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Web-Based Counseling Skills Evaluation Information System Using Design Science Research Methodology (DSRM) Approach

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ABSTRACT

This research presents the development of a web-based counseling skills evaluation information system using the Design Science Research Methodology (DSRM) approach. The DSRM approach was utilized to design and develop an effective and efficient information system that meets the requirements of the counseling profession. The research discusses the six stages of DSRM, which include problem identification, solution design, construction, evaluation, communication, and reflection, and how they were used to develop the system. The evaluation stage involved conducting empirical studies to assess the system's effectiveness in supporting counseling skills evaluation. The article concludes that the DSRM approach was effective in developing a web-based counseling skills evaluation information system that meets the needs of the counseling profession. This web using PHP, MySQL and Youtube API. The testing software using blackbox and beta testing. the final results of the study show the level of success of the system in facilitating the process of assessing and evaluating basic counseling skills.

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1. INTRODUCTION

Counseling skills are essential for individuals who are working in fields that require them to provide emotional support and guidance to others [1]. Counseling skills are used in a wide range of settings, including schools, hospitals, community centers, and private practices [2]. These skills involve active listening, empathy, non-judgmental attitude, and problem-solving abilities [3]. Counseling skills are essential for individuals who are working in fields that require them to provide emotional support and guidance to others. Active listening, empathy, non-judgmental attitude, and problem-solving abilities are essential skills for counselors to have to be effective in their roles. By developing these skills, counselors can provide the support and guidance their clients need to overcome their problems and improve their lives [4].

Despite the existence of practicum courses on Basic Counseling Skills in Indonesia, the lack of a standardized evaluation and supervision instrument hinders the accurate measurement of students' mastery levels in the course. Currently, the process of evaluation and supervision for the Basic Counseling Skills practicum course is still carried out manually by the responsible lecturers [5]. The evaluation and supervision process may be subjective at times, leading to a less efficient

and effective process. Additionally, there may be inadequate record-keeping and verbal feedback that is not detailed enough. The statement suggests that subjective refers to a scenario where two lecturers evaluate students' proficiency in basic counseling skills and arrive at different results. This indicates that the assessment is not objective and may be influenced by the individual perspectives, biases, or preferences of the lecturers. Therefore, the results may not accurately reflect the students' actual level of mastery of counseling skills. When a process is done manually, it tends to be less efficient and effective in terms of time. Additionally, the results obtained by students may not accurately describe the situation because they do not use valid and reliable measuring instruments. Due to relying solely on the memory of the lecturer, the recording has not been accurately documented and may contain aspects that were overlooked during evaluation and supervision. Due to the lack of a standardized instrument for categorization, the statement lacks detail in effectively conveying the level of student mastery, whether it be at a skilled, medium skilled, or unskilled level.

The use of technology-based evaluation and supervision tools is crucial for enabling the implementation of practicum programs that are flexible, easily accessible, and adaptable to the current learning conditions [6]. The advantages of using computer-based evaluation in assessment can be divided into five main categories [7] (1) the richness of the interface, the use of graphics allows the presentation of content to be more easily understood according to the specific needs of individuals; (2) computer-based evaluation and supervision that uses the internet, has a diverse population coverage because individuals have easy access efforts; (3) errors in administration, which can lead to bias, are minimized; (4) has a faster scoring time, and greater accuracy; and (5) the quantity and quality of writing is better than the conventional method using paper.

The Design Science Research Method (DSRM) will be employed to develop a program that can be utilized for the evaluation and supervision of counseling skills in this research. Design Science Research Method (DSRM) is a research methodology used to develop and evaluate the effectiveness of new artifacts such as information systems, processes, and products. DSRM is a problem-solving approach that focuses on designing solutions to real-world problems through a process of iterative design and testing [8].

The reason the DSRM was selected is because of its capacity to incorporate the strengths of existing methods and merge them into a fresh creation that brings advantages to organizations. Employing the DSRM to analyze the counseling skill evaluation is an innovative and unprecedented approach, as no relevant papers on this topic have been discovered. Illustrations of the DSRM expanding into other unexplored domains include enhancing the development of decision support systems (DSS) within organizations [9], refining construction purchasing procedures [10], and enhancing work-flow ergonomics [11]. All three of these instances adhere to the DSRM in order to devise practical solutions to real-world challenges.

DSRM has six stages, which are problem identification, solution design, construction, evaluation, communication, and reflection. These stages involve developing a clear understanding of the problem, designing a solution, building and implementing the solution, evaluating its effectiveness, communicating the results to stakeholders, and reflecting on the research process and outcomes [12].

The purpose of this advanced learning innovation development research is to create an innovative, efficient, and standardized evaluation and supervision model application program. This study will focus on the development of a website-based evaluation and supervision system, which will involve system design, testing, and integration. The system is web-based and utilizes multi-agent technology with a client/server approach for database access and information delivery to users, enabling them to carry out their work effectively.

2. RESEARCH METHOD

Research methods refer to the systematic approach used by researchers to collect and analyze data to answer research questions. The Design Science Research Method (DSRM) is a research method that combines principles of design and research methodology to develop and evaluate innovative solutions to complex problems.

DSRM involves six stages, namely problem identification, solution design, construction, evaluation, communication, and reflection as shown in Figure 1. Each stage is designed to ensure that the research is rigorous and that the solutions developed are effective and meet the user's requirements.

1. Problem Identification:

The first stage of DSRM involves identifying the problem that the research seeks to address. The researcher must gather information about the problem's context, stakeholders, and the existing solutions.

2. Solution Design:

The second stage involves designing a solution that addresses the problem identified in the first stage. The researcher must develop a conceptual model that describes the proposed solution's components and their relationships.

3. Construction:

The third stage of DSRM involves constructing the solution using appropriate software development methodologies and tools. The researcher must ensure that the solution is developed according to the design and meets the user's requirements.

4. Evaluation:

The fourth stage of DSRM involves evaluating the solution's effectiveness and contribution to the field. The researcher must conduct empirical studies to assess the solution's impact on the user's performance and satisfaction.

5. Communication:

The fifth stage of DSRM involves communicating the research findings and recommendations to the relevant stakeholders. The researcher must present the research findings and recommendations to the user community, academic researchers, and practitioners in the field.

6. Reflection:

The sixth and final stage of DSRM involves reflecting on the research process and outcomes. The researcher must assess the success of the research and identify any areas for improvement.

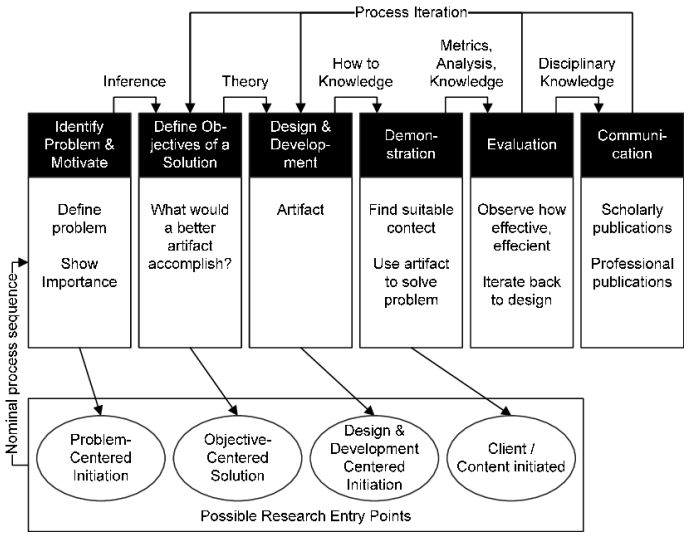

Figure 1. Design science research method [13]

In conclusion, developing an information system web-based using design science research method is a rigorous approach that requires a combination of skills in information systems design and research methodology. DSRM is an iterative process that involves problem identification, solution design, construction, evaluation, communication, and reflection. By following the DSRM approach, researchers can develop effective and efficient information systems that meet the user's requirements and contribute to the field of information systems research.

3. RESULTS AND DISCUSSION

Problem Identification: The first stage of DSRM involves identifying the problem and defining the objectives of the project. In this section describe about the existing system, user requirements, and the context of the system's use. The existing system are 1) Students carry out a counseling simulation 2) Lecturers carry out direct assessments 3) Students receive the results of the assessment. Non-functional requirements analysis describes the system support requirements needed to run the software being built [14]. The non-functional requirements analysis that will be made consists of an analysis of software requirements and an analysis of hardware requirements [15] as shown in the table 1, 2, and 3 below.

Table 1. Minimum Computer Hardware Specifications

No	Hardware	Spec.
1	Processor	2.3 GHz
2	Memory	4 GB
3	Storage	150 GB
4	LED Monitor	10 Inch

Table 2. Minimum Computer Software Specifications

No	Hardware	Spec.
1	Operating System	Windows 10
2	Browser	Google Crhome
3	Web Server	Xampp v3.2.2
4	Text Editor	Visual Studio Code

Table 3. User Knowledge and Experience

No	Hardware	Spec.
1	Task Structure	High
2	Social Interactions	High
3	Primary Training	None
4	Job Category	Traveler
5	Frequency of Use	Low
6	Task or Need Importance	Medium

Solution Design: The second stage of DSRM involves designing a solution that addresses the problem and meets the user's requirements. In this section must develop a conceptual model that describes the system's components and their relationships. The system architecture [16] depicted in Figure 2 demonstrates that the client area is comprised of a frontend website that serves as the main interface [17] for both lecturers and students. On the other hand, the server area is divided into three distinct components: the web server, the system logic environment, and the MySql [18].

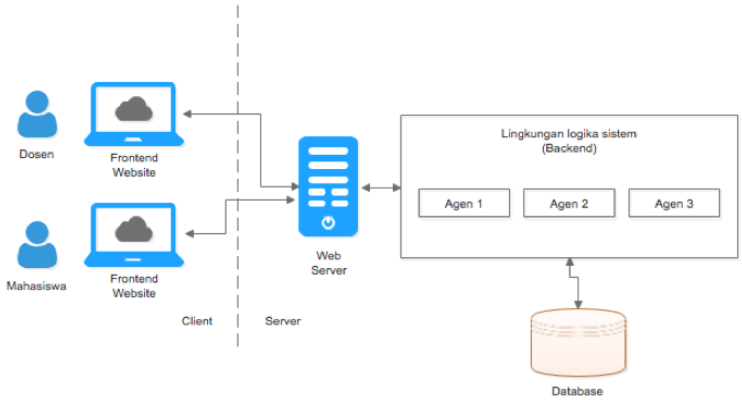

Figure 2. Architecture System's Components and Their Relationships

Construction: The third stage of DSRM involves constructing the system using appropriate software development methodologies and tools. In this section describe about analysis of context diagram system, database design, and user interface design. The creation of this system employs a structured programming methodology, which entails utilizing context diagrams and data flow diagrams (DFDs) for system modeling. A context diagram in Figure 3 is essentially a visual representation that outlines the system's boundaries and interactions with its surroundings [19]. The diagram typically comprises a circle that represents the system, and a square that represents external entities. The interaction between the system and its surroundings is depicted through data flows, which are represented by arrows that show the direction of input or output. In this case, the diagram illustrates the flow of information for the Web Application, from the system that is yet to be constructed. In figure 4, during the database design stage, the tables are conceptualized, but in NoSQL databases, they are referred to as collections. These collections have distinct document structures, and thus, the document structure design is carried out for each collection [20]. In addition to designing tables, this stage entails designing the document structure of each collection that has been identified. In figure 5, interface design refers to a visual representation of a program's display, presented in the form of a design or mockup [21], which will eventually be integrated into the program or application during its development. The application that has been developed includes the interface design that was previously created.

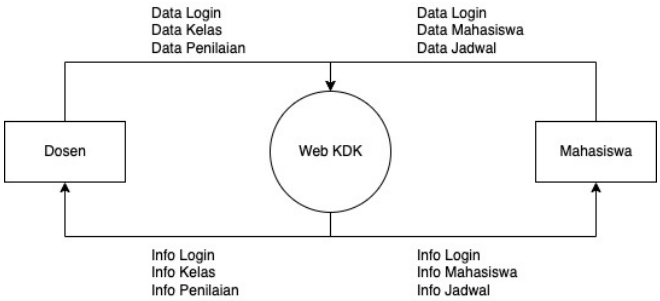

Figure 3. Context Diagram System

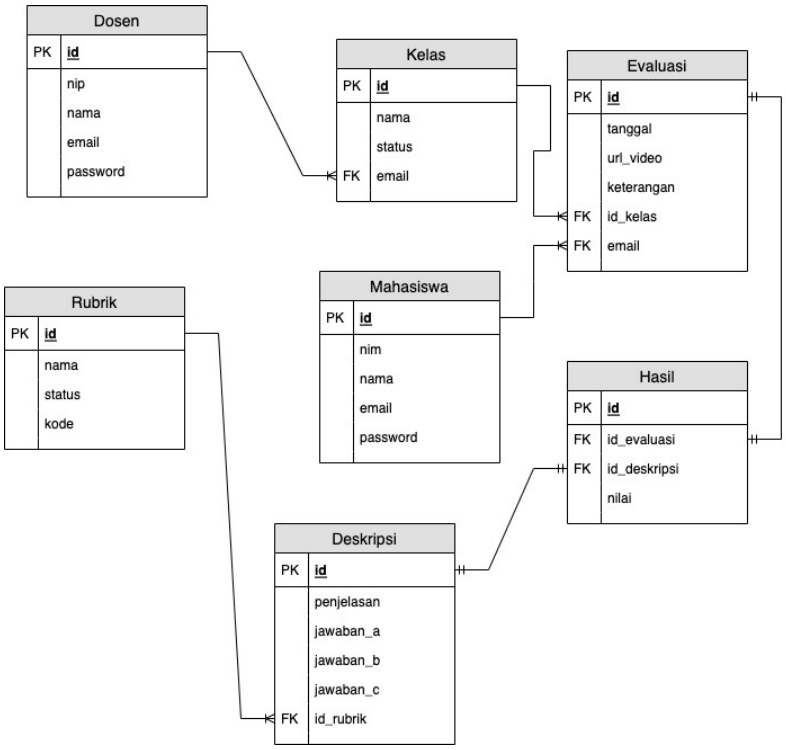

Figure 4. Database Design

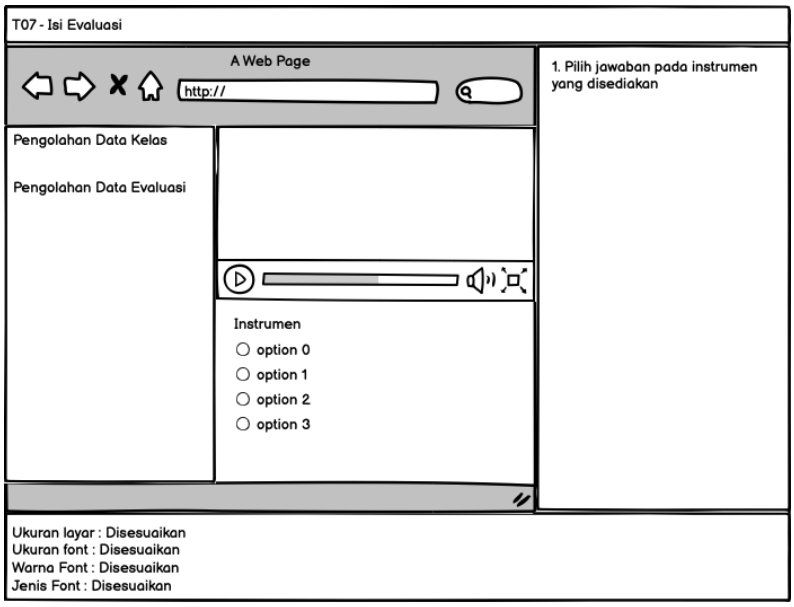

Figure 5. Interface Design System

Evaluation: The fourth stage of DSRM involves evaluating the system's effectiveness and contribution to the field. In this section describe the testing scenarios and evaluation of system. The crucial phase of the KDK application development process is the system testing stage, where the primary objective is to detect any defects or inadequacies present in the application. The main aim of this stage is to ascertain whether the application built satisfies the application design goals or not. This stage employs a variety of testing strategies such as alpha testing (black-box) and beta testing, to identify and eliminate any issues that may arise in the application system [22].

The appearance and usability of each page's functions are described by the implementation of the interface, and the resulting software's [23] look can be viewed in the image as shown in figure 6 below.

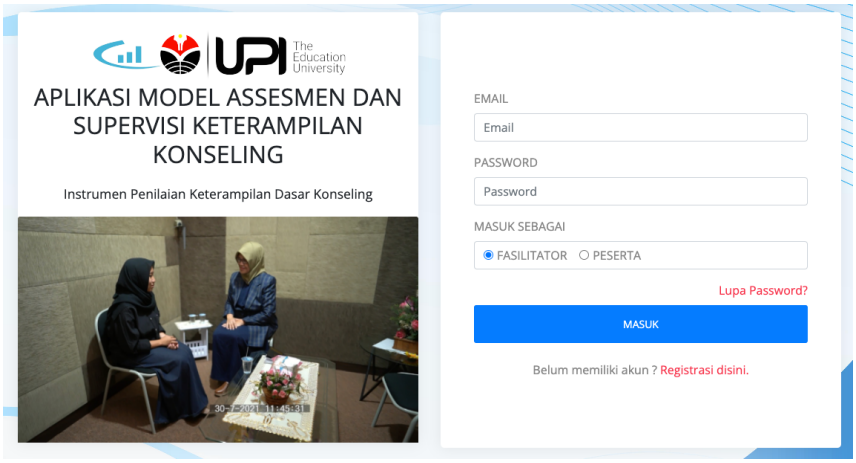

Figure 6. Login Page

To be able to log in to the application as shown in figure 7, the user must first fill in: 1. Enter the email that was registered during registration 2. Enter the password that was registered during registration 3. Select the type of user who will log in 4. Click the blue MASUK button 5. If you forgot your password, you can click Lupa Password?

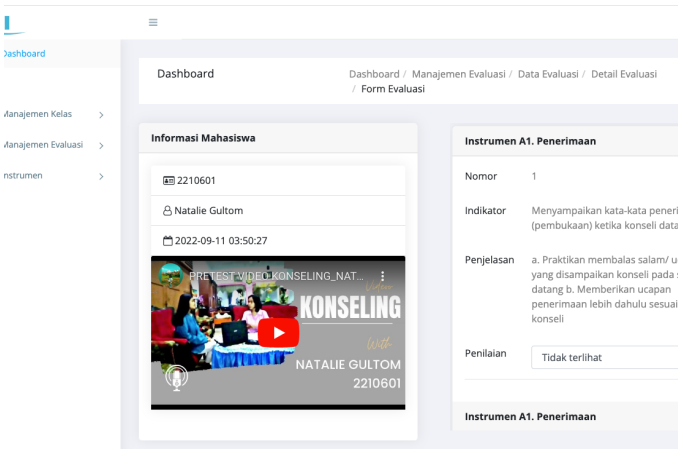

Figure 7. Evaluation Page

This page is used to start the instrument-based evaluation assessment process. 1. There is student account information 2. There is a practice video as an assessment material 3. Instrument charging.

The test results display the results of the tests carried out according to the test plan and scenario. The results of this test are divided into two, namely the results of functionality testing and the results of beta testing. Testing is of utmost importance in the development process and often incurs additional charges in the subsequent stages. Evaluation serves as a crucial component in the development of an information system as it determines the suitability of the requirements. In this particular case, the testing and evaluation methods adhere to established software testing standards, such as black-box testing. The utilization of black-box testing enables the assessment of the proposed information system's performance through a series of steps. The table 4 below presents the design parameters employed in the testing of the information system in accordance with the requirements.

Table 4. Testing Result

No	Scenario of Test	Expected Result	Observation	Result
1	Registration	System displays the main menu	Main menu appears	Accepted
2	Login	System displays the main menu	Main menu appears	Accepted
3	Create Class	The system displays the added class data	Added class data appears	Accepted
4	Create Evalution	The system displays the evaluation class data	Added evaluation data appears	Accepted
5	Assesment of Evaluation	The system displays the assement data	Added assessment data appears	Accepted

4. CONCLUSION

In conclusion, the article presents the development of a web-based counseling skills evaluation information system using the Design Science Research Methodology (DSRM) approach. The DSRM approach was utilized to design and develop an effective and efficient information system that meets the requirements of the counseling profession. The six stages of DSRM were utilized to develop the system, including problem identification, solution design, construction, evaluation, communication, and reflection. The evaluation stage involved conducting empirical studies to assess the system's effectiveness in supporting counseling skills evaluation. The article concludes that the DSRM approach was effective in developing a web-based counseling skills evaluation information system that meets the needs of the counseling profession. This system can be a valuable tool for counselors to evaluate and improve their skills, ultimately benefiting their clients. Overall, this article provides important insights into the use of DSRM in developing web-based information systems for the counseling profession.

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