Jurnal Ilmiah Komputer dan Informatika (KOMPUTA)
Edisi. .. Volume. .., Bulan 20.. ISSN : 2089-9033

APPLICATION OF KNOWLEDGE MANAGEMENT SYSTEM FOR NURSING SERVICE IN NURSING DIVISION OF RSUD AL-IHSAN BANDUNG

Muhammad Ari Anggara

Informatic Engineering – Indonesia Computer University
Dipatiukur Street 112-114 Bandung
E-mail : muh.ari.anggara@gmail.com

ABSTRACT

Nursing is one of structural organization in RSUD Al-Ihsan Bandung which has the task of manage nursing services in hospital. Nursing services is an integral part of health patient implementation. Based on the interviews with Mrs. Oom Umriah, S.Kep., Nurses. as Head of Services Section in Nursing Division of RSUD Al-Ihsan Bandung said, that the current nursing process is less than adequate, it is caused by undocumented nursing care properly so that the nurse is hard to find nursing information. The process of knowledge dissemination is carried out through discussion forums are still limited, resulting in a growing knowledge does not directly spread to the nurse.

Based on the problems described above, then we need a system that can store, absorb, distribute and update knowledge for nursing care by applying knowledge management system. The conversion process knowledge is made by the SECI (socialization, externalization, combination and internalization). The process of utilization of knowledge by using text mining method that uses an algorithm TF / IDF and VSM (Vector Space Model).

Based on the test results it can be concluded that the knowledge management system has been quite helpful in this regard Sector Nursing Services Section Head of Head room assisted in managing knowledge for nursing services and assist caregivers in finding and disseminating knowledge directly.

Keywords *: Knowledge Management System, Nursing Services, SECI, Text Mining Algorithm TF/IDF. VSM (Vector Space Model)*

1. INTRODUCTION

The nursing field is one part of the organizational structure of Al-Ihsan Hospital Bandung which has duties and functions to help hospital administrators to manage nursing services. The nursing care is an important part of a health service to patients. Forms of nursing services in the form of meeting the needs of patients in terms of physiological, psychological, social and cultural. For a hospital to manage and develop the nursing services to patients is not an easy thing, as well as the Al-Ihsan Hospital Bandung. The development of the knowledge society is getting smarter in assessing the quality of services provided, making the hospital the need for creating good-quality nursing care to the level of public trust in a hospital maintained. Currently, there has been a paradigm shift, especially in how to manage resources at the level of the organization / institution which includes hospitals, by placing knowledge as a resource that must be managed. Nurses, as the executor of nursing services have different knowledge in performing nursing care, although in accordance with the procedure provided. This can occur due to several factors such as differences in tenure, experience, habits, and knowledge of various seminars or training which have been followed by each nurse. Differences such knowledge will greatly affect the quality of nursing care to patients in the hospital, so the handling is good and true through the management of nursing knowledge will be very helpful in terms of managing its resources.

Based on the background described above, it can be concluded that the formulation of the problem is how to implement a knowledge management system in the field of Nursing Hospital Al-Ihsan Bandung to help manage and supervise the nursing knowledge in patient care in the form of repository nursing documentation that can be managed and reused as an attempt improving the quality of health care by nurses to patients, with the goal to be achieved are as follows:

1. Assist the Field of Nursing in this case the Head of Nursing Services Section assisted the Head of room to spread knowledge of nursing such as nursing care documentation results conducted by nurses , so the document can be structured in the field of nursing and can be reused by the user in the Field of Nursing itself.
2. Assist nurses in making , storing and updating the results of nursing care documentation and

find a solution in nursing from the nursing care documentation stored .

3. Facilitate the dissemination of knowledge directly through a discussion forum for all nurses in each work unit

2. THEORITICAL BASIC

2.1. *Knowledge Management System*

Knowledge management system is a tool to manage knowledge (knowledge) in the organization, including the arrest of the cultural habits of communication between personnel, provide opportunities for learning and promoting the sharing of knowledge. Where the business is going to create and sustain an increase in the value of the core business competencies by leveraging existing information technology. This is excerpted from Batgerson opinion [7] as follows :

"Knowledge management is a systematic approach to managing intellectual assets and other information sheingga competitive advantage for the company " .

2.2. 10 *Steps Roadmap* Amrit Tiwana Method

Knowledge management is a complex activity and such other things as well that there will be a positive impact if not properly planned. One of the methods in the application of knowledge management is a method of 10 steps roadmap Amrit Tiwana . This method will guide the design and implementation of knowledge management system illustrated in Figure 1. In this method presented in four main phases consisting of 10 steps, namely

1. Evaluation phase infrastructure
2. Analysis Phase, design and development
3. Development Phase
4. Phase Evaluation

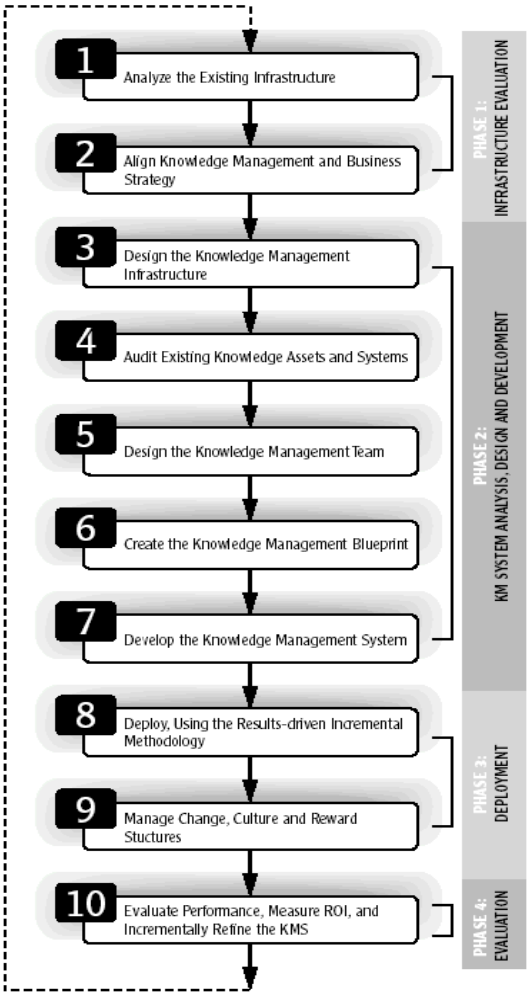


Figure 1. 10 *steps roadmap* Amrit Tiwana

2.3. Nursing Services

The nursing care is a form of professional services are an integral part of health care that is based on nursing science and troubleshooting. Forms of nursing services performed by organizing nursing practice in the form of nursing care.

Stages to implement the Nursing Care consists of the assessment, diagnosis, planning, implementation and evaluation of each stage documented in nursing care.

Implementation of Nursing itself is based on nursing science development priorities, namely :

1. The basic nursing science as the foundation of professional nursing services
2. Child Nursing
3. Nursing maternity
4. Medical - Surgical Nursing
5. Emergency Nursing
6. Nursing soul
7. Nursing community and family
8. Nursing gerontik

2.4. Text Mining

Text mining according to Feldman, R and Sanger, J. in his book [9] states that text mining is a knowledge-intensive process in which users interact and work with a collection of documents by using several analytical tools.

In text mining, there are several stages as follows :

a. Preposessing, the process of changing all the letters in the document to lowercase (lowercase). In this case also the characters other than letters omitted.
b. Tokenazion, the process of separating a row of words in sentences, paragraphs or pages into a single token or word chunks.
c. Stopword Removal, advanced process of tokenisasi to eliminate irrelevant words on the results of parsing a text document by comparing it with existing stopword .
d. Stemming, the search process forms the basis of a sentence by removing affixs .
e. Weighting, the process of calculating the term frequency in the document to see the connectedness between words in a document.

2.5. Algorithm TF/IDF

Algorithm TF/IDF is an algorithm based on the statistical value show occurrences of a word in the document. TF (Term Frequency) denote the number of a word appears in a document, while the DF (Document Frequency) stating the number of documents that contain these words in one segment of the publication. In the book Fieldman & Sanger [9] describes the TF-IDF is the weight value of a word taken from the value of TF and DF inverse value, which is defined by :

$$IDF(w) = \log\left(\frac{N}{DF(w)}\right)$$

$$TF - IDF(w, d) = TF(w, d)\, x\, IDF(w)$$

2.6. Algorithm VSM (*Vector Space Model*)

VSM algorithm created based on the premise that the content of the document is determined by the words used in the document. This model determines similarity (similarity) between the document by the query in a way to represent documents and queries are each in the form of a vector.

The similarity between the text document is defined based on the representation of bag-of-words and converted to a vector space model (vector space model, VSM). This model was introduced by Salton and has been used widely. At VSM every document in the database and query the user is represented by a multi-dimensional vector. Dimensions according to the number of terms in the database. In this model: [21]

- Vocabulary is a collection of all the different terms remaining after preprocessing of documents in the database, and contains t index terms. The terms "orthogonal" form a vector space.
- Every term i, in a document or query j, is given a weight (weight) is real wij.
- Documents and queries are expressed as vectors t dimension dj = (w1, w2, ..., WTJ). Considered there are n documents in the database, namely j = 1, 2, ..., n.

To measure the similarity of the text with the most famous VSM algorithm using cosine similarity, which calculates the cosine angle between two vectors. Given a vector that represents the document (dj) and query (q), and the term (t) is extracted from the database, the cosine between dj and q are defined as: [21]

$$Similarity(d_j, q_k) = \frac{\sum_{i=1}^{n}(td_{ij}\, X\, tq_{ik})}{\sqrt{\sum_{i=1}^{n} td_{ij}^{2}\, X\, \sum_{i=1}^{n} tq_{ik}^{2}}}$$

3. CONTENTS RESEARCH

3.1. Analysis Of The Problem

Based on the results of interviews have been conducted with Mrs. Oom Umriah, S.Kep.Ners as the Head of Nursing Services Section in the Division of Nursing Hospital Al-Ihsan Bandung stated that today in improving the quality of service to accommodate nursing knowledge for nursing care to the patient still has obstacles like :

1. Implementation of nursing care implemented yet can manage in this store and disseminate knowledge on documentation by nurses arranged , resulting in loss of that knowledge which leads to the difficulties in finding a solution other nurses problem of implementation of previous nursing care .
2. The process of dissemination of knowledge (knowledge transfer) is only done once a month to make the knowledge is not spread directly to nurses, thus making the inequality of knowledge among nurses

.

3.2. Application 10 *steps roadmap* Amrit Tiwana

Appropriate method of 10 steps KM road map of Amrit Tiwana adjusted to a study, which used was a Phase 1 to Phase 3 (phase 1 to 8) in Figure 2 , performed data processing along with the analysis of the data collected to draft first knowledge management system (KM) in the field of Nursing Hospital Al - Ihsan . The data obtained is taken of the elements involved in the process of nursing to

patient care in hospitals Nursing Sector Al - Ihsan Bandung.

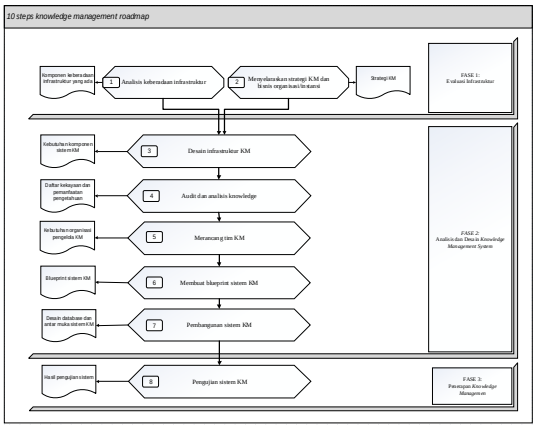


Figure 2. Research Methodology

3.2.1. Evaluation Infrastructure

The first phase an activity to determine the understanding of the components that build strategy and information technology framework that will be used in knowledge management sytem. Infrastructure evaluation is done by identifying the available infrastructure, namely the identification of users, software and hardware, as well as the network of Al-Ihsan Hospital, especially in the field of nursing. The results of this phase is used to design a knowledge management system that will be built in the Field of Nursing.

Table 1. TI Infrastructure of Bidang Keperawatan RSUD Al-Ihsan

No	Name Infrastucture TI	Ket
1.	*Local area network*	54 Mbps
2.	*Intranet*	Limited
3.	*Internet*	Limited
4.	Windows 7	
5.	Microsoft Office	
6.	7 PC *destop* in Nurse Division	
7.	15 PC *desktop*	
8.	1 PC Server	
9.	7 *printer*	Bidper Office
10.	3 phone line in Nurse Division	
11.	1 phone line in Work Unit	
12.	1 *Acces Point*	Wifi Office
13.	2 *Router*	

3.2.2. Align KM and Business Strategy

The second stage in phase 1, which do penyelarasakan business strategy and KM systems. Align intended to identify the organization's business strategy with the KM system, so the system will be built in accordance with the organization's business strategy to be achieved. Business strategies that can be taken by the Division of Nursing can be seen in Table 2 as follows:

Table 2. Matriks SWOT

	***Strengths (S)*:**	***Weakness (W)*:**
IFAS	1. A system of nursing developme nt in the form of training and continuing education 2. An application of the modular FGM each work unit 3. The existence of co-ordination of activities to improve the professiona l relationshif to facilitate services such as monthly meetings and discussions of cases for nurses 4. The nursing workforce is already memenuhui terms of FGM is their S - 1 Nursing totaling 13 people 5. Availability of supporting administrati on (injection books , SAK , SOP , PROTAP , etc.) are	1. There are many new nurses in the implementa tion of FGM every unit that has not attended training 2. The workload of nurses is quite high due to the hospitals of Al - Ihsan is one governmen t referral hospital 3. There are maximally utilized means of documentin g nursing for patients 4. Monitoring of the systematic documentat ion has not been implemente d
EFAS		

	adequate	
Opportunities (O): 1. The existence of a training program / seminar conducted by the Training section 2. The co-operation with the hospital nursing schools for nursing practice process or the distribution of nursing personnel 3. The existence of nurses opportunities to improve education to a higher level 4. There are programs to the provision of facilities and infrastructure needed	**Strategy (SO):** 1. Running training programs according to the needs of nurses 2.Maintaining cooperation with the school which has cooperated 3. Providing free continuing education program for nurses	**Strategy (WO):** 1. Running training programs according to the needs of nurses 2. Adding to the nursing staff of the nursing schools that perform tasks practice 3. Maximizing the utilization of documentation for internal purposes and patients 4. To supervise the systematic documentation of nursing
Threats (T): 1. The existence of a private hospital that has a full service unit 2. The level of public awareness of the quality of service is getting better 3. Limited quota nursing staff continuing education each year	**Strategy (ST):** 1. Improving the quality of services so that people prefer to take medication in public hospitals 2. Involve nurses in training / seminar specifically to increase knowledge of nurses	**Strategy (WT):** 1. Cultivate nurses to increase their knowledge with training and documenting knowledge so as to encourage the implementation of good service 2. Utilizing the existing facilities and infrastructure in hospitals in the development of nursing services either by using information technology 3. Documenting each nursing care activities for knowledge sharing in the discussion of cases or problems that arise for new nurses

3.2.3. Design the KM Infrastructure

To increase knowledge of the human resources field of Nursing, the information technology holds a strategic role as a supporter or facilitator in implementing knowledge management processes. Based on analysis of the existing infrastructure, in developing a KM system will be done using the website so that the system can be accessed by users without limitation of time and space. Inside there is a process which is the creation of knowledge management (create), presentation (capture), placement (refine), storage (store), setting (manage) and dissemination (sharing). To support the process running on the Field of Nursing conducted embodiment SECI activity in the model with the consideration of the proposed organizational strategy, as follows :

a. Socialization

The socialization process among nurses in hospitals Al-Ihsan is one done through face to face meetings (meetings, operands and case discussions). Through these activities, the nurse can share its knowledge and experience, so as to create new knowledge for them. In the KMS will be developed, collaboration features such as electronic discussion need to be applied, thereby enabling the socialization process can run as well as to support organizational strategies that exploit knowledge assets therein.

b. Externalization

Utilization of knowledge assets can be done also with the externalization process, so that the KM system to be developed must support the process eksternaliasasi knowledge. Hospital nursing field Al-Ihsan in serving patients, nurses in each work unit is required to document the results of nursing care were implemented. The document used one of them to the patient's medical record as well as a form of responsibility of the nursing profession. In the document there is knowledge that can be used again by the Nursing Division. To that end, the KM system can provide organized storage media documents in a repository so it's easy to be rediscovered by the user.

c. Combination

The conversion process that combines knowledge through a combination of a variety of explicit knowledge that can be rearranged into different knowledge. Functions such as categorizing

information and search functions can be used as a medium that is very helpful in the process of combination in the field of Nursing.

d. Internalization

All document data, information and knowledge that has been documented to be read. This process supports the understanding of the nurse's knowledge about the knowledge shared in the system. To that end, the KM system to be developed must have a media that can help nurses in reading knowledge stored.

After determining the design of technology to be used at this stage is also conducted to determine the type of infrastructure needs and equipment required for the implementation of KM system, analysis of previous infrastructure can be taken into consideration so that the utilization of existing technologies could be relevant to the needs of the system. After getting the results of the analysis to the knowledge management system in the preceding stage, the following described some of the need to support the KM system. Users in the system consists of a Head of Division, Head of Nursing Services Section, head of the room, and the nurse executive as well as Administrator of Section EDP hospitals. The networks used to use the existing network design but adapted to the needs of the system, as follows :

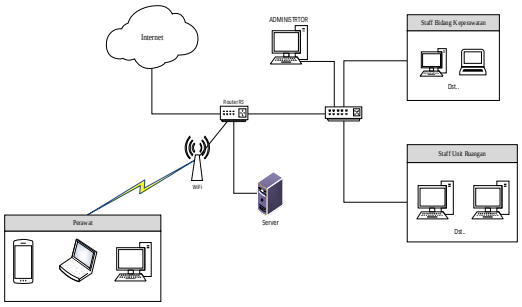


Figure 3. KM System Network

3.2.4. Audit Knowledge Asset and System

At this stage of the audit and analysis of this data analysis knowledge management knowledge in nursing care for patients and search analytics solutions by nurses of the document corresponding to the problems faced during the nursing process as an effort to use the knowledge in the field of Nursing . Based on the research that has been done , the knowledge developed in the nursing field can be illustrated in Figure 4 taxonomy knowledge. Utilization of knowledge by using methods of text mining algorithms using TF / IDF and VSM algorithm to seek adjustment of the existing problems with document nursing care as a base of knowledge in this KM system .



Figure 4. *Taxonomy Knowledge* of Nursing Services RSUD Al-Ihsan

The process of utilization of such knowledge to use text mining phase results can be seen in Table 3 as follows :

Table 3. Analisys Algorithm TF/IDF

Based on the weighting word $W_i = tf_i * IDF_i$

***Keyword* (Q)** "Luka patah kaki dengan trauma. Diagnosa dan intervensi jika pasien merasa tidak dapat menggerakan kakinya"

D1 : "Dokter dapat mendiagnosis patah tulang dengan sinar-x. Mereka juga dapat menggunakan CT scan (tomografi komputer) scan dan MRI (resonansi magnetik imaging). Patah tulang sembuh sendiri. tujuan pengobatan adalah untuk memastikan potongan-potongan tulang merupakan berbaris dengan benar. Tulang perlu pulih sepenuhnya dalam kekuatan, gerakan dan sensitivitas. Intervensi yang perlu dilakukan tergantung di mana fraktur dan seberapa parah, pengobatan dapat mencakup:
- Penyangga – untuk menghentikan gerakan ekstremitas yang rusak
- Kawat gigi – untuk mendukung tulang
- Gips – untuk memberikan dukungan dan mengimobilisasi tulang
- Traksi – pilihan yang kurang umum
- Batang logam dimasukkan secara operasi atau pelat – untuk memegang potongan tulang bersama-sama
- Menghilangkan rasa sakit."

D2 : "Suatu patah tulang atau fraktur tulang terjadi ketika kekuatan yang diberikan terhadap tulang lebih kuat dari tulang dapat menanggung. Ini mengganggu struktur dan kekuatan tulang, dan menyebabkan rasa

sakit, hilangnya fungsi dan kadang-kadang pendarahan dan cedera di sekitar lokasi."

Setalah dilakukan preprosessing pada *keyword* dan dokumen-dokumen diatas, maka dihasilkan token-token yang akan dihitung pembobotannya sebagai berikut:

D=2; IDF= log (D/df$_i$)

Term	tf$_i$ yang terhitung			**df$_i$**	**D/df$_i$**	**IDF$_i$**	Bobot W$_i$=tf$_i$ * IDF$_i$		
	Q	**D1**	**D2**				**Q**	**D1**	**D2**
Luka	1	0	0	1	2	0.301	0.301	0	0
Patah	1	2	1	2	1	0	0	0	0
Kaki	2	0	0	1	2	0.301	0.602	0	0
Trauma	1	0	0	1	2	0.301	0.301	0	0
Diagnosa	1	1	0	1	2	0.301	0.301	0.301	0
Intervensi	1	1	0	1	2	0.301	0.301	0.301	0
Pasien	1	1	1	2	1	0	0	0	0
Dokter	0	1	0	1	2	0.301	0	0.301	0
Tulang	1	7	5	2	1	0	0	0	0
Sinar x	0	1	0	1	2	0.301	0	0.301	0
CT Scan	0	1	0	1	2	0.301	0	0.301	0
Tomografi	0	1	0	1	2	0.301	0	0.301	0
Komputer	0	1	0	1	2	0.301	0	0.301	0
Scan	0	1	0	1	2	0.301	0	0.301	0
MRI	0	1	0	1	2	0.301	0	0.301	0
Resonansi	0	1	0	1	2	0.301	0	0.301	0
Magnetik	0	1	0	1	2	0.301	0	0.301	0
Imaging	0	1	0	1	2	0.301	0	0.301	0
Sembuh	0	1	0	1	2	0.301	0	0.301	0
Tujuan	0	1	0	1	2	0.301	0	0.301	0
Obat	0	2	0	1	2	0.301	0	0.602	0
Potong	0	3	0	1	2	0.301	0	0.903	0
Baris	0	1	0	1	2	0.301	0	0.301	0
Pulih	0	1	0	1	2	0.301	0	0.301	0
Kuat	0	1	3	2	1	0	0	0	0
Gerak	1	2	0	1	2	0.301	0.301	0.602	0
Sensitivitas	0	1	0	1	2	0.301	0	0.301	0
Fraktur	0	1	1	2	1	0	0	0	0
Parah	0	1	0	1	2	0.301	0	0.301	0
Cakup	0	1	0	1	2	0.301	0	0.301	0
Sangga	0	1	0	1	2	0.301	0	0.301	0
Henti	0	1	0	1	2	0.301	0	0.301	0
Ekstremitas	0	1	0	1	2	0.301	0	0.301	0
Rusak	0	1	0	1	2	0.301	0	0.301	0
Kawat	0	1	0	1	2	0.301	0	0.301	0
Gigi	0	1	0	1	2	0.301	0	0.301	0
Dukung	0	2	0	1	2	0.301	0	0.602	0
Gips	0	1	0	1	2	0.301	0	0.301	0
Mobilisasi	0	1	0	1	2	0.301	0	0.301	0
Traksi	0	1	0	1	2	0.301	0	0.301	0
Batang	0	1	0	1	2	0.301	0	0.301	0
Logam	0	1	0	1	2	0.301	0	0.301	0
Operasi	0	1	0	1	2	0.301	0	0.301	0
Pelat	0	1	0	1	2	0.301	0	0.301	0
Pegang	0	1	0	1	2	0.301	0	0.301	0
Hilang	0	1	0	1	2	0.301	0	0.301	0
Rasa	0	1	1	2	1	0	0	0	0
Sakit	0	1	1	2	1	0	0	0	0
Struktur	0	0	1	1	2	0.301	0	0	0.301
Sebab	0	0	1	1	2	0.301	0	0	0.301
Fungsi	0	0	1	1	2	0.301	0	0	0.301
Darah	0	0	1	1	2	0.301	0	0	0.301
Cedera	0	0	1	1	2	0.301	0	0	0.301
Lokasi	0	0	1	1	2	0.301	0	0	0.301

Based on Table 3 above, then using the formula cosine similarity in the results obtained VSM algorithm suitability of the following documents:

a. The similarity (Cosine D1 (document 1)) Similarity (D1 , q) = 0,362 / (0,903 * 0,222) = 0,362 / 0.2 = 0.0724
b. The similarity (Cosine D2 (document 2)) Similarity (D2 , q) = 0 / (0903 * 0) = 0
c.

Table 4. Analisys Document Similarity

Rank	Similarity	Document
1	0.0724	D1
2	0	D2

3.2.5. Design the KM Team

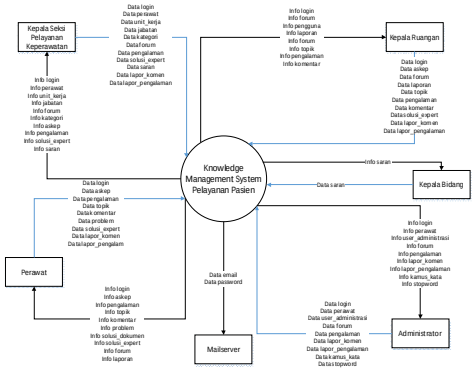
Pengelolaan Knowledge management is very different from other asset management organization. In the management of intellectual assets, various characteristics for managers should be met in terms of both structurally and in terms of the characteristics of individuals who occupy strktur-existing structure.

In the current study, the KM team will be formed consisting of three positions. From the observation and analysis conducted and discussions carried out by the Division of Nursing, the KM team can be determined as follows:

1. Head of Nursing Services Section as Chief Knowledge Officer (CKO), in charge of:
a. Ensuring the availability of knowledge management strategies and policies and monitor the effectiveness of its implementation.
b. Ensure the creation of knowledge and forums.
c. Ensuring system availability requirements.
2. Head room as Senior Operation Officer KM, charge:
a. Adjusting the creation of knowledge in the system.
b. Creating a forum for users.
c. Ensuring the availability of the proposed forum.
d. Ensure proper functioning of knowledge sharing in the portal.
e. Proposes granting rewards to contributors.
3. The clerk EDP as Senior Officer of KM System Development, in charge of:
a. Develop alternatives electoral systems and knowledge management models.
b. Develop a systemic knowledge management architecture.
c. KM system has to manage, both in terms of content and the users of the system.
d. Ensure the system can work well for users.
KM team was formed, given the duty and responsibility to ensure the system. While other nurses were given emphasis to support and provide knowledge (sharing) to the team. Besides, the team also needed a consultant, in this case the Head of Nursing.

3.2.6. Create the KM Blueprint

Design blueprints KMS in the Field of Nursing to find out how this framework KM system saves the existing knowledge in the field of nursing , including how the KM system provides access for users and what KM processes that will run. It is intended to determine generally the running KMS in the Field of Nursing. The design is based on the design of a KM system that has been described previously using SECI models. From the data processing and analysis has been performed on the stage of the methodology KM previously can be described the creation of a blueprint for a KM system in the field of Nursing in managing knowledge about nursing care to patients by using modeling Diagram Context, Data Flow Diagrams, Process Specification and Data Dictionary for describes the process flow and data flow in a KM system to be built. The following diagram Context KM system to be built



Fidure 5. Context Diagram

For DFD Level 1 can be seen in Figure 5 as follows :

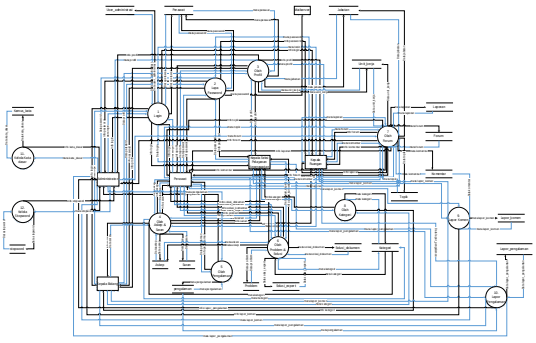


Figure 6. DFD Level 1

3.2.7. Develop the KM System

At this stage of development of the KM system includes the database design process , the design of the menu structure , interface design , message design , network design semantic and procedural design . Database design can be seen in Figure 7. Relation Scheme as follows :

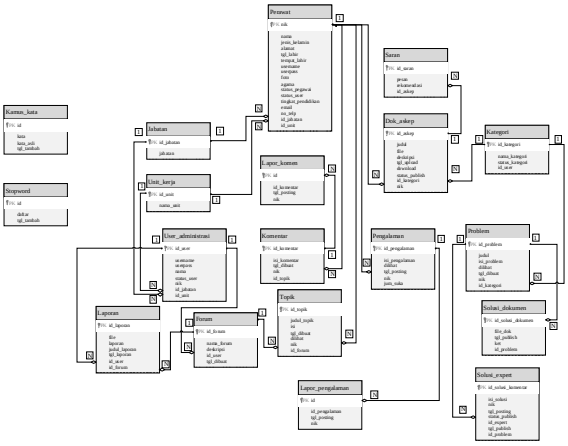


Figure 7. Relationship Schema

The design of the interface is made to describe the display rogram that will be used by the user to interact with the system to be built. The design is based on the interface display both input and output that will be generated when the application is implemented . Here is a sample login interface design that can be seen in Figure 8

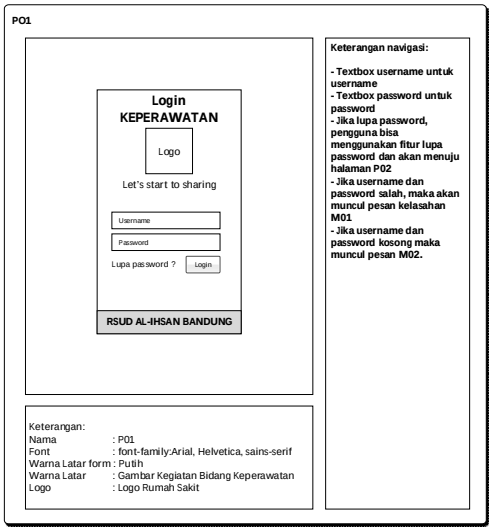


Figure 8. Login the KM system

3.2.8. Testing the KM System

Testing of the system is the cornerstone that aims to find errors or deficiencies in the KM system tested . The test intends to determine a KM system is prepared to comply with the performance in accordance with the design objectives.

Tests are used to test the new system is a black box testing methods. Black box testing focused on testing the functional requirements of information systems.

Test plan will do is to test the system built by Black Box and beta. Testing system construction KM in Nursing Field test data based on data provided from some of the data that has been given.

3.2.8.1. Black Box Testing

Black box testing focuses on functional requirements of software built. Testing is done by testing each process for possible mistakes. Based on test results with sample test cases that have been done to the conclusion that the process is correct. Filtering process in the form of referrals error message page is enough to see the maximum. Functional system can already produce the expected output.

3.2.8.2. Beta Testing

Beta testing is a test that is directly actual environment. Users make an assessment of the software using interviews and questionnaires. From interviews and questionnaires, it can be concluded whether the software has been built in accordance with the purpose or not.

Interviews conducted for the users of the system consisting of the Head of Nursing Services Section and Head of the room. While the questionnaire was conducted against the nurse, who was represented by 30 nurses. This research was conducted in the Field of Nursing Hospital Al-Ihsan Bandung in order to determine the extent to which the system is built to be a solution and settlement of issues that have been described previously.

Based on the results of beta testing, it can be concluded that the KMS provides convenience in the management of nursing knowledge for nursing care in hospitals Al-Ihsan Bandung. Lack of access to nurses in discussion forums directly give effect to the dissemination of knowledge equally for every nurse and the knowledge stored in the information system helps users find a solution on the basis of knowledge of nursing nursing stored.

4. CLOSING

4.1. Conclusion

Based on the description of the discussion of the analysis and testing that has been done, it can be a conclusion to the Knowledge Management System For Nursing Care Nursing In The Field Hospital Al - Ihsan Bandung is as follows :

1. Application of this knowledge management system has been quite helpful in spreading

knowledge for nursing care in hospitals Nursing Sector Al - Ihsan Bandung for the Head of Services Section , assisted by the head of the room.
2. The application of this knowledge management system has been able to assist nurses in making , storing and updating documentation outcomes of nursing care as well as in finding solutions to the nursing of nursing care documentation stored.
3. Application of this knowledge management system facilitate the dissemination of knowledge in the field of nursing by hosting a discussion forum that fits the needs of nurses in each unit each work in the Field of Nursing Hospital Al – Ihsan.

4.2. Suggestion

Based on the conclusions that have been described above, it is expected in the future for the development of knowledge management system is
1. Application of knowledge management system for nursing services can be developed more broadly and properly managed so that more helpful in improving health services, especially in nursing services to patients in the nursing field.
2. The addition of user data would be better if their special systems such as human resources information systems to manage employee data so that users can be selected directly from the system.
3. Knowledge management system can cover all parts of the organizational unit in the hospital not only for the nursing field, so that knowledge in a hospital can be managed comprehensively.
4. The use of algorithms for finding the best solution is still producing results that are less than expected, resulting in the development of other algorithms can then be used or can be added as a method to maximize the weaknesses in this study is the addition of a search category.

BIBLIOGRAPHY

[1] Prof. Dr. Sugiono. (2013). "Metode Penelitian Kuantitatif, Kualitatif, Dan Kombinasi (*Mixed Methods*)". Edisi Keempat. Bandung: ALFABETA.
[2] Prof. Dr. Jogiyanto. (2005). "Analisis & Desain Sistem Informasi: Pendekatan Terstruktur Teori dan Praktik Aplikasi Bisnis". Edisi Ketiga. Yogyakarta: ANDI OFFSET.
[3] Von Krogh, George, Kazuo ichiyo, Ikujiro Nonaka. (2000). "*Enabling Knowledge Creation*". New York: Oxford University Press.
[4] Hidajat, Jann., Rachman, Haitan., Kristinawati, Didin. (2013). "Personal Knowledge Management". Bandung: ITB.
[5] Nawawi, Ismail. (2012). "Manajemen Pengetahuan (*Knowledge Management*) Teori dan Aplikasi dalam mewujudkan Daya Saing Organisasi Bisnis dan Publik". Bogor: Ghalia Indonesia.
[6] Maier, Ronald. (2007). "*Knowledge Management Systems Information and Communication Technologies for Knowledge Management*". Edisi Ketiga. Germany: Springer Publisher.
[7] Tobing, Paul L. (2007). "Knowledge Management: Konsep, Arsitektur dan Implementasi'. Edisi Pertama. Yogyakarta: Graha Ilmu.
[8] Dinarti, SKp, dkk. (2013). "Dokumentasi Keperawatan". Cetakan Kedua. Jakarta: CV.Trans Info Media.
[9] Fieldman, R. & Sanger, J. (2007). "*The Text Mining Handbook*". New York: Cambridge University Press.
[10] Kadir, Abdul. (2003). "Pemrograman WEB Mencakup: HTML, CSS, JavaScript & PHP". Edisi Pertama. Yogyakarta: Andi.
[11] Tiwana, Amrit. (1999). "*The knowledge management toolkit*". First Edition. Prentice Hall PTR
[12] Potter, Patricia A & Anne Griffin Perry. (1997). "*Fundamentals Of Nursing: Concepts, Process, and Practice*". Fourth Edition. Diterjemahkan oleh Asih, Yasmin, S.Kp dkk. Jakarta: EGC
[13] Rangkuti, Freddy. (1997). "Analisis SWOT: Teknik Membedah Kasus Bisnis". Cetakan keduapuluh. Jakarta: PT.Gramedia Pustaka Utama
[14] Nursalam. (2015). "Manajemen Keperawatan: Aplikasi dalam Praktik Keperawatan Profesional". Edisi Kelima. Jakarta: Salemba Medika
[15] Wilkinson, Judith M. dan Nancy R. Ahern. (2009). "*Prentice Hall Nursing Diagnosis Handbook*". Nineth Edition. Diterjemahkan oleh Esty Wahyuningsing, S.Kep. Jakarta: EGC
[16] Agusta, L. (2009) "Perbandingan Algoritma *Stemming* Porter dengan Algoritma Nazief & Adriani untuk *Stemming* Dokumen Teks Bahasa Indonesia". Konferensi Nasional Sistem dan Informatika 2009. Vol. 09 No. 036. Bali, 14 November 2009.
[17] Tala, F. Z. (2003). "*A Study of Stemming Effects on Information Retrieval in Bahasa Indonesia*". M.S. thesis. M.Sc. Thesis. Master of Logic Project. Institute for Logic, Language and Computation. Universiteti van Amsterdam The Netherlands.
[18] Raharjo, Budi. (2015). "Belajar Otodidak MySQL (Teknik Pembuatan dan Pengelolaan Database". Bandung: Informatika Bandung.

[19] Han, J & Kamber, M. (2001). "*Data Mining: Concepts and Techniques*". San Francisco: Morgan Kaufmann.

[20] Bunyamin, Hendra., Puspa N, Chathalea. (2008). "Aplikasi Information Retrieval (IR) CATA Dengan Metode *Generalized Vector Space Model*". Jurnal Informatika. Teknik Informatika Universitas Kristen Maranatha. Vol. 4 No. 1, Juni 2008, 29-38.

[21] Christopher, M., Raghavan, P., Shcutze, H. (2009). *"An Introduction to Information Retrieval*". England: Cambrigde University Press.

[22] Wisnu, Dwija B., Hetami, Anandini. (2015). "Perancangan Information Retrieval (IR) Untuk Pencarian Ide Pokok Teks Artikel Berbahasa Inggris Dengan Pembobotan Vector Space Model". Jurnal Ilmiah Teknologi dan Informasi ASIA. STMIK ASIA Malang. Vol. 9 No 1, Februari 2015.