

Development Model for Knowledge Management System (KMS) to Improve University's Performance (Case Studies in Indonesia University of Education)

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Abstract

Knowledge Management System (KMS) is one way to organize and documented the knowledge of institution. The purpose of this study is to develop a prototype KMS in organizing and documenting the knowledge in the university and to do a document aggregation based on the total number, subjects and writers (lecturers). The development method of KMS prototype is using sharepoints which are able to collect, store and publish all digital data available at the university which can be accessed online. Aggregation is using the percentage between the number of documents, subjects, and writers (lecturers). The aggregation's result between the number of digital files compared to the number of courses and the number of lecturers are each below 10%. In the future, the university still needs to encourage all lecturers or academic community to increase the collection of digital files that can indirectly improve the quality and educational services.

Keywords: Knowledge Management System (KMS, knowledge based, competitive advantage, resources based, digital files, online.

1. Introduction

The advance development of technology and science changes the paradigm of the university which initially relies on resources based into knowledge based, so the knowledge exists in university should be managed into an asset of the university. Problem arose in the university is the number of knowledge of individuals are not documented and well organized, and even the university itself does not realize that the individuals have knowledge that can enhance competitive advantage. Management of Science-based system is known by the term Knowledge Management System (KMS). In general, the implementation of KMS aims to increase the competitive

advantage of university and can be one factor to improve the performance of the university.

The impact of the implementation of KMS can cause changes into university, therefore before applying KMS, it is necessary to do some series of activities first aimed to assess the readiness of the university and do an inventory of knowledge so that university know the knowledge had by individuals. In general, some universities are implementing KMS which focused more on the development of KM system (which emphasizes on information technology) only without noticing aspects to human-related such as socio-cultural factors and leadership. This is emphasized by Karl Wiig that the understanding and implementation of KMS should focus more on human beings (people-focused) since knowledge and empowerment are closely related to humans [4].

The success and the failure of the implementation of KMS in a university depends on organizational culture formation process generated by social interaction, effective communication and mutual trust among individuals within the university; in other words, a desire from individuals within the university to share knowledge. According to Charles T. Townley, KMS most effectively applied to learning management. Learning management is the management which is able to create, add and forward the knowledge or information and modify itself to reflect knowledge and new insights [9].

From the explanation above, it can be concluded that the application of KMS in a university that has a category of public service has to pay attention and make a socio-cultural factors into factors that influence the success of KMS. The differences of socio-cultural factors in each university create a unique planning and implementation of KMS. For example, the implementation of KMS for the public and private sector has little differences. David E. Mc.Nabb mentioned that this is due to the management between the two sectors are different [5].

David E. McNabb also described the characteristics of the public sector, which are (i) having limitations in the selection procedure, (ii) conducting activities within the mandate of the organization supported by political organizations, (iii) dealing with external controls in more and more specific actions, (iv) dealing with external influences on what and how they do things, (v) requiring the approval of many and diverse stakeholders, (vi) having variety goals which sometimes contradictory, (vii) having limited autonomy and control in decision making and human resources, (viii) having a limitation in increasing the incentives for staff, and (ix) being known and exposed for the mistakes made by either large or small faults to the public [5].

The implementation of KMS on the college level in Indonesia tends to be seen from technology aspects. Yet according to Ahza, the implementation of KMS is not only the completion of the KMS but also the role of the human involved in the organization. According to Sirajuddin bin Suhaimie et al, based on the study in 2005 the implementation of KMS in the Public Institution of Higher Education (PIHE) in Malaysia was still in the Intermediate level, and recorded only 47.1%; which also means only eight universities that have implemented or started to implement KMS. It is likewise in Thailand, the implementation of KM in higher education institutions has not been going well. This is because the paradigm of "Knowledge is Power" is still regarded as one of the factors that make individuals feel "safe" in the university [7].

Indonesia University of Education is a public university that is in the state of going into BHMN and soon became the Public Service Board. It allows KMS since the process of academic independence is continued still. By implementing KMS, UPI is expected to increase competitive advantage and to improve the performance of the university. The implementation should be prepared based on demands. Yet, UPI should first do the supported activities so that the prepared planning is in accordance with the conditions of organization and the applied strategy of KMS which can facilitate knowledge transfer within the University. The development of KMS is very wide and complex and yet the development of KMS in this study is focused on data gathering in the form of digital files that can be accessed online and aggregates are made based on the number of courses and lecturers in UPI.

2. Research Questions

The research conducted is designed to answer the following questions:

1. How is the model of knowledge management system (KMS) being applied in improving the performance of Indonesia University of Education?
2. How far is the achievement of the implementation of knowledge management system (KMS) in improving the performance of Indonesia University of Education?

3. Aim of The Research

This research includes two major areas, namely developing a prototype of Knowledge Management System (KMS) at the university and studying towards the achievement of Knowledge Management System (KMS) to improve the performance of the university.

4. Theoretical Foundation

Knowledge Management System (KMS) is a computerized system of Knowledge Management (KM), especially which connected to data, information and knowledge. Nilmini Wickramasinghe & Dag von Lubitz (2006) stated that the importance of understanding the basic concepts of KM has a relevance to the KM initiative. According to Awad & Ghaziri, data is a collection of facts about a discretely event that has not been organized and processed; while information is a set of data that has been processed to facilitate in making decision; whereas knowledge is a human understanding of the certain areas that have been learned through education and experiences [1].

The term of KM was first introduced in 1986 in the European management conference (American Productivity and Quality Center, 1996). The concept of KM then expanded rapidly and attracted the attention of many parties, and also reaped a lot of criticism [3]. Nilmini Wickramasinghe & Dag Von Lubitz explained that the activity of knowledge centered on individual psychology processes such as experience, perception and emotion. In organizations there are four main activities of knowledge, which are (1) knowledge acquisition, which refers to the internalization of information, (2) knowledge creation, which are related to the creation of new knowledge (3) knowledge distribution, which is the phase distribution of knowledge within the organization, and (4) knowledge application, which refers to the use of knowledge in the practical [6].

The same thing was suggested by Awad & Ghaziri (2003), which stated that within the knowledge life cycle, there are several processes undertaken by the organization. Phases of the KM life cycle process can be divided into creation, capturing, organizing, refining, and transfers. The phase of creating is a new phase of knowledge creation from both a research as well as the phenomenon of certain events. The phase of capturing is the phase of collecting and

comprehending knowledge which is documented or not. The next phase is the phase of organizing, which is the phase of organizing knowledge so that can be searched easily and reused by individuals within the organization. Method of organizing knowledge can be done with indexing, clustering, cataloging, filtering, codifying, ontology, etc. The phase of refining is an activity in which the organized knowledge is refined for example by mining. The final phase is the phase of transferring/ disseminating, which is a phase that exchanges the knowledge which either can be procedure, tutorial or guide.

Knowledge organization is a place where individuals exchange knowledge of various functional areas within an organization by using technology and determined processes. The next step of Knowledge then is internalized and adopted into organizational culture. By referring to Grover & Davenport, Gottschalk stated that generally categorization of knowledge is divided into two which are explicit and tacit knowledge. The explicit knowledge can be in the form of words, numbers, data forms, scientific formulas, specifications, manuals, etc. [2]. This type of knowledge can be categorized as knowledge which can directly share with others in a systematic or formal way. Tacit knowledge is the opposite of explicit knowledge, which has a very personal nature and difficult to be formalized, so that will be more difficult to communicate with each other. Tacit knowledge is stored in the human mind and hard to be defined as it is relating to experiences, activities, and the value experienced by individuals. The same opinion stated by Tiwana who mentioned that knowledge category can be classified into two categories: tacit and explicit [8].

In the environment of university/higher education, there are two categories of knowledge namely the Academic Knowledge and Organizational Knowledge. The Academic Knowledge is the main aim for higher education, while the Organizational Knowledge includes knowledge which refers to the whole business process of the institution of education in the term of lack or excellence. Huang explained that the Academic Knowledge Framework is suggested to go through four main processes to form a culture of knowledge sharing and collaboration, namely (1) making knowledge visible (2) increasing knowledge intensity (3) building knowledge infrastructure (4) developing knowledge culture.

Referring to Galboreath, from the perspective of academic knowledge, learning community must begin at the individual stages, building sections which manage knowledge in organizations, creating an interesting domain across departments, creating a knowledge network of organizations and networks with other organizations. Thus, in the context of academic knowledge, Galboreath emphasized three strategies that built ie the individual strategy, institutional strategy and network strategy. From

the above explanation, the collective knowledge built through sharing within the community, from individual through the team and the group into the sharing level of the organization. Individual strategies aimed at competence development of teachers into professional teachers. The role of KMS in this case is to develop the skills, the ability of teachers, and experiences through e-learning, and doing research. After the individual knowledge is captured, then the teams, groups and processes must be able to make the individual knowledge into organizational knowledge. After becoming an organizational knowledge, the role of KMS should increase at the level of inter-organization, namely the organizational strategy.

At the level of organizational strategy, knowledge sharing is expected to occur between organizations. This can be applied in various activities such as teacher's community, seminars, and culture sharings. It should be understood that at this stage, knowledge sharing is not limited to the organization only. The American Productivity and Quality Center (APQC) and Arthur Andersen, stated that in Organizational Knowledge Framework there are four aspects of the KM strategy namely culture, leadership, technology and measurement. Coukos-Semmel provides an example in the strategy of culture at the university, including staff development, training, community of practice, and development of organizational learning. KM strategy in leadership at the university includes KM strategic plan, in line with the vision and mission, employs a knowledgeable staff and assesses employer in his/her contribution to the knowledge. University is responsible for the provision of infrastructure and systems (intranet, webpages, electronic repositories, databases, etc.). Measurement strategy taken are comparisons with other universities in the field of KM, the allocation of resources, improvement of the knowledge base, connection and assessment of the impact of KM on the term of strategic plan.

5. Research Methode

This research is intended to improve the performance of Indonesia University of Education by using knowledge management system (KMS). The method used are Research and Development. The steps taken in the process of this research leads to a cycle based on the findings of research studies and then develop a product. Product development based on preliminary findings of this research was tested in a situation and made revisions to the test results until finally obtained a product. The product itself is knowledge management system (KMS) in improving the performance of Indonesia University of Education. The procedure of this study uses the techniques of research and development with the following steps: (i)

development of models, which are: preliminary study, planning, field testing and revision of the model. (ii) analysis of the KMS model impact on the performance of the university.

6. Research Findings

6.1 KMS Model of Indonesia University of Education

Based on the analysis needs, KMS should be able to fulfill the needs of KM process that has been running. Besides, KMS should be able to facilitate various components of knowledge within the UPI. Therefore, the KMS was developed by considering the following matters:

- Content Management; the source content can be from the academic community or from outside community and digital libraries. The three sources needs to be managed, filtrated and stored in the database which can be gained from: External Source, Internal source, and Domain knowledge and information. Those sources of Content Management should be comprehended, filtrated and stored in the Knowledge Base (storage media). With a specific platform, this knowledge can be reused for the testing instrument.
- Experience Management; the organization members as knowledge worker should participate in knowledge management. This knowledge worker is the academic community of UPI whom needed as the source of KM along with the external knowledge sources that are expected to fill the KMS to be used in the process of sharing knowledge within the organization.
- Process Management; are the source of knowledge which can be gained from sharing results, access of the knowledge base and the sources from both internal and external which will be a cycle, and a best practice or a reference for users.

The three components above would be a contributor to the formation of knowledge management with the following cycle: (i) Knowledge Acquisition; knowledge within the academic community of UPI should be collected and categorized according to the specified category, (ii) Record Knowledge: Knowledge must be recorded and stored on storage media by using standard technology platforms and applications that are used in the organization, (iii) Knowledge Storage; new knowledge which has been digitalised will be stored on a centralized database system, (iv) Knowledge Sharing; is the process that allows the sharing of knowledge and valuable information stored on the system through the use of internet or intranet.

From the description of the needs, then KMS should be able to accommodate the needs of KM processes, namely: (i) The development of KMS should be qualified in accordance with the development platform of system information of UPI, (ii) KMS must have the features that can represent the process of KM namely the collection, recording, storage and sharing knowledge, (iii) KMS should be designed in such a way that users do not experience access confusions.

The developed KMS has features such as (i) web-based system so it can be accessed anywhere, (ii) user authentication, (iii) upload facility, (iv) an adjustment facility for the user, (v) connection with other document storage systems owned by UPI, (vi) and a searching facility.

The system architecture developed includes 7 layers which are the interface layer, access and authentication, collaborative intelligence and filtering, application, middleware, transport and repository, as can be seen in the Fig 1.

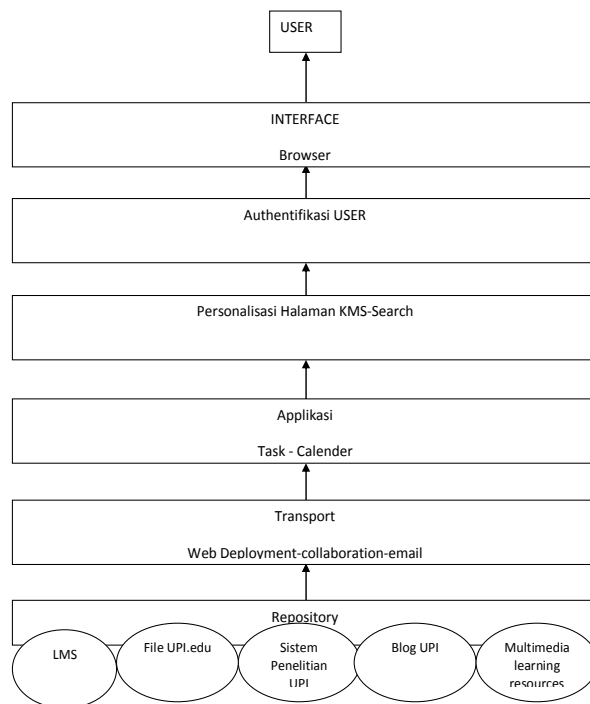


Fig. 1 The system architecture developed.

Descriptions:

Interface: This layer transfers information to and from the KMS. It is the layer that connects users who use the KMS. The interface of KMS UPI is using a web-browser. This is needed so the built system is in accordance with the policy of system development of UPI and can be integrated with other systems in UPI.

User Authentication: This layer authenticates the validity of user and access in the KMS. The security and restricted access is part of this layer. Authentication is done by using the username and password owned by the academic community to access internet.

Personalized page of KMS: The goal of personalized pages is the effectiveness of the user; it is meant to allow users more effective in accessing KMS and avoid overloaded information.

Application: the existed application in KMS means to accommodate the process of KMS.

Transport: this layer is based on the infrastructure of intranet which provides a basic functionality to synchronized and asynchronous communication, data sharing and document and as a tool to organize electric asset in general and specifically web content.

Repository: Repository is a place to storage and categorize knowledge data; those should be synchronized with KMS.

Based on the system architecture and features needed by KMS of UPI, the development of KMS is using Microsoft Sharepoint software. Microsoft SharePoint is one of the software released by Microsoft that has the facilities needed by the KMS such as: Knowledge Network, Search and Indexing, Content Management, Web content, Records Management, Document Management, and Collaboration. The selection of sharepoint is based on the share point architecture that allows developing the capabilities and services of SharePoint itself without disrupting the core of the platform, and in terms of scalability SharePoint has the capability to add applications that are needed without having to design and to develop from scratch. In addition, SharePoint is an application that is responsible for providing document repository services, document workflow services, intranet sites, search indexing, and collaboration service. The data storage in Microsoft SharePoint uses Microsoft SQL database server to provide data storage, retrieval, modification, and destruction.

6.2 Knowledge Achievement on The Implementaion of Knowledge Management System Model (KMS) in Improving The Perpformance of Indonesia University of Education

KMS has been running now and can be used by the academic community of UPI to share knowledge. The early stages of the implementation focused on gathering knowledges which are obtained from research results, articles or teaching materials. It is more clearly illustrated in the Table 1:

Table 1: Number of File Accessed by UPI Peoples in KMS

System	Number of File
Document storage system of KMS	2153
file.upi.edu	74162
System of research	2425
Learning management system	2020

All files have the character as the type of portable document file (pdf) of Microsoft Word, and other types of files. The files categorize based on the institution where the sources are, for example the Faculty of Science Education, the Faculty of Matematics and Science Education and so forth. The categorization is used to search files easily for general users and have not considering the prevailing taxonomy of knowledge.

7. Conclusions

The development of KMS is expected to be the starting point of inventoring the knowledge within UPI, so it is hoped that the knowledge of the academic community of UPI can be seen and used. The development was done by using a waterfall approach method and supported by Microsoft SharePoint software, which was considered to represent and have the characteristic of the required features. KMS of UPI can be accessed at <http://kms.upi.edu>, and have these features namely:

1. The web-based system development which can be accessed from anywhere
2. User authentication
3. Upload facility
4. Adjustment facility for user to make some adjustment according to their needs
5. Connected to other storage document system owned by UPI
6. Searching facility

KMS has been running now and can be used either, but the success of KMS is not only determined by technological factors. There are other factors that must be considered and prepared such as the factor of people and process. Both factors mentioned above in the study were not influenced factors. Further research is needed to make the factor of people and process in KM can be run as expected. The successful implementation of KM should be supported also by the leadership policy of the university so that the academic community has a desire and willingness to share knowledge, and given support through policy and reward for the academic community who share the knowledge. And for the results of data analysis on the number of digital files in the database of UPI compared to the number of courses and lecturers at UPI have not shown encouraging results; it is still below 10%.

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