirebon Campus. Furthermore, this study is expected to enhance the researchers' knowledge and technical expertise in developing digital mental health solutions while offering an innovative contribution to adolescent mental health services. For the participating school, the developed system is expected to facilitate rapid, efficient, and web-based monitoring of students' mental health conditions.

Previous studies have demonstrated variations in research focus, methodological approaches, and screening instruments. Most existing studies have concentrated on university students or employed machine learning techniques without utilizing the Mini MindHear Youth Scale or a rule-based reasoning approach. Therefore, the novelty of this study lies in the development of a prototype web-based early detection system utilizing the Mini MindHear Youth Scale Version 1 and rule-based reasoning specifically designed for senior high school students.

Methods

This study employed a Research and Development (R&D) approach to develop and evaluate a prototype web-based early detection system for depression and anxiety among adolescents. The software was developed using the Software Development Life Cycle (SDLC) model, which consisted of system planning, system analysis, system design, system implementation, and system testing. The study was conducted at a senior high school in Cirebon Regency, West Java, Indonesia, between January and February 2026.

The study population comprised all 1,441 students enrolled in Grades X, XI, and XII during the 2025/2026 academic year. A purposive sampling technique was applied to select Grade XII students as participants because of their greater psychological maturity and ability to independently use the system. The sample size was determined using the Slovin formula with a 10% margin of error, resulting in a minimum sample of 81 students from a population of 427 Grade XII students. Inclusion criteria included Grade XII students who agreed to participate, were not undergoing mental health treatment, and had access to an internet-connected device. Students who did not meet these criteria were excluded.

The research object was a prototype website for the early detection of depression and anxiety using the Mini MindHear Youth Scale Version 1 (MMYS V.1). The system processed user identity, MMYS V.1 questionnaire responses, and assessment scores as inputs. A rule-based reasoning approach was implemented to calculate scores and classify participants into three categories: not detected, mild, and severe. The system generated classification results together with educational information and recommendations. System usability and user acceptance were evaluated using the User Acceptance Test (UAT) and the System Usability Scale (SUS).

Data were collected through a literature review, observations, interviews, user requirement questionnaires, the MMYS V.1 screening questionnaire, and system usability testing using the SUS questionnaire. Data processing included data collection, reduction, presentation, and descriptive analysis. SUS scores were calculated based on the standard scoring procedure by subtracting one point from responses to odd-numbered items and subtracting responses to even-numbered items from five, with the total score multiplied by 2.5 to obtain a final score ranging from 0 to 100. Scores below 50 indicated that the system was not feasible, scores between 50 and 67 indicated conditional feasibility, and scores of 68 or above indicated that the system was acceptable for use.

Ethical considerations included obtaining participants' informed consent, maintaining the confidentiality of respondent data, and ensuring that all collected information was used exclusively for research purposes in accordance with ethical standards for human subject research. This study was limited to the development of a prototype intended for early detection rather than clinical diagnosis. Furthermore, the system was evaluated only among Grade XII students and did not include a maintenance phase, limiting the generalizability of the findings.

Results

This study employs the Software Development Life Cycle (SDLC) development model, as it effectively illustrates the systematic stages of system development—ranging from planning to testing—for a website designed for the early detection of depression and anxiety based on the Mini MindHear Youth Scale Version 1 (MMYS V.1). The research findings are categorized into input, process, and output stages.

Input

The input phase constitutes the system planning stage, aimed at identifying requirements for developing a prototype website for the early detection of depression and anxiety at a high school in Cirebon Regency, West Java.

User requirements were identified through questionnaires, observations, and interviews with students and guidance counselors. The results indicate that users require a system that is user-friendly, accessible via smartphone, features a simple interface, provides automated results, ensures data confidentiality, and offers mental health educational resources alongside recommendations for further services.

Primary data collection utilized the MMYS V.1 instrument, comprising six questions—three regarding depression and three regarding anxiety—with "Yes" and "No" response options. Users completed the questionnaire independently via the website, and the results were stored as the system's primary input data.

Functional system requirements include a homepage, an online questionnaire, user data storage, data processing using Rule-Based Reasoning, a results display, and follow-up recommendations.

Non-functional requirements encompass ease of use, accessibility, system speed, data security, and system reliability.

The software employed includes Windows, PHP, HTML, CSS, JavaScript, MySQL, and Google Chrome, while the hardware comprises servers, laptops/computers, user smartphones, and an internet network.

Process

The processing stage involves transforming system requirements into a design ready for implementation. The system analysis phase is conducted based on the identified user requirements. The system is designed to accept responses from the MMYS V.1 questionnaire and process them using a Rule-Based Reasoning method to determine risk categories for depression and anxiety. The system design phase encompasses the process flow, database, user interface, and use case diagrams. There are two primary actors in this system: students, acting as the main users, and guidance counselors or administrators, who monitor the screening results.

Table 1. Use Cases for the Depression and Anxiety Early Detection

No	Actor	Use Case	Scenario Description	Interaction	Objective
1	Student	Access the System	The student opens the early detection website using their device.	The student accesses the main page, and the system displays the homepage.	To allow users to access the system easily.
2	Student	Complete the Questionnaire	The student completes the MMYS V.1 questionnaire consisting of 6 questions.	The student selects "Yes/No" answers, and the system stores the responses.	To collect symptom data from the user.
3	Student	View Screening Results	After completing the questionnaire, the student views the screening results.	The system processes the data and displays the results.	To provide information about the student's level of depression and anxiety risk.
4	Student	View Recommendations	The student receives recommendations based on the screening results.	The system displays recommendations according to the screening outcome.	To provide education and initial follow-up guidance.
5	School Counselor/Admin	View Student Results	The school counselor or administrator accesses students' screening results.	The system displays the screening results in a tabular format.	To assist in monitoring students' mental health conditions.
6	School Counselor/Admin	Manage System Data	The school counselor or administrator manages the system data.	The system accepts data management inputs.	To keep the data organized and available for future use.

Entity Relationship Diagram (ERD)



Picture 2. Entity Relationship Diagram

The database design for this system is represented using an Entity-Relationship Diagram (ERD), which serves to illustrate the relationships between system entities in a structured manner. The ERD acts as a foundation for data management, ensuring that data storage, processing, and retrieval are performed effectively.

This early detection system for depression and anxiety comprises three primary entities: `users`, `data_user`, and `hasil_screening`. The `users` entity stores account information, including the username, password, and user role. The `data_user` entity stores user identity details—such as name, age, gender, school of origin, and other supporting data—and is linked to the `users` entity via the `id_user` attribute, which serves as a foreign key.

Furthermore, the `hasil_screening` entity stores screening results obtained after a user completes the MMYS V.1 questionnaire; these results include depression scores, anxiety scores, result categories, and system-generated suggestions or recommendations. This entity also maintains a relationship with the `users` entity through the `id_user` attribute.

Based on these relationships, a single user possesses one set of identity data and can undergo multiple screening processes. This database design enables organized data storage, facilitates information management, and optimally supports the early detection process.

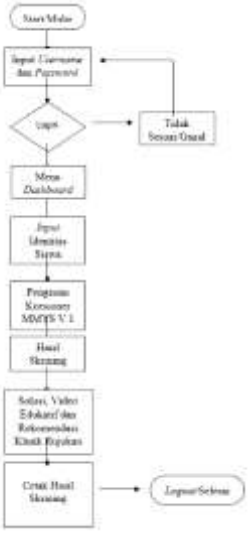
Flowchart

A flowchart is used to illustrate the system's overall workflow, spanning from the input stage and data processing to the generation of output. Designing the flowchart aims to provide a systematic and structured overview of the system flow, thereby facilitating the implementation of the website for the early detection of depression and anxiety.

In the developed system, the workflow is divided into two main parts: the user (student) flow and the admin/guidance counselor flow. Generally, the process begins when the user accesses the website and completes the MMYS V.1 questionnaire. The input data is then processed using a rule-based reasoning method, based on rules defined within the system's knowledge base. The processing results are displayed as categories indicating the risk levels for depression and anxiety, accompanied by preliminary recommendations for follow-up action.

a) User Flowchart

In the user flow, the process begins when the student opens the website on their device. The system then displays the main page, and the user is prompted to enter their personal details before proceeding to the questionnaire page. Next, the student answers all questions in the MMYS V.1 questionnaire by selecting from the available options. The submitted responses are saved by the system and automatically processed using the rule-based reasoning method. Once processing is complete, the system displays the screening results—categorizing the risk levels for depression and anxiety—along with preliminary recommendations accessible to the user.



Picture 3. Flowchart User

b) Admin Flowchart

In the admin workflow, the process begins when the guidance counselor or admin logs into the system using a registered account. Upon successfully logging in, the admin can access student screening data stored in the database. The admin has access to view detection results, monitor student conditions, manage user data, and oversee the information contained within the system. Once all processes are complete, the admin can log out of the system.



Picture.4 Flowchart Admin

Knowledge Base Design

The knowledge base is designed to organize the knowledge used by the system in its decision-making process, employing the Rule-Based Reasoning method. The knowledge base is structured based on depression and anxiety symptoms found in the MMYS V.1 instrument, represented as symptom data, condition data, solution data, and if-then rules.

a. Symptom Data

Table 2. Symptom Data

Symptom Code	Symptom Description	Category
G1	Feeling excessively anxious or restless	Anxiety
G2	Overthinking and having difficulty controlling one's thoughts	Anxiety
G3	Difficulty sleeping and difficulty concentrating	Anxiety
G4	Feeling sad and depressed without a clear reason	Depression
G5	Loss of interest in daily activities	Depression
G6	Frequently feeling tired, having difficulty sleeping, and difficulty focusing	Depression

b. Condition Data

Table 3. Condition Data

Condition Code	Condition Name
K1	Not Detected
K2	Mild Risk
K3	High Risk

c. Recommendation Data

Table 4. Recommendation Data

Recommendation Code	Condition	Recommendation
S1	Anxiety Not Detected	Mental health education, strengthening protective factors, and routine screening once a year.
S2	Mild Anxiety Risk	Initial counseling, psychological assessment, and follow-up screening.
S3	High Anxiety Risk	Intensive counseling, medical management, psychological assessment, and referral to a mental health professional.
S4	Depression Not Detected	Mental health education, strengthening protective factors, and routine screening once a year.
S5	Mild Depression Risk	Initial counseling, psychological assessment, and follow-up screening.
S6	High Depression Risk	Intensive counseling, medical management, psychological assessment, and referral to a mental health professional.

c. *Rule-Based Reasoning*

Tabel 5. Rule-Based Reasoning

Rule Code	IF	THEN	Solusi
R1	G1 AND G2 AND G3	K3	S3
R2	G1 AND G2	K2	S2
R3	G2 AND G3	K2	S2
R4	G1	K1	S1
R5	G3	K1	S1
R6	NOT (G1 OR G2 OR G3)	K1	S1
R7	G4 AND G5 AND G6	K3	S6
R8	G4 AND G5	K2	S5
R9	G5 AND G6	K2	S5
R10	G4	K1	S4
R11	G6	K1	S4
R12	NOT (G4 OR G5 OR G6)	K1	S4

Output

The output phase is the final stage of system development, resulting in a website prototype, the screening results of users' mental-emotional conditions, and a system feasibility assessment using the System Usability Scale (SUS) method. This phase aims to ensure the system functions correctly, automatically displays detection results, and offers a high level of usability for users. The research outputs comprise the implemented website prototype, depression and anxiety classification results, and the system feasibility evaluation.

Prototype System

The system prototype is a web-based implementation of the design, intended to assist in the early detection of depression and anxiety among adolescents through the administration of the MMYS V.1

questionnaire. The system accommodates two types of users—students and administrators/guidance counselors—each with distinct functions tailored to system requirements.
The developed user interface comprises the following:

1) User Interface

The user interface is designed to be simple, responsive, and intuitive, enabling students to undergo the detection process independently. Available features include a login page, a main dashboard, the MMYS V.1 questionnaire, screening results, and follow-up recommendations.

Login Page

The login page serves as the initial interface where students enter the necessary data to access the system and begin the screening process. It features a simple design to facilitate ease of access for users. Prototype sistem merupakan implementasi hasil perancangan ke dalam bentuk website untuk membantu deteksi dini depresi dan kecemasan pada remaja melalui pengisian kuesioner MMYS V.1. Sistem ini memiliki dua jenis pengguna, yaitu siswa dan admin/guru bimbingan konseling (BK), yang masing-masing memiliki fungsi berbeda sesuai kebutuhan sistem.



Figure 5. Login screen and username/password entry.

The user login page serves as the initial access point for students before they use the system. On this page, users can log in by entering basic identification details or proceed directly without complex authentication. The page is designed to ensure ease of access and a user-friendly experience.

Homepage



Figure 6. Homepage Layout

The homepage is the initial screen displayed after a user successfully accesses the system. It contains general information on early mental health detection, a brief explanation of the system's purpose, and navigation directing users to the primary feature: completing the screening questionnaire.

Questionnaire Completion Instructions Page



Figure 7. Questionnaire Instructions Display

The questionnaire instruction page provides information on the procedure for completing the MMYS V.1. It contains a brief explanation of the screening's purpose, how to answer the questions, and the meaning of the available response options. This page aims to ensure users correctly understand the completion process, thereby minimizing errors and enhancing the accuracy of the resulting data.

Student Information Entry Page



Figure 8. Student Information Entry Page

This page is used to enter student details—such as name, age, gender, school of origin, grade, phone number, and address—to support the analysis process and the storage of screening results. The interface is designed to be simple and easy to fill out.

Screening Questionnaire Page (MMYS V.1)



Figure 9. Screening Questionnaire Page (MMYS V.1)

This page is a core component of the system, where students answer six questions regarding their mental-emotional state by selecting either "Yes" or "No." The interface features a simple design to ensure users remain focused while completing the questions.

Screening Results Page



Figure 10. Screening Results Page

This page displays analysis results based on user responses. The system processes the data using a rule-based reasoning method and generates risk categories: undetected, mild, or severe.

Educational Videos and Clinic Recommendations



Figure 11. Educational Videos



Figure 12. Clinic Recommendations

This page provides mental health educational videos as well as recommendations for services or referral clinics for follow-up based on screening results.

Screening Result Printout Page



Figure 13. Screening Result Printout Page

This feature allows users to save or print screening results in PDF format, containing user details, risk category, and preliminary recommendations. The printout can be used for further consultation.

Instrument Print Page



Figure 14. Instrument Print Page

This page allows users to view and print the MMYS V.1 instrument in PDF format for offline use and supports system transparency.

2) Admin Interface

The admin interface is used to support the monitoring and management of student screening data.

Login Page

The admin login page is used to authenticate guidance counselors or administrators via username and password to ensure data security.

Dashboard Page



Figure 15. Dashboard Page

The dashboard displays a summary of information such as the number of users, screening data, and system feature navigation.

Screening Data Page



Figure 16. Screening Data Page

This page displays student screening results in a table format and allows for export to Excel to facilitate monitoring.

User Management Page



Figure 17. User Management Page

This page is used by the admin to view and manage user data in order to keep it organized.

Screening Report Page



Figure 18. Screening Report Page

The report page presents a structured summary of screening results to serve as a basis for evaluation by guidance counselors.

Mental-Emotional Screening Results: Depression and Anxiety

The screening results represent the system's primary output following the user's completion of the MMYS V.1 questionnaire. User responses are processed using a Rule-Based Reasoning method to classify conditions into "undetected," "mild," or "severe" categories based on the symptoms identified. An example of the screening results generated by the system is presented below.

Table 6. System Depression and Anxiety Screening Results

No	Student's Name	Anxiety Score	Depression Score	Detection Date
1	R1	2	1	14-09-2025
2	R2	0	0	14-09-2025
3	R3	2	2	14-09-2025
4	R4	3	2	14-09-2025
5	R5	1	3	14-09-2025

The "undetected" category indicates that the user exhibits no or minimal symptoms of depression or anxiety, suggesting a relatively stable mental state. The "mild risk" category indicates the presence of early-stage, manageable symptoms; users are advised to practice stress management and seek consultation if symptoms persist. The "severe risk" category indicates more serious symptoms, requiring follow-up with a school counselor or a professional.

Screening Result Summary

Anxiety Outcome

Table 7. Distribution of Students' Anxiety Levels

No	Anxiety Category	Number of Studen	Persentage
1	Not Detected	41	50,6%
2	Mild Risk	30	37,0%
3	Severe Risk	10	12,4%
Total		81	100%

Based on the table, the majority of students fall into the "undetected" category (41 students, or 50.6%), followed by the "mild risk" category (30 students, or 37.0%) and the "severe risk" category (10 students, or 12.4%).

Depression Outcome

Table 8. Distribution of Students' Depression Levels

No	Depression Category	Number of Students	Persentage
1	Not Detected	55	67,9%
2	Mild Risk	23	28,4%
3	Severe Risk	3	3,7%
Total		81	100%

Based on the distribution results, the majority of students fell into the "undetected" category (55 students, 67.9%), followed by the "mild risk" category (23 students, 28.4%) and the "severe risk" category (3 students, 3.7%).

System Usability Scale Test Results (SUS)

Usability testing was conducted using the System Usability Scale (SUS) method with 81 respondents after they used the system. The questionnaire consisted of 10 questions with a rating scale of 1–5, which were then converted into an SUS score.

Table 9. SUS Test Results

Number of Respondent	Average SUS Score	Category
81 Respondents	75,77	Acceptable Usability

The calculation results show an average SUS score of 75.77. This value exceeds the SUS acceptability threshold of 68, indicating that the system possesses a good level of usability and is acceptable to users.

MMYS V.1 Validity and Reliability Test Results

Validity and reliability testing was conducted to ensure that the MMYS V.1 instrument is capable of measuring mental-emotional conditions accurately and consistently.

1) Validity Test

The validity test was conducted on 81 respondents. The results indicate that all question items had a calculated r-value greater than the r-table value (0.216); therefore, all six items were deemed valid.

Table 10. Validity Test Results

Number of Items	r -Tabel	Result
6 Items	0,216	All items valid

2) Reliability Test

The reliability test yielded a Cronbach's Alpha value of 0.683. This value is greater than 0.6; therefore, the instrument is considered reliable.

Table 11 Reliability Test Results

Cronbach's Alpha	Kriteria	Hasil
0,683	> 0,6	Reliabel

Based on these results, the MMYS V.1 instrument meets validity and reliability requirements, making it suitable for use as a measurement tool within an early detection system for emotional and mental health.

Discussion

1. Input Phase (System Planning)

The input phase is a crucial initial stage in determining the direction of system development. During this phase, user requirements are identified through questionnaires, observations, and interviews with guidance and counseling teachers. Questionnaire results indicate that users require a system that is user-friendly, accessible online, and capable of providing rapid screening results. Observations reveal that the manual screening process has limitations due to inefficiencies in data processing. Meanwhile, interview findings highlight the need for a system that facilitates the early detection of students' mental health conditions in a more structured manner. Furthermore, a functional requirements analysis was conducted, covering features such as login, questionnaire completion, result processing, and administrative data management; non-functional requirements included ease of use, access speed, and user data security. This phase aligns with research by Yas Q et al. (2023) and Subiyakto & Ahlan (2021), which explain that the input phase serves as the primary foundation for system success by ensuring the system meets actual user needs.33,51 Research by Akbar & Siregar (2024) also states that effective planning determines the overall success of the system.36

2. Process Stage (System Analysis and System Design)

The process stage involves data processing and system design based on the requirements identified in the previous stage. This stage entails system analysis and design using use case diagrams, Entity-Relationship Diagrams (ERDs), flowcharts, and knowledge base design. Use case diagrams are

employed to illustrate interactions between users and the system, covering both standard users and administrators. This aligns with the theory of Vranic et al. (2024), which states that use cases are used to describe system processes and user interactions in detail. ERDs are used to explain data structures and relationships between entities to ensure organized data storage, in accordance with the concepts of Waruwu (2024). Flowcharts are used to depict the system's logic flow from input to output, thereby facilitating the program development process, consistent with the theory of Sutanti et al. (2020).

The core component of this stage is the design of the knowledge base using the Rule-Based Reasoning method. Each student's response is treated as a fact that is matched against "if-then" rules to generate a classification of mental health conditions. This method aligns with the theory of Handayani S et al. (2024), which states that Rule-Based Reasoning is a reasoning method that mimics an expert's decision-making ability through production rules. This stage encompasses knowledge acquisition from mental health literature, knowledge base construction, the inference process, and user interface design. Through these steps, the system is capable of functioning like an expert to assist in the early detection of students' mental health conditions.

3. Output Phase (System Implementation and Testing)

The output phase represents the actual implementation of the entire system planning and design process in the form of a prototype website for the early detection of depression and anxiety. The website features a simple, mobile-friendly interface designed for ease of use by adolescents. The choice of green as the dominant color is based on research by Janeczko et al. (2023), which indicates that green has a restorative effect capable of calming the mind and reducing stress. Furthermore, the minimalist design aligns with the preferences of Generation Z—who tend to favor systems that are easy to navigate—as noted in research by Qin et al. (2024).57

This study also introduces novel elements: a feature recommending specialist services and mental health educational videos. The specialist service recommendation feature provides information on clinics, hospitals, psychologists, and psychiatrists as a follow-up to screening results, in accordance with research by Moore et al. (2022).46 Meanwhile, the mental health educational video feature serves as an early intervention for students, based on research by Takagaki et al. (2022) and Osman et al. (2022).48 With these features, the system functions not only as a detection tool but also serves preventive and curative purposes.

The system categorizes screening results into three groups: no detection, mild risk, and severe risk. While the majority of users fall into the "no detection" category, there are also users in the mild and severe risk categories who require further attention. The system also limits screening frequency to once every seven days, based on the "golden time" concept derived from consultations with mental health expert Tifanny Gita Sesaria, S.Kep., Ns., M.Kep. This restriction aims to prevent result bias caused by repeated submissions within a short timeframe and to encourage users to seek professional follow-up.

In the final stage, usability testing was conducted using the System Usability Scale (SUS) with 81 respondents. Test results showed an average score of 75.77, placing the system in the "Acceptable Usability" category as it exceeded the minimum standard of 68.44. These results indicate that the system meets requirements regarding ease of use, interface clarity, access speed, and user comfort, making it suitable for use as a tool for early mental health detection in schools.

4. System Advantages and Limitations

The developed mental-emotional health early detection system offers several advantages. It enables rapid, automated detection, making the process more efficient for both students and guidance counselors. The system employs a Rule-Based Reasoning method, allowing for specific decision-making based on combinations of symptoms. Furthermore, it utilizes the MMYS V.1 instrument, which

has been proven valid and reliable. SUS testing results indicate a good level of usability. The system also provides immediate solution recommendations through educational videos and referrals to clinics. Being web-based, it is accessible anytime and anywhere, while also allowing administrators or guidance counselors to monitor student data in a structured manner.

However, the system still has certain limitations. The scope of detection remains basic, as the assessment is limited to six symptom-related questions. Screening results serve only as preliminary indications rather than medical diagnoses, meaning professional consultation is still required. The system relies heavily on user honesty when completing the questionnaire. Additionally, it lacks a feature to track the user's condition over time. As it is currently a prototype, the system has not yet been widely implemented and requires an internet connection for operation.

Conclusion

Based on the research findings regarding the website prototype for the early detection of depression and anxiety in adolescents—developed using the Mini Mindhear Youth Scale Version 1 (MMYS V.1)—it can be concluded that the system development was successfully executed through systematic input, process, and output stages. In the input stage, user requirements were identified through questionnaires, observations, and interviews with guidance and counseling teachers. Analysis revealed that conventional screening methods still face limitations regarding time efficiency, data processing, and continuous monitoring; thus, there was a need for a web-based system that is user-friendly, fast, and informative.

In the process stage, user requirements were translated into a system design utilizing use case diagrams, Entity-Relationship Diagrams (ERDs), and flowcharts, alongside a Rule-Based Reasoning method to classify users' mental conditions based on "if-then" rules. The MMYS V.1 instrument employed in the system proved valid (calculated r > table r of 0.216) and reliable (Cronbach’s Alpha of 0.683), ensuring a sound basis for measurement.

In the output stage, the prototype was successfully implemented as a website capable of performing automated screening, displaying risk categories (undetected, mild risk, and severe risk), and providing recommendations such as mental health education and professional service referrals. Testing using the System Usability Scale (SUS) with 81 respondents yielded an average score of 75.77, placing it in the "acceptable usability" category. The system also limits screening to once every seven days, thereby functioning as an early detection tool rather than a diagnostic tool. Overall, the developed system meets the technical and functional requirements for supporting the early detection of adolescent mental health issues.

Based on these findings, it is recommended that the system be utilized periodically within guidance and counseling services to monitor students' mental health continuously. Future development should aim to incorporate automated notification features for counselors, enhance data security through stronger encryption and authentication, and expand the system's implementation across various educational institutions. In addition, educational content and professional reference information need to be updated regularly to remain relevant and accurate.

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