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Web-Based Knowledge Management System Application to Improve Employee Activities

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ABSTRACT

The need for information is very high in the current 4.0 era, every organization needs fast, accurate and detailed information. Currently there is documentation at the Indonesian Medical Council Secretariat regarding knowledge on how to handle employee problems which can help the employee's own performance so that it has an impact on secretariat activities that feel ineffective. Based on the results of the analysis that has been carried out, there is a lot of important knowledge at the Indonesian Medical Council Secretariat whose function is to support activities in Health Institutions. The methodology used in this research is to use Beccera Fernandez which was developed by Beccera and Sabherwal. The data collection methods used were observation, interviews, literature study, while the Knowledge Management System implementation used the Knowledge Management Process, and the KMS design used the Unified Modeling Language (UML) modeling. The programming languages used in building the system are PHP and MySQL. The concept of knowledge sharing among employees was applied as a result of a study conducted at the Indonesian Medical Council Secretariat. This is implemented on the website so that individual employee knowledge is not simply lost.

1. Introduction

In the current era, technology evolves rapidly over time. The invention of advanced technology that supports human work so that it can be done easily without consuming energy.

Knowledge management becomes a fundamental role when institutions and companies want to manage and store knowledge in a structured way. Fernandez explained that knowledge management has four triggers. These include the need to avoid costly repetitive mistakes, the need to prevent unnecessary rediscovery, the need to predict accurate forecasts, and the emerging need for competitive answers.[1]

The government has implemented bureaucratic reforms in all ministries, independent agencies/committees to accelerate good, efficient and speedy governance. In order to realize these together, it is necessary for each agency and independent agency to be ready to take advantage of the wealth of knowledge that each person has. Knowledge management is also an attempt to improve organizational ability to manage assets in the form of knowledge. The main goal of managing knowledge management is to accelerate the achievement of the goal of implementing bureaucratic reform. Guidelines for implementing knowledge management for independent ministries/institutions have been set by Permenpan. [2].

The Indonesian Medical Council Secretariat is a supporting element in the exercise of the duties and powers of the Indonesian Medical Council, including the management of the licenses of doctors, dentists, specialists and dentists.[5] The Indonesian Medical Council Secretariat also recognizes the importance of documenting data and information for the continuity of the agency's activities. It has learning process and problem-solving capabilities that can support employee performance through repeated failures.[11] The importance of a knowledge management system is urgently needed to alleviate the problems of employees sharing knowledge and improve the quality of their work.[3]

The absence of knowledge management in the Indonesian Medical Council Secretariat as a forum for working staff to share knowledge and organize

learning is necessary for the competitiveness of the organization to achieve its corporate goals. In this context, researchers at the Indonesian Medical Council Secretariat are trying to design a suitable knowledge management system model to modify tacit knowledge to obtain structured and categorized information. The problem addressed in this study is the implementation of a web-based knowledge management system application that uses information technology to support the needs of the Indonesian Medical Council Secretariat.

2. Literature Review

2.1 Basic of Thinking

The system is a collection of parts that are related to each other and depend and are arranged in such a way as to produce a whole. Studying a system will be easier if you know in advance the definition of the system in question. [4]

After being described openly regarding the definition of the system, in general the system is a set of elements that are interrelated or integrated which are intended to achieve a goal of providing information in decision making.

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2.2 Definition of Knowledge Management System

According to Beccera-Fernandez in his definition of knowledge, states that "Knowledge is quite distinct from data and information, although the three terms are sometimes used interchangeably" [3] . There are four processes in Knowledge management namely discovery, capture, sharing and application.

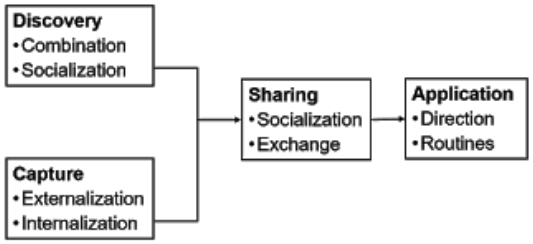


Figure. 1 *Knowledge Management Process*

a. Discovery. Knowledge discovery is the creation of new knowledge, both explicit and tacit. Development of this knowledge can be done by analyzing data and information or by combining existing knowledge. The sub-processes in knowledge discovery are: 1. Combination is making explicit knowledge using existing knowledge, available data or information. 2. Socialization is the development of tacit knowledge obtained from other individuals
b. *Capture.* It is the process of retrieving knowledge from storage within a person or organization. There are two sub-processes in Capture: 1. Externalization is related to the conversion from tacit into explicit forms such as words, concepts or visuals. 2. Internalization process to change explicit to tacit. This process is the opposite of externalization, the goal is to make it easy for other employees to understand in terms of learning, for example in viewing manual books or simulations and experiments.
c. *Sharing.* Is a process when explicit or tacit knowledge is shared with others. There are sub-processes in Sharing, namely: 1. Socialization for Knowledge Sharing. The process of sharing tacit knowledge. 2. Exchange. The process of sharing explicit knowledge.
d. *Application.* Is the application of knowledge management to business processes. In the Application there are two sub-processes, namely: 1. Directions. The process by which the individual receives directions or orders to do something. There is no knowledge transfer process that underlies the direction of the action. 2. Routines. Use of knowledge contained in procedures, norms and regulations.

2.3 System Coding

In this phase the coding system is created. It is based on user-agreed web-based results translated into programming languages. For this study, researchers used the PHP programming language with the latest version of the Laravel framework. Laravel is a framework based on the PHP programming language that can be used to support and optimize the website development process. Using Laravel makes the resulting website more dynamic. [9] The existence of the Laravel framework makes the PHP programming language more powerful.. The Laravel framework uses the MVC (Model View Controller) structure. MVC is an application model that separates data and views based on application components. The MVC model makes it easier for Laravel users to learn Laravel. It also speeds up the process of creating web-based applications. Many companies and developers choose Laravel for its benefits and flexibility in supporting their website-based application development process. Suitable for a wide range of companies from SMEs to large corporations. Apart from that, the application

development uses MySQL for the database system and also Bootstrap for rendering the website. [10]

2.4 User Acceptance Test

According to perry, user acceptance testing is testing performed by end users, who are employees or employees interacting directly with the system, and that existing functionality is being performed according to their needs and capabilities. to validate.

User Acceptance Testing, as defined above, is a test performed by the users of the system to ensure that the functions within the system are performing properly according to the needs of the system users. [7]

3. Methodology and Design/Research Design

3.1 Research Method

This study uses a qualitative descriptive research method with a case study method which aims to get a detailed and in-depth description of the object that has been studied, namely Indonesian Medical Council Secretariat.

3.2 Data Analysis Technique

Data analysis in this study began with observations to arrive at problems that existed in the Indonesian Medical Council Secretariat. We conducted interviews with the structure department based on the results that were converted into data, and confirmed that the obtained data corresponded to the current situation. The next step is to create a KMS model based on insights gained from previous research.

3.3 Knowledge Management System Model By Beccera Fernandez

The framework or model used in this study is the model framework developed by Beccera-Fernandez.

Table 1 Contingency Factor (Beccera-Fernandez dan Sabherwal)

	KM Processes							
Contingency Factors	Combination	Socialization for knowledge discovery	Socialization for knowledge sharing	Exchange	External-ization	Internalization	Direction	Routines
Task uncertainty	Low	High	High	Low	Low	Low	High	Low
Task interdependence	High	High	High	High	Low	Low	High/low	High/low
Explicit (E) or tacit (T) knowedge	E	T	T	E	T	E	T/E	T/E
Procedural (P) or declarative (D) knowledge	P/D	P/D	P/D	P/D	P/D	P/D	P	P
Organizational size	Small/large	Small	Small	Large	Small/large	Small/large	Small	Large
Business strategy (Low cost—LC; Differentiation—D)	D	D	LC/D	LC/D	LC/D	LC/D	LC	LC
Environmental uncertainty	High	High	Low	Low	Low	Low	High	High
Information								
T : Tacit Knowledge			**P : Procedural Knowledge**				**LC : Low Cost**	
E : Explicit Knowledge			D : Decklaratif Knowledge				D : Differentiation	

Contingency factor analysis is highly recommended with the methodology used, the purpose is to obtain identification of the KM solution, the following seven sequences: 1. Assess the contingency factor. 2. Identification of knowledge management processes based on each contingency factor. 3. Priority required knowledge management process. 4. Identify existing knowledge management processes. 5. Identify the needs of the current knowledge management process. 6. Assess the knowledge management infrastructure and identify the sequential ordering of the knowledge management process. 7. Building systems, mechanisms and technology for knowledge management.

In the table of contingency factors, the tendency of the dominant contingency factor in the organization is selected. The dominant contingency factor that is in accordance with organizational conditions then gives a different sign to be given a value in the priority analysis of knowledge management process needs.

4. Results And Discussion

4.1. Identify KM Processes Based on Contingency Factors

Based on the results of the identification that has been carried out, it can be concluded from the results of the assessment in the table below :

Table 2 Contingency Factor Assessment Results

Contingency Factor	Grade
Task Uncertainty	Low
Task Interpedence	High
Tacit/Explicit	Tacit
Declarative / Procedural	Procedural
Organization size	Small
Business Strategy	Differentation
Enviromental Uncertainty	Low

By using the contingency factor assessment table above that was proposed by Fernandez, the results of the contingency factor assessment obtained are then entered into the table as shown in the table below.

Table 3 Analysis of Knowledge Management Process Needs

KM Process	*Contingency Factors*							
	Combination	**Socialization for Knowledge Discovery**	**Socialization for Knowledge Sharing**	**Exchange**	**Externalization**	**Internalisation**	**Direction**	**Routiners**
Task Uncertainty	No	Yes	Yes	No	No	Yes	No	No

Task Interdependence	No	No	No	No	Yes	Yes	Ok	Ok
Knowledge (tacit vs explicit)	No	Yes	Yes	No	Yes	No	Ok	Ok
Knowledge (Procedural vs Declarative)	Ok	Ok	Ok	Ok	Ok	Ok	Yes	Yes
Organization Size	Ok	Yes	Yes	No	Ok	Ok	Yes	No
Business Strategy	Yes	Yes	Ok	Ok	Ok	Ok	No	No
Environmental Uncertainty	No	No	Yes	Yes	Yes	Yes	No	No
Total 'Yes'	1	4	4	1	3	3	2	1
Total 'Ok'	2	1	2	2	3	3	2	2
Total 'No'	4	2	1	4	1	1	3	4
Priority Cumulative Value (Yes=1; Ok=0,5; No=0)	2.0	4.5	5.0	2.0	4.5	4.5	3.0	2.0

From the table that has been processed, the cumulative results are obtained for each KM process. Then the value of each KM process will get the priority of its needs and if it is sorted by rating it will be as shown in table [1] below.

4.2. Prioritize the required KM Processes

Table 4 Priority Requirement Knowledge Management Process

Contingency Factor KM Process	Cumulative Value	Ranking
Socialization for Knowledge Sharing	5.0	1
Socialization for knowledge discovery	4.5	2
Externalization	4.5	2
Internalization	4.5	2
Direction	3.0	3
Combination	2.0	4
Routines	2.0	4
Exchange	2.0	4

Priority according to Fernandez is indicated by a cumulative score greater than 3.0 for each KM process requirement. The table of priority KM process requirements shows that the priority KM processes are socialization for knowledge sharing, socialization for knowledge discovery, externalization, and internalization. The next KM process is direction, combination, routines and exchange. [1]

4.3. Use Case Diagram

At this point, from the results of identifying the functional requirements of the knowledge management system of the Secretariat of the Indonesian Medical Council which have been explained, then these needs are modeled using a use case diagram [6] which can be seen in the image below

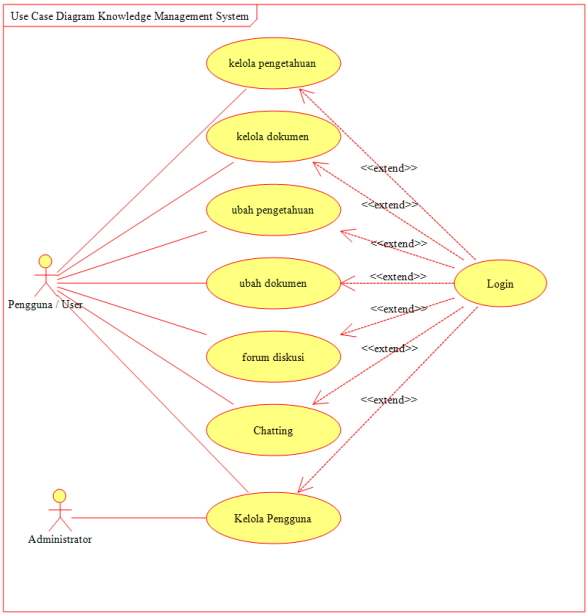


Figure. 2 Knowledge Management System Use Case Diagram

The use case diagram above shows the need for a knowledge management system for the Secretariat of

the Indonesian Medical Council, which will then become a model for the knowledge management system for the Secretariat of the Indonesian Medical Council. There are 6 functional use cases and 1 management use case for administrators. Each use case requires a login as authentication. The use case function for seeking knowledge has been able to represent the use case of the library, so the features of the library are not used in this knowledge management system.

4.4. Class Diagram

The database design for this knowledge management system is described in the form of a class diagram as follows [6]:

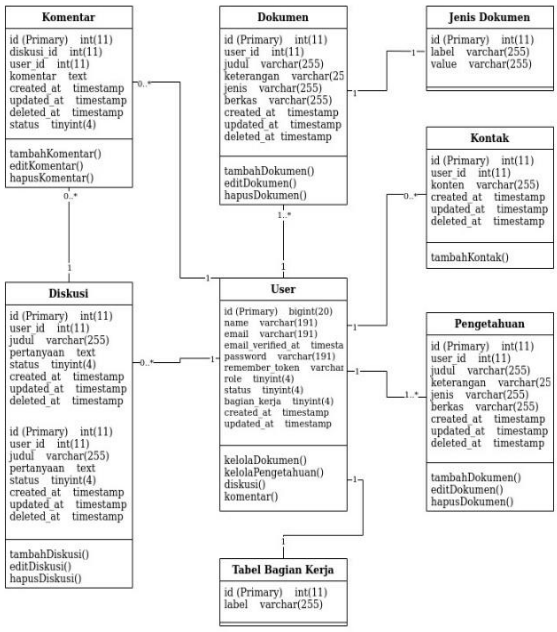


Figure. 3 Class Diagram *Knowledge Management System*

4.5. System Implementation

A. Main Menu Display

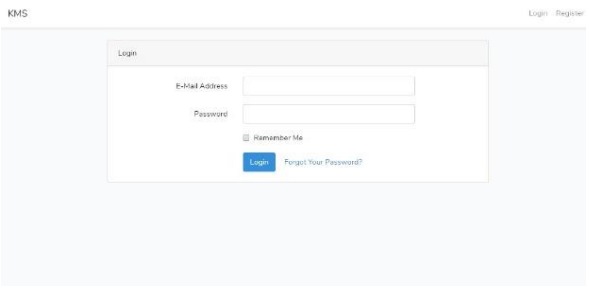


Figure. 4 Main Menu Screen Display

This page is the initial display for logging in either as an administrator or as a user. [9]

B. View of Manage Knowledge Menu Display

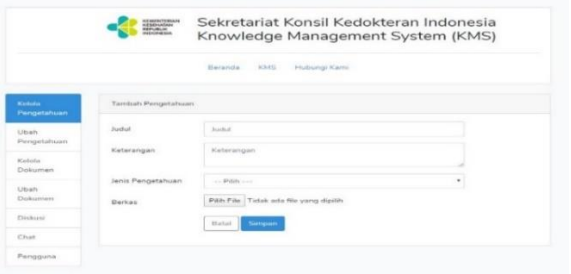


Figure. 5 Knowledge Management menu

The menu on knowledge management has options to increase knowledge. Knowledge that can be added is divided into articles, ebooks. [9]

C. Manage Document Menu Display

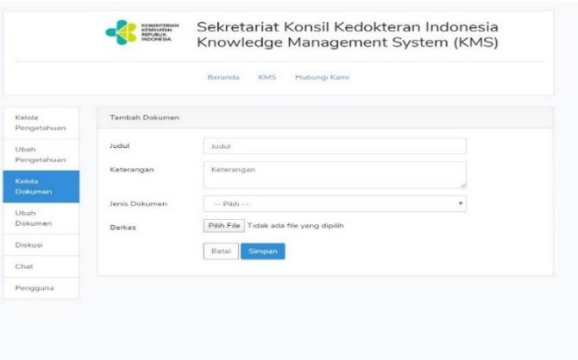


Figure. 6 Manage Document Menu Display

The document manage menu has the option to add documents. The added documents are divided into standard operational procedures, ministerial regulations, activity reports, budget realization reports and others. [9]

D. Change Knowledge Menu Display

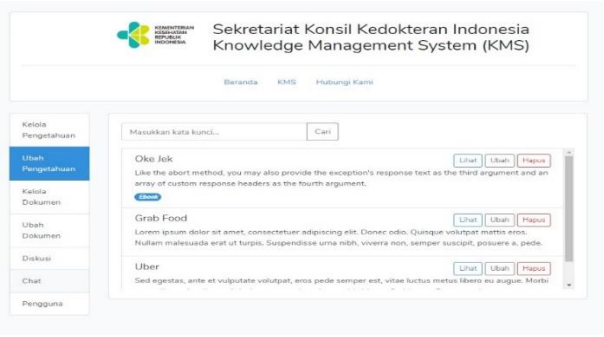


Figure. 7 Change Knowledge Menu Display

The change knowledge menu is used to search for knowledge which is done by entering keywords, then it is also used to change and delete the type of knowledge that has been stored. [8]

E. Change Document Menu Display

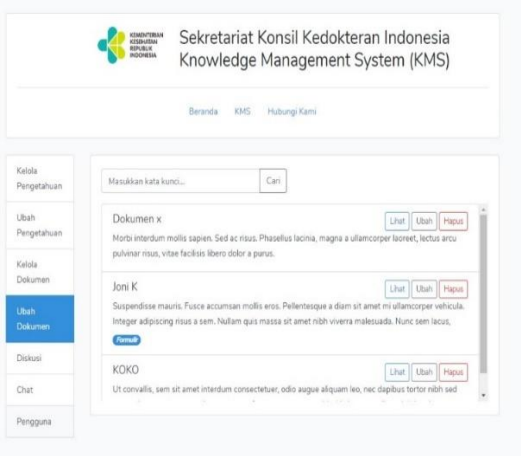


Figure. 8 Change Document Menu Display

The edit document menu is used to search for documents by entering keywords, then it is also used to change and delete the type of document that has been saved. [8]

F. Forum Discussion Menu Display

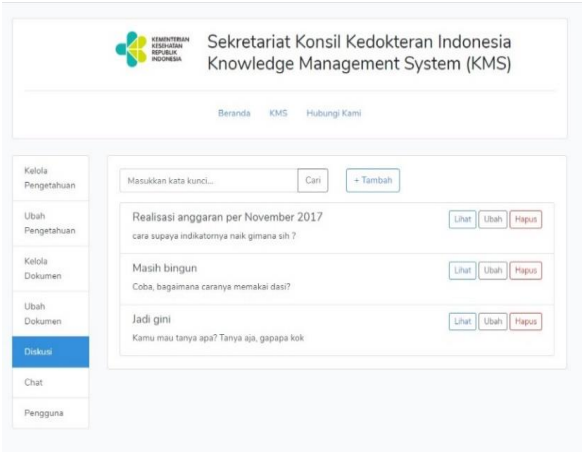


Figure. 9 Display Forum Discussion Menu

On the discussion forum menu there are options to create topics, delete topics, can also add comments, and delete comments. To create a topic, users can immediately write down the criteria for what type of topic to create. To delete a topic, users can first search for a topic by writing down the criteria for the topic keywords they want to search for. [8]

G. Display Chat Menu

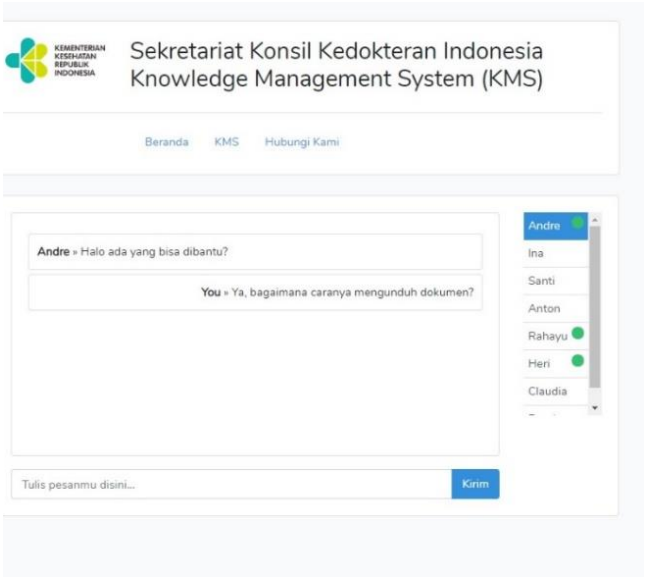


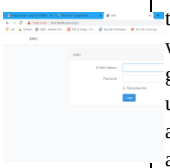
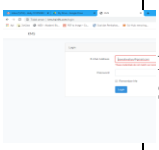
Figure. 10 Chatting Menu

The chat menu is used to start online conversations with other users who are currently accessing the knowledge management system of the Secretariat of the Indonesian Medical Council. Users can chat by selecting other users in the list of users who are currently accessing the knowledge management system.

4.6 System Testing

System testing is carried out by verifying the features in the knowledge management system of the Secretariat of the Indonesian Medical Council. The purpose of this test is to test whether the system is in accordance with what is expected. in testing given a questionnaire to 30 respondents representing each section. The test cases carried out can be seen in the following table below [7]: In the integration testing section it explains that the integration testing process between menus in the application is described in the table below.

Table 5 Integration Testing Table

No.	Testing Name	Before Testing	Testing Input	After Testing	Conclusion
1.	Login Menu		Entering the wrong username and password		PASS

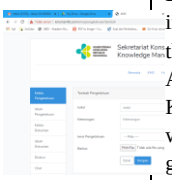
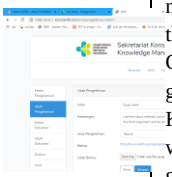
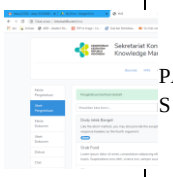
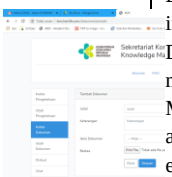
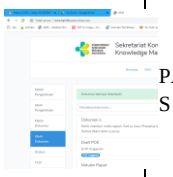
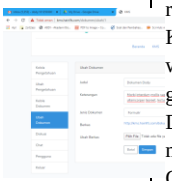
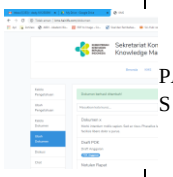
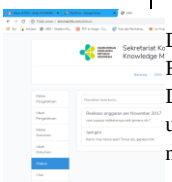
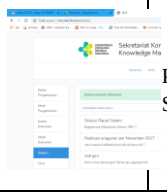
2.	Knowledge Management Menu		Entering the Add Knowledge Form	 PASS
3.	Edit Change Knowledge		Editing the Change Knowledge Form	 PASS
4.	Manage Documents menu		Entering Document Management Input	 PASS
5.	Change Knowledge Document menu		Perform Knowledge Document Changes	 PASS
6.	Menu For Discussion		Do For Discussion	 PASS

Table 6 Questions on User Acceptance Testing testing

No	Question	Respondent's Answer			
		Strongly Agree	Agree	Disagree	Strongly Disagree
1	Will using the KMS application to support the needs of the Indonesian Medical Council Secretariat facilitate the sharing of each individual's implicit and explicit knowledge?	6,7	93,3	0,0	0,0
2	Will using the KMS application at the Indonesian Medical Council Secretariat facilitate the process of sharing each individual's tacit knowledge?	26,7	70,0	3,3	0,0
3	Do you think a web-based KMS application would be very helpful in searching for individual knowledge in the Indonesian Medical Council Secretariat?	26,7	70,0	3,3	0,0
4	Can Indonesian Medical Council Secretariat KMS application users increase their personal knowledge?	30,0	56,7	13,3	0,0
5	Is it easy to search for knowledge when using the KMS app at the medical association secretariat?	30,0	63,3	6,7	0,0
6	With the KMS application at the Indonesian Medical Council Secretariat, you can easily do what you want. Find documents and discuss them with other officemates, etc.?	33,3	60,0	6,7	0,0
7	When you used the KMS app for the first time at the medical association secretariat, was the interaction very user-friendly and easy to use?	16,7	76,7	6,7	0,0
8	When using KMS at the Indonesian Medical Council Secretariat. With the chat function, you can easily discuss and exchange ideas with other office colleagues.	13,3	76,7	10,0	0,0
9.	Using the KMS application at the Indonesian Medical Council Secretariat facilitates the process of exchanging clear knowledge in the form of documents (budgets, meeting notes, etc.).	23,3	76,7	0,0	0,0
10.	Will the use of the KMS application at the Indonesian Medical Council Secretariat facilitate the discussion process of knowledge shared by others?	10,0	83,3	3,3	3,3

5. Conclusion and Suggestion

Based on the results of the research discussed in the previous chapter, the research on the development of a knowledge management system at the Indonesian Medical Council Secretariat can be drawn the following conclusions:

1. This knowledge management system was built with the hope that every employee at the Secretariat of the Indonesian Medical Council can manage existing knowledge and disseminate it easily to all employees

involved, so that the existing knowledge develops and knowledge walkouts do not occur again.

2. The research instrument was designed using a Likert scale of 1-4 and interviews with the heads of each section to find out the current conditions and the process of expectations for the future interests of the organization. This aims to determine the level of readiness to implement the knowledge management system within the Secretariat of the Indonesian Medical Council.
3. To be able to support the process that will be implemented in accordance with the feature mapping process carried out using the Fernandez method, what is needed is a knowledge management system that exists at the Secretariat of the Indonesian Medical Council with features including knowledge management features, knowledge change features, document management features, features change documents, discussion forum features, chat features.
4. The introduction of a web-based knowledge management system is expected to make it easier to share the knowledge held by each employee and support the work of each employee.

Although the implementation of this web-based knowledge management system later makes work easier for some employees of the Indonesian Medical Council Secretariat, there are drawbacks to the implementation of the knowledge management system, which are later identified as minimal weaknesses. It should also be noted that it can be suppressed for further research. Implementation of a knowledge management system including:

1. Hard to find an efficient way to record business-related insights.
2. All information and sources received are at risk of being discovered by others.
3. Increasingly difficult to encourage individuals (among employees) to share, share and apply knowledge.

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